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Subject: Summary of Protocol Surveys for Federally-Listed Vernal Pool Branchiopods Conducted on Newport Banning Ranch, City of Newport Beach and Unincorporated Orange County, California

Dear Ms. Medak:

The purpose of this letter is to provide a comprehensive summary of the federally-listed vernal pool branchiopods (fairy shrimp) protocol surveys conducted by Glenn Lukos Associates, Inc. (GLA) and Dudek on the Newport Banning Ranch Project site (Project Site). Over the course of several years, GLA conducted numerous focused wet-season and one dry-season survey for fairy shrimp within 49 of the 53 seasonal features that have inundated (i.e. ponded) to varying degrees during winter seasons after substantial rain fall. Wet-season surveys were conducted in 2000 and 2007 through 2012. A dry-season survey was conducted by GLA for a single feature in 2011. Lastly, Dudek conducted a final dry-season survey for 34 seasonal features in November and December of 2012, which also included cyst analysis, culturing, and identification.

All fairy shrimp surveys followed the procedures detailed in the U.S. Fish and Wildlife Service's (USFWS) *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* (USFWS 1996). The results of surveys for each year are detailed in the 90-day reports previously submitted to the USFWS for each of the subject survey seasons (GLA 2000, GLA 2008, GLA 2009, GLA 2010, GLA 2011a, GLA 2011b, GLA 2012), with the exception of the 90-Day Dry-Season Protocol Survey Report for Federally-Listed Vernal Pool Branchiopods on Newport Banning Ranch (Dudek 2013b) (*Appendix A*).

SITE LOCATION AND DESCRIPTION

The Project site covers approximately 401.07 acres and is located in the City of Newport Beach and unincorporated Orange County, California (*Appendix B: Figure 1*). The Project site is located north of Pacific Coast Highway (PCH), east of the Santa Ana River, south of 19th Street

(extended), and west of existing residential and commercial/industrial areas. The Project site is situated within un-sectioned areas of Township 6 South, and Range 10 West of the U.S. Geological Survey (USGS) Newport Beach 7.5' Topographic quadrangle map. Coordinates for the site in longitude and latitude are as follows: 33.634102°, -117.943283°.

The Project site has been utilized as an active oil field for over 70 years evident by extensive ongoing oil extraction operations and remnant oil wells and pipelines. The site includes flat lowlands throughout the western portion of the Project site, south and west facing slopes located east of the lowlands, a southwest facing bluff overlooking the Newport Shores residential area, a large coastal terrace that encompasses the eastern portion of the site, and two arroyos that bisect the terrace. All of the seasonal features are located on the terrace. While the coastal terrace may have supported natural vernal pools prior to widespread disturbance of the area by the oil field operations, the vast majority of seasonal features that currently occupy the terrace have been created in the course of oil field operations and maintenance, such as oil exploration, oil pad development/abandonment, excavation, soil remediation, and storm water control. The location of each seasonal feature discussed herein is depicted on *Figure 2*.

SUMMARY OF WET SEASON CONDITIONS FOR THE 1999-2000 AND 2007-2012 RAIN SEASONS

Average rain totals for the Project Site based on the County of Orange, Costa Mesa weather station (STA 219), correlated with data from the Los Alamitos rain station extending back for a period of 54 years, totals 10.09 inches. Of the six years during which fairy shrimp surveys were conducted the rain totals varied dramatically ranging from a low of approximately 6.49 inches to a high of 19.06 inches, as summarized in *Table 1* below. Two of the six years exhibited rain amounts that were less than one-quartile (i.e., 25-percent) from the mean (1999-2000 = 6.49 and 2011-2012 7.31 inches respectively) and two years exhibited rain totals that exceeded one quartile from the mean (2009-2010 = 15.9 and 2010-2011 = 19.06 inches respectively). The 2007-2008 rain seasons exhibited 9.54 inches while 2008-2009 exhibited 8.26 inches, both which are considered “normal”. Within each rain season, conditions also vary significantly. For example, December of 2010 exhibited 647 percent of normal rain (9.19 inches). Such variation results in dramatically different ponding regimes on the site from year to year, making it difficult to determine the habitat suitability of many seasonal features which pond only during such extreme events, particularly given that many of the seasonal features that exhibited ponding during the December 2010 event consist of various oil field seasonal features as noted.

Table 1
Summary of Yearly Local Rain Totals

Rain Season (July 1 through June 30)	Total Rain Amount (inches)	Above or Below Normal Rain at STA 219
1999-2000	6.49	Below
2007-2008	9.54	Normal
2008-2009	8.26	Normal
2009-2010	15.9	Above
2010-2011	19.06	Above
2011-2012	7.31	Below

SOURCE:

Orange County 2012

Mean rain total at STA 219 in Costa Mesa between the years of 1958-59 and 2011-12 is 10.09

Normal rain total-s is defined as within 25-percent of the mean.

DESCRIPTION OF THE SEASONAL FEATURES SAMPLED AND/OR SUBJECT TO HYDROLOGICAL MONITORING DURING THE 2000 AND 2007-2012 SURVEYS

The accounts below provide a description and survey results for each seasonal feature sampled during the 1999-2000, 2007-2008, 2008-2009, 2009-2010, 2010-2011 and 2011-2012 wet-season surveys as well as the dry-season survey conducted in 2011, and of the 2012 dry-season survey. Also included are seasonal features that were subject to hydrological monitoring in 2011-2012 in response to a USFWS' request for more information as a result of information provided by the Banning Ranch Conservancy (BRC). Preceding the descriptions of each seasonal feature sampled is *Table 2*, which summarizes the nomenclature used for each seasonal feature over the course of the comprehensive survey program. Also included in the *Table 2* is the nomenclature used by the BRC in their report to USFWS regarding ponding within the Project site. Following the descriptions of each seasonal feature sampled is *Table 3*, which summarizes the survey results for each seasonal feature over the course of the comprehensive survey program.

It is important to note that the recorded size of many of the seasonal features varies from year to year and that estimates of maximum extent are only estimates. All of the seasonal features addressed in this summary have been subject to a wetland determination/delineation (Dudek 2013a), and, in many instances, the areas evaluated for the wetland determination/delineation have also been used as the dimensions of the seasonal features surveyed for fairy shrimp. As described in the Jurisdictional Determination of Seasonal Features on the Newport Banning Ranch (Dudek 2013a), the “pool boundaries” were typically determined based on obvious breaks in topography or in some instances by abrupt changes in vegetation from potential wetland indicator species to upland species. The significant storm events of December 2010, which accounted for 647-percent of normal precipitation for December (9.19 inches), created rain pools

on the Project site where standing water had never been previously observed during fairy shrimp surveys or other biological surveys.

Essentially all of the seasonal features, except for Seasonal Feature A, were likely created during standard oil field operations. USFWS concurred that Features RR, SS, and TT do not meet USFWS 3 centimeter minimum ponding depth criteria, as noted (USFWS 2011). One seasonal feature identified by the BRC as 6 was not surveyed since it is located on the adjacent Newport-Mesa Unified School District property.

On March 1, 2011, GLA received the results of a model airplane aerial flyover survey conducted by BRC (BRC 2011). BRC utilized model aircraft fitted with cameras to take close-range aerial photographs of the Project site, and GLA was provided with this data consisting of a series of photographs and corresponding ponding data collected on January 28, 2010, December 24, 2010, January 11, 2011, and February 7, 2011. BRC identified a total of 30 seasonal features, of which 23 were subject to 2010-2011 wet-season surveys and four were no longer subject to survey requirements due to the presence of previously documented listed species or where the full two-year protocol had been completed with no listed species detected. *Table 2* below summarizes and cross references standardized nomenclature developed by GLA in 2011 with the seasonal feature nomenclature used by BRC, as well as nomenclature used by GLA in the 90-Day Reports (GLA 2000, GLA 2008, GLA 2009, GLA 2010, GLA 2011a, GLA 2011b, and GLA 2012).

Table 2
Summary of Nomenclature Used at Newport Banning Ranch for the Seasonal Features

Seasonal Feature ID	Source and Year					Seasonal Feature ID	Source and Year				
	BRC	GLA					BRC	GLA			
	2010	2000	2008	2009	2010		2010	2000	2008	2009	2010
VP1	1	Vernal Pool	-	-	-	Y	38	-	-	-	-
VP2	2	Depression 5	-	-	-	Z	25	-	-	-	-
VP3	AD3	-	-	-	Pool 2010-A	AA	40	-	-	-	-
A	30/30a	-	Pool 1	Pool 1	Pool 1	BB	41	-	-	-	-
B	5	-	-	-	Pool 2010-C	CC	31	-	-	-	-
C	4	-	-	-	-	DD	43	-	-	-	-
D	3	Depression 4	-	-	-	EE	48	-	-	-	-
E	17	-	-	-	-	FF	23	-	-	-	-
F	7	-	-	-	-	GG	47	-	-	-	-
G	-	-	-	-	-	HH	26	-	-	-	-
H	14	-	-	-	-	II	42	-	-	-	-
I	8	-	-	-	-	JJ	33	-	-	-	-
J	9	-	-	-	-	KK	30b	-	-	-	-
K	10	-	-	-	-	LL	37	-	-	-	-
L	15	-	-	-	-	MM	24a	Depression 2	-	-	-
M	11	-	-	-	-	NN	45	-	-	-	-
N	16	-	-	-	-	OO	44	-	-	-	-
O	18	-	-	-	-	PP	27/46	Depression 1	-	-	-
P	12	-	-	-	-	QQ	39	-	-	-	-
Q	19	-	-	-	-	RR**	36	-	-	-	-
R	13	-	-	-	-	SS**	34	-	-	-	-
S	21	-	-	-	-	TT**	35	-	-	-	-
T	20	-	-	-	-	NA ³	24b	Depression 3	-	-	-
U	22	-	-	-	-	NA ³	49a	-	-	-	-
V	28	-	-	-	Pool 2010-B	NA ³	49b	-	-	-	-
W	29	-	-	-	-	NA ⁴	6	-	-	-	-
X	28b	-	-	-	-	-	-	-	-	-	-

SOURCE:

BRC 2010, GLA 2000, GLA 2008, GLA 2009, GLA 2010

NOTES:

BRC – Banning Ranch Conservancy

GLA – Glenn Lukos Associates, Inc.

NA³ = Not Available; GLA did not find in 2011; No current seasonal feature IDNA⁴ = Not Available; Seasonal feature outside of Project Site and permission to sample was not obtained from the landowner

** = Seasonal Features RR (BRC 36), SS (BRC 35), TT (BRC 34) were not surveyed because the U.S. Fish and Wildlife Service determined that they did not exhibit potential to support fairy shrimp

RESULTS AND DISCUSSION

A total of 49 seasonal features were surveyed, according to the USFWS 1996 guidelines, for the presence/absence of federally-listed vernal pool branchiopods. In 8 of the seasonal features, the federally endangered San Diego fairy shrimp (*Branchinecta sandiegonensis*) was positively detected; the common versatile fairy shrimp (*Branchinecta lindahli*) occupied an additional 26 seasonal features; 7 features were void of fairy shrimp; 3 were considered unsuitable habitat by the USFWS; and, 4 contained limited number of cysts (n=1-4), however, the features were incapable of supporting sufficient inundation duration for shrimp reproduction. Descriptions of each seasonal feature and the results of protocol surveys are presented below.

Seasonal Feature Vernal Pool 1

Vernal Pool 1 (VP1) is located near the center of the Project site just southwest of 17th Street entrance (*Figure 2*). The existing shape and contours of the basin appear to have resulted from anthropogenic modifications caused by oil operation and maintenance post-1943. Well-used oil field operation roads (two paved and two unpaved) surround VP1 near the 17th Street entry/exit gate and traversed by oil field pipelines. At maximum extent, the pool covers approximately 0.304 acre and averages approximately 13 centimeters deep.

When VP1 was first surveyed in 2000, it supported a predominance of saltgrass (*Distichlis spicata*) and creeping spikerush (*Eleocharis macrostachya*), with a very limited number of vernal pool associate species such as hairy pepperwort (*Marsilea vestita*). However, during the last 12 years, the feature has been colonized and is now dominated by mule fat (*Baccharis salicifolia*), saltgrass, and the non-native annual rabbitsfoot grass (*Polypogon monspeliensis*). Non-dominant species within the feature include alkali mallow (*Malvella leprosa*), creeping spikerush, western goldentop (*Euthamia occidentalis*), alkali seaheath (*Frankenia salina*), and Cuman ragweed (*Ambrosia psilostachya*).

The San Diego fairy shrimp was identified in VP1 during the 2000 wet-season survey and as such protocol surveys were complete following identification of San Diego fairy shrimp (*Table 3*). USFWS was notified by 90-Day Report and voucher specimens are in the process of being accessioned at the Natural History Museum of Los Angeles County. USFWS concurs that protocol surveys are complete for VP1 (USFWS 2012).

In conclusion, VP1 is occupied by a federally-listed fairy shrimp species, the San Diego fairy shrimp. No future surveys are required for this feature.

Seasonal Feature Vernal Pool 2

Seasonal Feature Vernal Pool 2 (VP2) is located immediately south of VP1, and appears to have been created during site preparation of an oil well that is situated adjacent to VP2 or by other incidental oil field activities. At maximum extent, the seasonal feature covers 0.021 acre and a maximum depth of 8.5 centimeters (in the deepest ruts). VP2 is dominated by mule fat, hyssop loosestrife (*Lythrum hyssopifolia*), common brassbuttons (*Cotula coronopifolia*), and clustered tarweed (*Deinandra fasciculata*). Non-dominant species present within the feature include curly dock (*Rumex crispus*) and salt heliotrope (*Heliotropium curassavicum*).

The San Diego fairy shrimp was identified in VP2 during the 2000 wet-season survey and as such protocol surveys were complete following identification of San Diego fairy shrimp (Table 3). In 2010-2011, VP2 was inadvertently sampled and the presence of San Diego fairy shrimp was confirmed. USFWS was notified by 90-Day Report and voucher specimens are in the process of being accessioned at the Natural History Museum of Los Angeles County. USFWS concurred that protocol surveys are complete for VP2 (USFWS 2012).

In conclusion, VP2 is occupied by a federally-listed fairy shrimp species, the San Diego fairy shrimp. No future surveys are required for this feature.

Seasonal Feature Vernal Pool 3 (VP3)

Seasonal Feature Vernal Pool 3 (VP3) is located immediately east of VP1 (separated by a dirt road) and consists of an anthropogenic bulldozer scrape situated near an existing oil field pipeline. At maximum extent, the pool covers approximately 0.006 acre and averages approximately 6 centimeters deep. VP3 supports a mix of upland grasses and weedy annual species. Dominant species include red brome (*Bromus madritensis* ssp. *rubens*), and salt sandspurry (*Spergularia marina*). Non-dominant species within the feature include Cuman ragweed, curly dock, and clustered tarweed.

A single sub-adult male San Diego fairy shrimp was identified in VP3 during the 2009-2010 wet-season survey and as such protocol surveys were complete following identification of San Diego fairy shrimp (Table 3). USFWS was notified by 90-Day Report. USFWS concurs that protocol surveys are complete for VP3 (USFWS 2012).

In conclusion, VP3 is considered occupied by a federally-listed fairy shrimp species, the San Diego fairy shrimp. No future surveys are required for this feature.

Seasonal Feature A

Seasonal Feature A is a depression within a grassland area on the western edge of the Project site. At maximum extent, the pool covers approximately 0.037 acre and averages approximately 10 to 13 centimeters deep; however, the deepest part of the seasonal feature consists of a rut that is approximately 41 centimeters deep in some deep ruts at the western edge. The depression is potentially the only “natural” depression on the Project site. Seasonal Feature A supports a predominance of hydrophytes in most years. Dominant species include short woollyheads (*Psilocarphus brevissimus*) and western goldentop. Non-dominant species within the feature include annual rabbitsfoot grass, curly dock, saltgrass, clustered tarweed, and creeping spikerush.

The versatile fairy shrimp was detected in Seasonal Feature A during protocol wet-season surveys in 2007-2008 and 2008-2009. A third year of sampling was conducted in wet-season 2009-2010 at the informal verbal suggestion of Ms. Christine Medak of USFWS; however, no fairy shrimp were detected as the seasonal feature failed to pond for sufficient duration to support fairy shrimp. The federally-listed San Diego fairy shrimp was determined to be absent from this feature. USFWS concurs that protocol surveys are complete for Seasonal Feature A (USFWS 2012).

Table 3
Summary of Protocol Survey Results for Fairy Shrimp on Newport Banning Ranch

Seasonal Feature ID	Protocol Surveys Conducted for Listed Vernal Pool Branchiopod on Newport Banning Ranch								Notes
	Wet Season 2000	Wet Season 2007-2008	Wet Season 2008-2009	Wet Season 2009-2010	Wet Season 2010-2011	Dry Season 2011	Wet Season 2011-2012	Dry Season 2012	
VP1	SDFS	-	-	-	-	-	-	-	Protocol surveys complete, occupied by SDFS
VP2	SDFS	-	-	-	SDFS	-	-	-	Protocol surveys complete, occupied by SDFS
VP3	-	-	-	SDFS	-	-	-	-	Protocol surveys complete, occupied by SDFS
A	-	VFS	VFS	No FS	No FS	-	-	-	Protocol surveys complete, occupied by VFS
B	-	-	-	VFS	VFS	-	-	-	Protocol surveys complete, occupied by VFS
C	-	-	-	-	VFS	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
D	VFS	-	-	-	No F	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
E	-	-	-	-	SDFS	-	-	-	Protocol surveys complete, occupied by SDFS
F	-	-	-	-	No FS	-	SI	No FS Cysts	Protocol surveys complete, unsuitable fairy shrimp habitat
G	-	-	-	-	SDFS	-	-	-	Protocol surveys complete, occupied by SDFS
H	-	-	-	-	M	-	SI	SDFS (CI)	Protocol surveys complete, occupied by SDFS
I	-	-	-	-	SDFS	-		-	Protocol surveys complete, occupied by SDFS
J	-	-	-	-	SDFS	-		-	Protocol surveys complete, occupied by SDFS
K	-	-	-	-	No FS	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
L	-	-	-	-	No FS		SI	BRCY	Protocol surveys complete, unlikely fairy shrimp habitat
M	-	-	-	-	VFS	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
N	-	-	-	-	VFS	-	SI	BRCY	Protocol surveys complete, occupied by VFS
O	-	-	-	-	M	-	SI	-	Unsuitable fairy shrimp habitat
P	-	-	-	-	VFS	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS

Ms. Christine Medak

Subject: Summary of Protocol Surveys for Federally-Listed Vernal Pool Branchiopods Conducted on Newport Banning Ranch

Seasonal Feature ID	Protocol Surveys Conducted for Listed Vernal Pool Branchiopod on Newport Banning Ranch								Notes
	Wet Season 2000	Wet Season 2007-2008	Wet Season 2008-2009	Wet Season 2009-2010	Wet Season 2010-2011	Dry Season 2011	Wet Season 2011-2012	Dry Season 2012	
Q	-	-	-	-	SI	-	SI	BRCY	Protocol surveys complete, unlikely fairy shrimp habitat
R	-	-	-	-	VFS	-	SI	No FS Cysts	Protocol surveys complete, occupied by VFS
S	-	-	-	-	No FS	-	SI	No FS Cysts	Protocol surveys complete, unsuitable fairy shrimp habitat
T	-	-	-	-	VFS	-	VFS	-	Protocol surveys complete, occupied by VFS
U	-	-	-	-	No FS	-	SI	No FS Cysts -	Protocol surveys complete, unsuitable fairy shrimp habitat
V	-	-	-	VFS	No FS	-	-		Protocol surveys complete, occupied by VFS
W	-	-	-	-	No FS	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
X	-	-	-	-	-	-	VFS	VFS (CI)	Protocol surveys complete, occupied by VFS
Y	-	-	-	-	-	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
Z	-	-	-	-	-	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
AA	-	-	-	-	-	-	SI	No FS Cysts	Protocol surveys complete, unsuitable fairy shrimp habitat
BB	-	-	-	-	-	-	SI	BRCY	Protocol surveys complete, unlikely fairy shrimp habitat
CC	-	-	-	-	-	-	VFS	VFS (CI)	Protocol surveys complete, occupied by VFS
DD	-	-	-	-	-	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
EE	-	-	-	-	-	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
FF	-	-	-	-	-	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
GG	-	-	-	-	-	-	VFS	VFS (CI)	Protocol surveys complete, occupied by VFS
HH	-	-	-	-	-	-	VFS	VFS (CI)	Protocol surveys complete, occupied by VFS
II	-	-	-	-	-	-	SI	BRCY	Protocol surveys complete, unlikely fairy shrimp habitat
JJ	-	-	-	-	-	-	SI	No FS Cysts	Protocol surveys complete, unsuitable fairy shrimp habitat
KK	-	-	-	-	No FS	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
LL	-	-	-	-	-	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
MM	VFS	-	-	-	-	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS

Seasonal Feature ID	Protocol Surveys Conducted for Listed Vernal Pool Branchiopod on Newport Banning Ranch								Notes
	Wet Season 2000	Wet Season 2007-2008	Wet Season 2008-2009	Wet Season 2009-2010	Wet Season 2010-2011	Dry Season 2011	Wet Season 2011-2012	Dry Season 2012	
NN	-	-	-	-	-	-	SI	No FS Cysts	Protocol surveys complete, unsuitable fairy shrimp habitat
OO	-	-	-	-	-	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
PP	VFS	-	-	-	-	-	SI	VFS (CI)	Protocol surveys complete, occupied by VFS
QQ	-	-	-	-	-	No FS Cysts	SI	No FS Cysts	Protocol surveys complete, unsuitable fairy shrimp habitat
RR	-	-	-	-	-	-	-	-	Unsuitable fairy shrimp habitat (USFWS 2011)
SS	-	-	-	-	-	-	-	-	Unsuitable fairy shrimp habitat (USFWS 2011)
TT	-	-	-	-	-	-	-	-	Unsuitable fairy shrimp habitat (USFWS 2011)
24b*	VFS	-	-	-	-	-	-	-	GLA did not find during 2011 surveys
49a*	-	-	-	-	-	-	-	-	GLA did not find during 2011 surveys
49b*	-	-	-	-	-	-	-	-	GLA did not find during 2011 surveys
6*	-	-	-	-	-	-	-	-	Seasonal feature offsite of Project Site, not surveyed

SOURCES:

GLA 2000, GLA 2008, GLA 2009, GLA 2010, GLA 2011a, GLA 2011b, GLA 2012

Dudek 2013b

NOTES:BRCY = *Branchinecta* cyst. Not identifiable to species.

CI = Culturing and Identification

FS = Fairy Shrimp

GLA = Glenn Lukos Associates

NS = Not sampled

SDFS = San Diego Fairy Shrimp (Federally Endangered)

SI – Protocol wet-season surveys were inconclusive due to insufficient ponding

VFS = Versatile Fairy Shrimp (non-listed)

- = Surveys not conducted

* = Seasonal Features 24b, 49a, 49b, and 6 have no current Seasonal Feature ID. See Table 2 above

Seasonal Feature B

Seasonal Feature B is located in the central portion of the Project Site and is an area of stockpiled remediated soil adjacent to two inactive or abandoned oil wells. At maximum extent, the seasonal feature covers approximately 0.030 acre and averages approximately 20 centimeters deep. The majority of Seasonal Feature B is bare ground; however, clustered tarweed and salt heliotrope can be abundant in select years. Other plant species sparsely vegetate the feature including telegraphweed (*Heterotheca grandiflora*), curly dock, and rod wirelettuce (*Stephanomeria virgata*).

The non-listed versatile fairy shrimp was detected in Seasonal Feature B during the 2009-2010 and 2010-2011 wet-season surveys. The federally-listed San Diego fairy shrimp was determined to be absent from this feature. In conclusion, Seasonal Feature B is occupied by the versatile fairy shrimp based on completed protocol surveys per the 1996 USFWS guidelines. Therefore, Seasonal Feature B is not subject to future survey requirements for listed vernal pool branchiopods.

Seasonal Feature C

Seasonal Feature C is a depression located within an area of stockpiled concrete in the central portion of the site. Seasonal Feature C is essentially a man-made feature that was created for the purpose of gaining access to a broken oil field pipeline which traverses the feature. The oil operator did not back-fill the depression following the excavation of the repair area. At maximum extent, the seasonal feature covers approximately 0.001 acre and an average depth of 10 centimeters. Seasonal Feature C supports a predominance of non-native plants including hyssop loosestrife and common brassbuttons.

The versatile fairy shrimp was detected in Seasonal Feature C during the 2010-2011 wet-season surveys and 2012 dry-season survey and in vitro culturing of hatched shrimp. An additional wet-season survey was attempted; however, the seasonal feature did not exhibit sufficient ponding during the 2011-2012 winter-spring to initiate the survey. The federally-listed San Diego fairy shrimp was determined to be absent from this feature. In conclusion, Seasonal Feature C is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Therefore, Seasonal Feature C is not subject to future survey requirements for listed vernal pool branchiopods.

Seasonal Feature D

Seasonal Feature D is located roughly 300 feet south of Seasonal Feature VP1 and was created by anthropogenic excavation for oil field maintenance within an area of intensive oil field activities and is adjacent to an oil field pipeline. Soils in this feature have been documented as contaminated by crude oil and contain debris from oil mining operations. At maximum extent, the seasonal feature covers approximately 0.002 acre and averages approximately 7.5 centimeters deep. Feature D is dominated by clustered tarweed and common brassbuttons. Non-dominant species within the feature include non-native annual fescue (*Vulpia myuros*) and annual rabbitsfoot grass.

The versatile fairy shrimp was detected in Seasonal Feature D during the 1999-2000 and 2012 dry-season surveys and in vitro culturing of hatched shrimp. An additional wet-season survey was attempted; however, the seasonal feature did not exhibit sufficient ponding during the 2011-2012 winter and spring season to initiate the survey. The federally-listed San Diego fairy shrimp was determined to be absent from this feature. In conclusion, Seasonal Feature D is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Therefore, Seasonal Feature D is not subject to future survey requirements for listed vernal pool branchiopods.

Seasonal Feature E

Seasonal Feature E is an excavated oil sump created to capture potential oil spills from existing and historic wells. The feature is directly north of an inactive or abandoned oil well, approximately 400 feet south of Seasonal Feature VP1, and has been documented to contain areas of contaminated soils that will require future remediation. At maximum extent, the seasonal feature covers approximately 0.049 acre and averages approximately 0.5 meter deep. Seasonal Feature E supports two dominant species, mule fat and shortpod mustard (*Hirschfeldia incana*). Salt heliotrope is non-dominant within the feature.

The San Diego fairy shrimp was identified in Seasonal Feature E during the 2010-2011 wet-season survey and as such protocol surveys were complete following identification of San Diego fairy shrimp (Table 3). USFWS was notified by 90-Day Report and voucher specimens are in the process of being accessioned at the Natural History Museum of Los Angeles County. USFWS concurs that protocol surveys are complete for Seasonal Feature E (USFWS 2012). In conclusion, Seasonal Feature E is occupied by a federally-listed fairy shrimp species, the San Diego fairy shrimp. Since a federally-listed species was determined to be present in this feature, no future surveys are required.

Seasonal Feature F

Seasonal Feature F is an anthropogenic depression created by a combination of excavation and berming. Seasonal Feature F is located immediately adjacent to the eastern project boundary in the central portion of the Project Site in an upland annual grassland area. At maximum extent, the seasonal feature covers approximately 0.030 acre and averages approximately 9 centimeters deep. Seasonal Feature F supports, as dominant native species, salt sandspurry and clustered tarweed. Non-dominants within the feature are native willow baccharis (*Baccharis salicina*) and non-natives star-thistle (*Centaurea melitensis*) and shortpod mustard. No fairy shrimp were detected in Seasonal Feature F during the 2010-2011 wet-season and 2012 dry-season surveys.

In conclusion, Seasonal Feature F is not occupied by the non-listed versatile fairy shrimp or federally-listed San Diego fairy shrimp based on a complete protocol survey. Therefore, Seasonal Feature F is not subject to future survey requirements for listed vernal pool branchiopods.

Seasonal Feature G

Seasonal Feature G is an oil field sump created to contain oil spills located roughly 100 feet south of Seasonal Feature VP1 and is crossed by a number of oil field pipelines. At maximum extent, the seasonal feature covers approximately 0.003 acre and averages approximately 10 centimeters deep. Seasonal Feature G supports soft brome (*Bromus hordeaceus*), clustered tarweed, rod wirelettuce, shortpod mustard, common brassbuttons, and Italian thistle (*Carduus pycnocephalus*).

The San Diego fairy shrimp was identified in Seasonal Feature G during the 2010-2011 wet-season survey and as such protocol surveys were complete following identification of San Diego fairy shrimp (Table 3). USFWS was notified by 90-Day Report and voucher specimens are in the process of being accessioned at the Natural History Museum of Los Angeles County. USFWS concurs that protocol surveys are complete for Seasonal Feature G (USFWS 2012). In conclusion, Seasonal Feature G is occupied by a federally-listed fairy shrimp species, the San Diego fairy shrimp. Since a federally-listed species was determined to be present in this feature, no future surveys are required for.

Seasonal Feature H

Seasonal Feature H is an area of disturbed ground within the oil field directly adjacent to well-used oil field operation roads located immediately west of Seasonal Feature I. Seasonal Feature

Ms. Christine Medak

Subject: Summary of Protocol Surveys for Federally-Listed Vernal Pool Branchiopods
Conducted on Newport Banning Ranch

H is likely an anthropogenic oil field depression created by excavation. At maximum extent, the seasonal feature covers approximately 0.021 acre.

Seasonal Feature H is dominated by native clustered tarweed and non-native annual yellow sweetclover (*Melilotus indicus*). Non-dominant non-natives present within the feature include soft brome and curly dock. Non-dominant natives include salt sandspurry and Cuman ragweed.

Seasonal Feature H did not exhibit ponding to support fairy shrimp during the 2010-2011 and 2011-2012 wet-season surveys. *Branchinecta* cysts were isolated from Seasonal Feature H during the 2012 dry-season survey. During culturing, the *Branchinecta* cysts were identified to be the federally-listed San Diego fairy shrimp (Table 3). In conclusion, Seasonal Feature H is occupied by a federally-listed fairy shrimp species, the San Diego fairy shrimp. Since a federally-listed species was determined to be present in this feature, no future surveys are required.

Seasonal Feature I

Seasonal Feature I is an anthropogenic depression created by a combination of excavation and berming located roughly 350 feet southeast of Seasonal Feature VP1 and adjacent to the eastern property boundary. At maximum extent, the seasonal feature covers approximately 0.028 acre and averages approximately 9 centimeters deep. Seasonal Feature I supports two dominant species, which are both non-native: annual yellow sweetclover and star-thistle. Non-dominant species within the feature include soft brome, shortpod mustard, curly dock, and annual rabbitsfoot grass. Non-dominant natives present in the feature include clustered tarweed and salt heliotrope.

The San Diego fairy shrimp was identified in Seasonal Feature I during the 2010-2011 wet-season survey and as such protocol surveys were complete following identification of San Diego fairy shrimp (Table 3). USFWS was notified by 90-Day Report and voucher specimens are in the process of being accessioned at the Natural History Museum of Los Angeles County. USFWS concurs that protocol surveys are complete for Seasonal Feature I (USFWS 2012). In conclusion, Seasonal Feature I is occupied by a federally-listed fairy shrimp species, the San Diego fairy shrimp. In conclusion, Seasonal Feature I is occupied by a federally-listed fairy shrimp species, the San Diego fairy shrimp. Since a federally-listed species was determined to be present in this feature, no future surveys are required.

Seasonal Feature J

Seasonal Feature J is located roughly 350 feet east of Seasonal Feature VP1 and adjacent to the eastern property boundary. The seasonal feature was created by construction of a berm located to protect an oil field road, and occurs in grassland. At maximum extent, the seasonal feature covers approximately 0.087 acre and averages approximately 12 to 15 centimeters deep. Seasonal Feature J is dominated by native clustered tarweed and non-native soft brome. Non-dominant species include red brome, annual yellow sweetclover, and annual rabbitsfoot grass.

The San Diego fairy shrimp was identified in Seasonal Feature J during the 2010-2011 wet-season survey and as such protocol surveys were complete following identification of San Diego fairy shrimp (*Table 3*). USFWS was notified by 90-Day Report and voucher specimens are in the process of being accessioned at the Natural History Museum of Los Angeles County. USFWS concurs that protocol surveys are complete for Seasonal Feature J (USFWS 2012). In conclusion, Seasonal Feature J is occupied by a federally-listed fairy shrimp species, the San Diego fairy shrimp. Since a federally-listed species was determined to be present in this feature, no future surveys are required.

Seasonal Feature K

Seasonal Feature K is a depression created by anthropogenic excavation of material to create adjacent berms located roughly 400 feet east of Seasonal Feature VP1 and adjacent to the eastern property boundary. At maximum extent, the seasonal feature covers approximately 0.014 acre and averages approximately 6 to 8 centimeters deep. Seasonal Feature K is dominated by native clustered tarweed and non-native annual yellow sweetclover. Non-dominant species within the feature include non-native shortpod mustard, soft brome, and native salt heliotrope.

No fairy shrimp were detected in Seasonal Feature K during the 2010-2011 wet season surveys, as the feature did not exhibit ponding. However, *Branchinecta* cysts were isolated from Seasonal Feature K during the 2012 dry-season survey. During culturing, the *Branchinecta* cysts were identified to be the non-listed versatile fairy shrimp. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature K is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature K is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature L

Seasonal Feature L is located roughly 500 feet east of Seasonal Feature VP1 and adjacent to the eastern property boundary. The seasonal feature was created by excavation in a grassland area as

part of oil field operations. At maximum extent, the seasonal feature covers approximately 0.003 acre and averages approximately 6 to 8 centimeters deep. Seasonal Feature L is dominated by non-native annual yellow sweetclover, native clustered tarweed, and salt heliotrope. Occurrences of non-native star-thistle are present within the feature.

No fairy shrimp were detected in Seasonal Feature L during the 2010-2011 wet-season surveys as the seasonal feature did not exhibit ponding. However, 2 *Branchinecta* cysts in approximately 1.0 liter of soil were isolated from Seasonal Feature L during the 2012 dry-season survey. During culturing, the cysts did not hatch; therefore, conclusive identification to species was not possible. The inability of this feature to pond water for a sufficient duration under normal rain fall conditions to complete fairy shrimp reproduction significantly reduces its habitat value. It is very possible that cysts from neighboring features were transported to this Seasonal Feature L by vehicle and/or wildlife movement; however, it is unlikely that this feature provides adequate habitat for fairy shrimp.

Seasonal Feature M

Seasonal Feature M occurs in the oil field pipe and material storage yard. Standpipes from oil field infrastructure occur within the area in which rainwater collects during and immediately following rain events. At maximum extent, the seasonal feature covers approximately 0.014 acre and averages approximately 6 to 9 centimeters deep. Seasonal Feature M is dominated by non-native Spanish false fleabane (*Pulicaria paludosa*) and soft brome. Non-dominant species within the feature include native clustered tarweed and mule fat. Non-dominant non-natives include pampas grass (*Cortaderia selloana*) and annual rabbitsfoot grass.

The versatile fairy shrimp was detected in Seasonal Feature M during the 2010-2011 wet-season surveys and 2012 dry-season survey and in vitro culturing of hatched shrimp. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature M is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature M is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature N

Seasonal Feature N is located in the gravel oil field pipe and material storage yard, surrounded by well-used oil field operation road, and consists of a gravel-covered area. At maximum extent, the seasonal feature covers approximately 0.029 acre and averages approximately 5 to 7 centimeters deep. Seasonal Feature N is dominated by clustered tarweed and mule fat. Non-

dominant species within this feature include native western goldentop, salt heliotrope, telegraphweed, and rod wirelettuce. Non-dominant non-natives include shortpod mustard and hyssop loosestrife.

The versatile fairy shrimp was detected in Seasonal Feature N during the 2010-2011 wet-season surveys. During dry-season surveys conducted in 2012, one *Branchinecta* cyst was isolated from Seasonal Feature N. In conclusion, Seasonal Feature N is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature N is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature O

Seasonal Feature O is a depression that occurs within a gravel parking and equipment storage area, surrounded by well-used oil field operation roads, and is located northeast of Seasonal Feature N. At maximum extent, the seasonal feature covers approximately 0.004 acre and averages approximately 2 centimeters deep. Seasonal Feature O vegetated areas are dominated by non-native longbeak stork's bill (*Erodium botrys*) and native clustered tarweed.

Seasonal Feature O did not exhibit sufficient ponding to support fairy shrimp (i.e., more than a few days following storm events) during the 2010-2011 wet-season surveys and does not appear to be capable of supporting minimum ponding depths of three centimeters. This feature did not pond during the 2011-2012 wet-season surveys.

Because of insufficient ponding depths and duration, no fairy shrimp were detected during the 2010-2011 or 2011-2012 wet-season surveys. No additional sampling is necessary for this feature, as it does not meet the minimum USFWS threshold for fairy shrimp surveys based on the three centimeter depth requirement— even during above-average rain years (i.e. 2010-2011). USFWS concurs that no additional sampling is necessary for Seasonal Feature O (USFWS 2012).

Seasonal Feature P

Seasonal Feature P is a depression within a soil remediation area near the 17th Street entry to the site. Seasonal Feature P is the site of a depression, likely caused by anthropogenic activities adjacent to an area where soil is stockpiled for remediation. At maximum extent, the seasonal feature covers approximately 0.009 acre and averages approximately 5 to 8 centimeters deep with some areas with depths of 10 centimeters.

Seasonal Feature P is dominated by western goldentop and common brassbuttons. Non-dominant non-native species within the feature include hyssop loosestrife and annual rabbitsfoot grass. Non-dominant, native species present in the feature include mule fat and clustered tarweed.

Seasonal Feature P did not exhibit ponding of sufficient duration (i.e., more than a few days following storm events) to support fairy shrimp during the 2011-2012 surveys. The versatile fairy shrimp was detected in Seasonal Feature P during the 2010-2011 wet-season surveys and 2012 dry-season survey and in vitro culturing of hatched shrimp. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature P is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature P is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature Q

Seasonal Feature Q is a depression that straddles the earthen shoulder along a well-used access road from the 17th Street gate. Seasonal Feature Q is a low area within the partially paved and partially dirt roadway and associated shoulder that contains a series of seasonal features. At maximum extent, the seasonal feature covers approximately 0.004 acre and averages approximately 5 centimeters deep. Seasonal Feature Q is largely unvegetated with the exception of a narrow strip that consists of earthen shoulder. Two species were detected: annual yellow sweetclover and clustered tarweed.

This seasonal feature does not exhibit ponding of sufficient duration or depth (three centimeters), other than for brief periods, to support fairy shrimp. In addition, because it is located in a very high traffic area, it does not appear to exhibit potential for supporting fairy shrimp.

No fairy shrimp were detected in Seasonal Feature Q during the 2011-2012 wet-season surveys. However, 1 *Branchinecta* cyst in approximately 1.0 liter of soil was isolated from Seasonal Feature Q during the 2012 dry-season survey. During culturing, the cysts did not hatch; therefore, conclusive identification to species was not possible. The inability of this feature to pond water for a sufficient duration under normal rain fall conditions to complete fairy shrimp reproduction significantly reduces its habitat value. It's very possible that cysts from neighboring features were transported to this Seasonal Feature L by vehicle and wildlife movement; however, it is unlikely that this feature provides adequate habitat for fairy shrimp.

Seasonal feature R

Seasonal Feature R is a roadside depression, one of a series of depressions occupying the paved parking area, well-used access road, and adjacent earthen shoulder near the 17th Street entrance

where rainwater and runoff collects for brief periods during and immediately following storm events. At maximum extent, the seasonal feature covers approximately 0.006 acre and averages approximately 5 centimeters deep. Seasonal Feature R is dominated by non-native common brassbuttons. Non-dominant non-native species within the feature include soft brome, shortpod mustard, hyssop loosestrife, and annual rabbitsfoot grass. Non-dominant native species present in the feature include Cuman ragweed and clustered tarweed.

Seasonal Feature R did not exhibit ponding of sufficient depth (three centimeters) or duration (i.e., more than a few days following storm events) to support fairy shrimp during the 2011-2012 surveys. The versatile fairy shrimp was detected in Seasonal Feature R during the 2010-2011 wet-season surveys. No fairy shrimp were detected during the 2011-2012 surveys due to insufficient ponding depth and duration. *Branchinecta* cysts were not detected in Seasonal Feature R during the 2012 dry-season survey. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature R is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature R is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature S

Seasonal Feature S is one of a series of depressions along the shoulder of the main well-used access road that is characterized by highly compacted soil and gravel adjacent to the major access road at the 17th Street entrance to the site. At maximum extent, the seasonal feature covers approximately 0.003 acre and averages approximately 4 centimeters deep. Seasonal Feature S is dominated by native clustered tarweed and non-native common brassbuttons. Non-dominant species include non-native hyssop loosestrife, shortpod mustard, and annual rabbitsfoot grass.

Seasonal Feature S exhibited ponding of sufficient duration, and depth (three centimeters) to support fairy shrimp during the 2010-2011 wet-season surveys, however, because it is located in a very high traffic area, it does not appear to exhibit potential for supporting fairy shrimp and it was not sampled during the 2010-2011 surveys. This seasonal feature did not exhibit ponding of sufficient depth (three centimeters) or duration (i.e., more than a few days following storm events) to support fairy shrimp during the 2011-2012 wet-season surveys, and as such, Seasonal Feature S was not sampled during the 2011-2012 surveys. Therefore, in conclusion of protocol surveys, it was determined that Seasonal Feature S does not contain habitat for fairy shrimp. No further surveys are recommended.

Seasonal Feature T

Seasonal Feature T is one of a series of depressions occupying the unvegetated paved parking area, well-used access road, and adjacent earthen shoulder near the 17th Street entrance. At maximum extent, the seasonal feature covers approximately 0.004 acre and averages approximately 12 to 15 centimeters deep.

The versatile fairy shrimp was detected in Seasonal Feature T during the 2010-2011 wet-season survey seasons as well as during the 2011-2012 wet-season survey seasons. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature T is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature T is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature U

Feature U is one of a series of depressions occupying the unvegetated paved parking area, well-used access road, and adjacent earthen shoulder near the 17th Street entrance. At maximum extent, the seasonal feature covers approximately 0.002 acre and averages approximately 5 centimeters deep. Seasonal Feature U exhibited sufficient ponding depth (maximum of five centimeters) and duration (12 days) during the 2010-2011 and 2011-2012 surveys; nevertheless no fairy shrimp were detected, and no *Branchinecta* cysts were observed in the 2012 dry-season survey. Of significant note, this seasonal feature is located in a parking area for the on-site field office and there is constant vehicle traffic that runs directly through this seasonal feature and it is therefore not suitable habitat for fairy shrimp of any kind. In conclusion, Seasonal Feature U does not exhibit suitable fairy shrimp habitat. No additional surveys are recommended.

Seasonal Feature V

Seasonal Feature V consists of a shallow seasonal feature located in the northeast portion of the Project Site along the property boundary between 18th and 19th Streets (extended). It is located on a plateau area adjacent to an existing oil well pad. At maximum extent, the seasonal feature covers approximately 0.090 acre and averages approximately 10 centimeters deep. The seasonal feature is mostly unvegetated, but supports some cover of native and non-native plants including mule fat, shortpod mustard, curly dock, salt heliotrope, and alkali seaheath.

The versatile fairy shrimp was detected in Seasonal Feature V in 2009-2010 wet-season surveys in low numbers; however, no fairy shrimp were detected during the 2010-2011 wet-season. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature V is occupied by the non-listed versatile fairy shrimp based on a complete protocol

survey. Seasonal Feature V is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature W

Seasonal Feature W is located in the southeast quadrant of the site within a grassland depression. The seasonal feature was likely created during grading activities in the 1960s. At maximum extent, the seasonal feature covers approximately 0.263 acre and averages approximately 10 centimeters deep. Seasonal Feature W is dominated by red brome, Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), and shortpod mustard.

No fairy shrimp were detected in Seasonal Feature W during the 2010-2011 wet-season surveys. This seasonal feature did not exhibit ponding during the 2011-2012 wet-season surveys, and as such, no fairy shrimp were detected. However, a single *Branchinecta* cyst was isolated from Seasonal Feature W during the 2012 dry-season survey. During culturing, the *Branchinecta* cyst was identified as the non-listed versatile fairy shrimp. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature W is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature W is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature X

Seasonal Feature X is one of a series of depressions and road ruts within a well-used access road on the Project Site. At maximum extent, the seasonal feature covers approximately 0.007 acre and averages approximately 7 to 8 centimeters deep. Seasonal Feature X is mostly unvegetated with limited quantities of upland grasses and forbs including dominant native clustered tarweed and non-native common brassbuttons. Non-dominant species within the feature include non-native soft brome and annual rabbitsfoot grass.

The versatile fairy shrimp was detected in Seasonal Feature X during the 2011-2012 wet-season surveys and 2012 dry-season survey and in vitro culturing of hatched shrimp. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature X is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature X is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature Y

Seasonal Feature Y is located in the northeast quadrant of the Project Site and consists of a depression that lies fully with a site access road well-used by vehicular traffic. At maximum extent, the seasonal feature covers approximately 0.001 acre and averages approximately 7 centimeters deep. Seasonal Feature Y is dominated by annual rabbitsfoot grass, star-thistle, mule fat, and Menzies' goldenbush (*Isocoma menziesii*). Non-dominant within the feature is native clustered tarweed. Seasonal Feature Y did not exhibit ponding during 2011-2012 wet-season surveys, the first year of monitoring for this feature, and as such, no fairy shrimp were detected. A dry-season survey was conducted in 2012 where *Branchinecta* cysts were observed and isolated from the feature. During the culturing of cysts, the non-listed versatile fairy shrimp were identified. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature Y is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature Y is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature Z

Seasonal Feature Z consists of an anthropogenic excavated trench constructed to contain oil spills from oil field pipelines that run over the trench located in the northeast quadrant of the Project Site. At maximum extent, the seasonal feature covers approximately 0.007 acre and averages approximately 10 centimeters deep. Seasonal Feature Z is dominated by mule fat, clustered tarweed, and shortpod mustard. Non-dominant species within the herb stratum include Jersey cudweed (*Pseudognaphalium luteoalbum*), curly dock, annual rabbitsfoot grass, and Canadian horsetweed (*Conyza canadensis*).

Seasonal Feature Z did not exhibit ponding during 2011-2012 wet-season surveys, the first year of monitoring for this feature, and as such, no fairy shrimp were detected. A dry-season survey was conducted in 2012 where *Branchinecta* cysts were observed and isolated from the feature. During *Branchinecta* cyst culturing, non-listed versatile fairy shrimp were identified. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature Z is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature Z is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature AA

Seasonal Feature AA consists of a depression on an inactive or abandoned oil well pad located in the central portion of the Project Site roughly 300 feet west of Seasonal Feature VP1. At maximum extent, the seasonal feature covers approximately 0.002 acre and averages approximately 6.5 centimeters deep. Seasonal Feature AA is dominated by clustered tarweed and annual yellow sweetclover. Non-dominant species include red brome, star-thistle, annual rabbitsfoot grass, and annual fescue.

Seasonal Feature AA did not exhibit ponding in 2011-2012, the first year of monitoring for this seasonal feature, and as such, no fairy shrimp were detected. No fairy shrimp were detected in Seasonal Feature AA during the 2012 dry-season surveys. In conclusion, Seasonal Feature AA is not occupied by the non-listed versatile fairy shrimp or federally-listed San Diego fairy shrimp based on a complete protocol survey. No further surveys are recommended. Seasonal Feature AA is, therefore, not subject to future survey requirements for listed branchiopods. Additionally, USFWS concurred that no additional sampling is necessary for Seasonal Feature AA (USFWS 2012).

Seasonal Feature BB

Seasonal Feature BB consists of a depression within an oil field pipeline array located central portion of the Project Site south of two active oil wells. At maximum extent, the seasonal feature covers approximately 0.002 acre and averages approximately 4 centimeters deep. Seasonal Feature BB is dominated by soft brome and red brome. Non-dominant species include star-thistle.

Seasonal Feature BB did not exhibit ponding in 2011-2012, the first year of monitoring of this seasonal feature, and as such, no fairy shrimp were detected. However, 4 *Branchinecta* cysts in approximately 1.0 liter of soil were isolated from Seasonal Feature BB during the 2012 dry-season survey. During culturing, the cysts did not hatch; therefore, conclusive identification to species was not possible. The inability of this feature to pond water for a sufficient duration under normal rain fall conditions to complete fairy shrimp reproduction significantly reduces its habitat value. It's very possible that cysts from neighboring features were transported to this Seasonal Feature BB by vehicle and wildlife movement; however, it is unlikely that this feature provides adequate habitat for fairy shrimp.

Seasonal Feature CC

Feature CC is a pit excavated for the purpose of repairing an oil field pipeline located in the central portion of the Project Site directly adjacent to a well-used oil field operation road. At maximum extent, the seasonal feature covers approximately 0.003 acre and averages approximately 12 to 13 centimeters deep. Seasonal Feature CC is mostly bare and vegetated areas are dominated by hyssop loosestrife.

The versatile fairy shrimp was detected in Seasonal Feature CC during the 2011-2012 wet-season surveys and 2012 dry-season survey and in vitro culturing of hatched shrimp. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature CC is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature CC is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature DD

Seasonal Feature DD consists of a depression in the central portion of the Project Site within an area of stockpiled concrete adjacent to a dirt road. At maximum extent, the seasonal feature covers approximately 0.003 acre and averages approximately 4.5 centimeters deep. Seasonal Feature DD is dominated by clustered tarweed. Menzies' goldenbush is also present but is not a dominant species.

Seasonal Feature DD did not exhibit ponding during 2011-2012 wet-season surveys, the first year of monitoring for this feature, and as such, no fairy shrimp were detected. A dry-season survey was conducted in 2012 where *Branchinecta* cysts were observed and isolated from the feature. During *Branchinecta* cyst culturing, non-listed versatile fairy shrimp were identified. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature DD is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature DD is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature EE

Seasonal Feature EE consists of a depression on an inactive or abandoned oil well pad located in the central portion of the Project Site. At maximum extent, the seasonal feature covers approximately 0.003 acre and averages approximately 3 to 6 centimeters deep.

Seasonal Feature EE is dominated by native clustered tarweed and non-native annual rabbitsfoot grass. Non-dominant species present within the feature include star-thistle, curly dock, and Menzies' goldenbush.

Seasonal Feature EE did not exhibit ponding during 2011-2012 wet-season surveys, the first year of monitoring for this feature, and as such, no fairy shrimp were detected. A dry-season survey was conducted in 2012 where *Branchinecta* cysts were observed and isolated from the feature. During *Branchinecta* cyst culturing, non-listed versatile fairy shrimp were identified. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature EE is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature EE is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature FF

Seasonal Feature FF consists of a depression on an inactive or abandoned oil well pad located in the central portion of the Project Site. Seasonal Feature FF overlays an abandoned oil well and it is believed that the depression formed as the soils above the remediated well settled following remediation. At maximum extent, the seasonal feature covers approximately 0.005 acre and averages approximately 3 centimeters deep. Seasonal Feature FF is dominated by non-native star-thistle and native clustered tarweed. Non-dominant species present within the feature include red brome, fivehorn smotherweed (*Bassia hyssopifolia*), prickly Russian thistle (*Salsola tragus*), shortpod mustard, and Menzies' goldenbush.

Seasonal Feature FF did not exhibit ponding during the 2011-2012 wet-season surveys, the first year of monitoring for this seasonal feature, and as such, no fairy shrimp were detected. According to information provided by the BRC to USFWS, this seasonal feature was impacted between January 9, 2011 and February 13, 2011 and therefore is no longer expected to support fairy shrimp. However, a single *Branchinecta* cyst was isolated from Seasonal Feature FF during the 2012 dry-season survey. During *Branchinecta* cyst culturing, non-listed versatile fairy shrimp were identified. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature FF is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature FF is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature GG

Seasonal Feature GG is within an active oil well site and consists of a series of depressions and road ruts that occurs at a low point within a major well-used access road on site. Prior to installation of the well the area was already part of an existing road. At maximum extent, the seasonal feature covers approximately 0.003 acre and averages approximately 7 to 8 centimeters deep. The feature is mostly unvegetated with limited quantities of upland grasses and forbs including shortpod mustard and red brome.

The versatile fairy shrimp was detected in Seasonal Feature GG during the 2011-2012 wet-season surveys and 2012 dry-season survey and in vitro culturing of hatched shrimp. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature GG is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature GG is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature HH

Seasonal Feature HH is a depression adjacent to an inactive or abandoned oil well located near the bluff adjacent to the western boundary of the Project Site. At maximum extent, the seasonal feature covers approximately 0.007 acre and averages approximately 7.5 centimeters deep. Seasonal Feature HH is dominated by native clustered tarweed. Non-dominant species present within the feature include mule fat, willow baccharis, salt heliotrope and annual yellow sweet clover.

Seasonal Feature HH exhibited brief ponding of about 2.5 centimeters in 2011-2012, sufficient for one sampling opportunity during which the versatile fairy shrimp was detected. In addition, three *Branchinecta* cysts were isolated from Seasonal Feature HH during the 2012 dry-season survey. During *Branchinecta* cyst culturing, non-listed versatile fairy shrimp were identified. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature HH is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature HH is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature II

Seasonal Feature II was likely created by an anthropogenic bulldozer scrape adjacent to an inactive or abandoned oil well pad located near the bluff adjacent to the western boundary of the Project Site. At maximum extent, the seasonal feature covers approximately 0.002 acre and

averages approximately 3 centimeters deep. Seasonal Feature II is dominated by native salt heliotrope. Non-dominant species include clustered tarweed, hyssop loosestrife, and annual rabbitsfoot grass.

Seasonal Feature II exhibited ponding for less than seven days during 2011-2012 wet-season surveys, the first year of monitoring for this feature, and as such, no fairy shrimp were detected. However, 3 *Branchinecta* cysts in approximately 1.0 liter of soil were isolated from Seasonal Feature II during the 2012 dry-season survey. During culturing, the cysts did not hatch; therefore, conclusive identification to species was not possible. The inability of this feature to pond water for a sufficient duration under normal rain fall conditions to complete fairy shrimp reproduction significantly reduces its habitat value. It's very possible that cysts from neighboring features were transported to this Seasonal Feature II by vehicle and wildlife movement; however, it is unlikely that this feature provides adequate habitat for fairy shrimp.

Seasonal Feature JJ

Seasonal Feature JJ consists of a roadside depression adjacent to an oil field pipeline along a well-used oil field operation road along the western boundary of the Project Site. At maximum extent, the seasonal feature covers approximately 0.005 acre and averages approximately 4 centimeters deep. Seasonal Feature JJ supports one dominant species: non-native star-thistle. Additional occurrences include Cuman ragweed, clustered tarweed, salt heliotrope, and California brittlebush (*Encelia californica*).

Seasonal Feature JJ did not exhibit ponding in 2011-2012, the first year of monitoring for this seasonal feature, and as such, no fairy shrimp were detected. No fairy shrimp were detected in Seasonal Feature JJ during the 2012 dry-season surveys. In conclusion, Seasonal Feature JJ is not occupied by the non-listed versatile fairy shrimp or federally-listed San Diego fairy shrimp based on a complete protocol survey. No further surveys are recommended. Seasonal Feature JJ is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature KK

Seasonal Feature KK occupies an area of a former oil field road directly north of a well-used oil field operation road located near the bluff adjacent to the western boundary of the Project Site. At maximum extent, the seasonal feature covers approximately 0.017 acre and averages approximately 4 centimeters deep. Seasonal Feature KK is dominated by native pale spikerush (*Eleocharis palustris*) and shortpod mustard. Non-dominant species present within the feature

include soft brome, curly dock, annual rabbitsfoot grass, and star-thistle. Non-dominant species include clustered tarweed, Cuman ragweed, salt heliotrope, and western goldentop.

Seasonal Feature KK was surveyed on a single occasion in 2010-2011, the first year of surveys for this feature, when versatile fairy shrimp were still present in some seasonal features; nevertheless no fairy shrimp were detected. Seasonal Feature KK did not exhibit ponding in 2011-2012, and as such, no fairy shrimp were detected. However, during the 2012 dry-season survey, *Branchinecta* cysts were isolated from Seasonal Feature KK. During *Branchinecta* cyst culturing, non-listed versatile fairy shrimp were identified. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature KK is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature KK is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature LL

Seasonal Feature LL consists of a depression that appears to be from a bulldozer scrape located in the southern portion of the Project Site. At maximum extent, the seasonal feature covers approximately 0.001 acre and averages approximately 4 centimeters deep.

Feature LL is dominated by soft brome and prairie plantain (*Plantago elongata*). Non-dominant species within the feature include red brome, curly dock, clustered tarweed, saltgrass, and Menzies' goldenbush.

Seasonal Feature LL exhibited ponding for less than five days on a single occasion during 2011-2012 wet-season surveys, the first year of monitoring for this seasonal feature, and as such, no fairy shrimp were detected. However, *Branchinecta* cysts were isolated from Seasonal Feature LL during the 2012 dry-season survey. During *Branchinecta* cyst culturing, non-listed versatile fairy shrimp were identified. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature LL is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature LL is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature MM

Seasonal Feature MM consists of a depression adjacent to an oil field pipeline within a former oil field road located in the southern portion of the Project Site. At maximum extent, the seasonal feature covers approximately 0.003 acre and averages approximately 4 centimeters deep. Seasonal Feature MM is dominated by annual rabbitsfoot grass and common brassbuttons. Non-

dominant species include soft brome, curly dock, clustered tarweed, pale spikerush, annual yellow sweetclover, and annual fescue.

The versatile fairy shrimp was detected in Seasonal Feature MM during wet-season surveys conducted in 2000. Seasonal Feature MM exhibited ponding for less than five days on a single occasion during 2011-2012 wet-season surveys, and as such, no fairy shrimp were detected. Additionally, *Branchinecta* cysts were isolated from Seasonal Feature MM during the 2012 dry-season survey. During *Branchinecta* cyst culturing, non-listed versatile fairy shrimp were identified. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature MM is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature MM is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature NN

Seasonal Feature NN consists of an almost imperceptible depression located in the southern portion of the Project Site. At maximum extent, the seasonal feature covers approximately 0.003 acre and averages approximately 7 centimeters deep. Seasonal Feature NN is dominated by curly dock and hare barley (*Hordeum murinum* ssp. *leporinum*). Non-dominant species include soft brome, ripgut brome (*Bromus diandrus*), and longbeak stork's bill.

Seasonal Feature NN did not exhibit ponding during 2011-2012 wet-season surveys, the first year of monitoring for this seasonal feature, and as such, no fairy shrimp were detected. Dry-season surveys were conducted in 2012 and no fairy shrimp cysts were observed. In conclusion, Seasonal Feature NN is not occupied by the non-listed versatile fairy shrimp or federally-listed San Diego fairy shrimp based on a complete protocol survey. No further surveys are recommended. Seasonal Feature NN is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature OO

Seasonal Feature OO consists of a depression within an oil field access road located in the southern portion of the Project Site. At maximum extent, the seasonal feature covers approximately 0.001 acre and averages approximately 6 centimeters deep. While Seasonal Feature OO is limited in size, it exhibits a diversity of species; however, salt sandspurry was the only dominant species observed. Associated species include longbeak stork's bill, soft brome, annual fescue, common brassbuttons, clustered tarweed, shortpod mustard, and red brome.

Seasonal Feature OO did not exhibit ponding during 2011-2012 wet-season surveys, the first year of monitoring for this feature, and as such, no fairy shrimp were detected. However, *Branchinecta* cysts were isolated from Seasonal Feature OO during the 2012 dry-season survey. During *Branchinecta* cyst culturing, non-listed versatile fairy shrimp were identified. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature OO is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature OO is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature PP

Seasonal Feature PP consists of a depression adjacent to a well-used paved oil field operation road located in the southern portion of the Project Site. At maximum extent, the seasonal feature covers approximately 0.001 acre and averages approximately 3 centimeters deep. Seasonal Feature PP is dominated by annual rabbitsfoot grass. Non-dominant species present within the feature include common brassbuttons, curly dock, and clustered tarweed.

The versatile fairy shrimp was detected in Seasonal Feature PP during wet-season surveys conducted in 2000. Seasonal Feature PP did not exhibit ponding during 2011-2012 wet-season surveys, and as such, no fairy shrimp were detected. Additionally, *Branchinecta* cysts were isolated from Seasonal Feature PP during the 2012 dry-season survey. During *Branchinecta* cyst culturing, non-listed versatile fairy shrimp were identified. The federally-listed San Diego fairy shrimp was not detected during surveys. In conclusion, Seasonal Feature PP is occupied by the non-listed versatile fairy shrimp based on a complete protocol survey. Seasonal Feature PP is, therefore, not subject to future survey requirements for listed branchiopods.

Seasonal Feature QQ

Seasonal Feature QQ consists of a depression adjacent to a dirt oil field operation road within the southeastern portion of the Project Site. At maximum extent, the seasonal feature covers approximately 0.003 acre and averages approximately 5 centimeters deep. Seasonal Feature QQ is dominated by Menzies' goldenbush, shortpod mustard, longbeak stork's bill, and soft brome. Non-dominant species within Seasonal Feature QQ include annual fescue, curly dock, redstem stork's bill (*Erodium cicutarium*), and Italian thistle.

Seasonal Feature QQ was subject to dry-season surveys in 2011 and 2012, during which no fairy shrimp cysts were detected. This seasonal feature did not exhibit ponding during 2011-2012 wet-season surveys; nevertheless, given the lack of cysts during two dry-season survey, no fairy

Ms. Christine Medak

*Subject: Summary of Protocol Surveys for Federally-Listed Vernal Pool Branchiopods
Conducted on Newport Banning Ranch*

shrimp are expected and it is Dudek's and GLA's opinion that wet season surveys should not be required. In their letter to the City of Newport Beach, dated October 28, 2011, USFWS concurred that protocol surveys were complete for Seasonal Feature QQ (USFWS 2011).

Seasonal Feature RR

Seasonal Feature RR consists of depressed tire ruts located in the southeastern quadrant of the Project Site. At maximum extent, the seasonal feature covers approximately 0.001 acre. Seasonal Feature RR is dominated by clustered tarweed, soft brome, and annual fescue. Non-dominant species within the feature include longbeak stork's bill, curly dock, star-thistle, and redstem stork's bill.

Seasonal Feature RR did not exhibit ponding during 2011-2012 wet-season surveys, and as such, no fairy shrimp were detected. It should be noted that in their letter to the City of Newport Beach, dated October 28, 2011, USFWS determined that Seasonal Feature RR was not a vernal pool and exhibits no potential for supporting listed fairy shrimp (USFWS 2011).

Seasonal Feature SS

Seasonal Feature SS consists of a depression adjacent to an inactive or abandoned oil well within the southeastern portion of the Project Site. At maximum extent, the seasonal feature covers approximately 0.002 acre. Seasonal Feature SS is dominated by native deerweed (*Acmispon glaber*) and annual fescue. Non-dominant species within the feature include Menzies' goldenbush, telegraphweed, star-thistle, curly dock.

Seasonal Feature SS did not exhibit ponding during 2011-2012 wet-season surveys, and as such, no fairy shrimp were detected. It should be noted that in their letter to the City of Newport Beach, dated October 28, 2011, USFWS determined that Seasonal Feature SS was not a vernal pool and exhibits no potential for supporting listed fairy shrimp (USFWS 2011).

Seasonal Feature TT

Seasonal Feature TT consists of a depression within the southeastern portion of the Project Site. At maximum extent, the seasonal feature covers approximately 0.001 acre. Seasonal Feature TT is dominated by soft brome, Menzies' goldenbush, and annual yellow sweetclover. Non-dominant species present within the feature include curly dock and longbeak stork's bill.

Seasonal Feature TT did not exhibit ponding in 2011-2012, and as such, no fairy shrimp were detected. It should be noted that in their letter to the City of Newport Beach, dated October 28,

2011, USFWS determined that this Seasonal Feature TT was not a vernal pool and exhibits no potential for supporting listed fairy shrimp (USFWS 2011).

Seasonal Feature 24b

Feature 24b no longer exists. This feature is identified on Slide 174 of the BRC *Complete Vernal Pools 1st Edition* where is simply references the GLA 2000 Fairy Shrimp Report wherein this feature was identified as “Depression 3”. Depression 3 consisted of an excavated pit that was apparently related to oil facilities and was approximately three feet deep and was found to support the versatile fairy shrimp as clearly described in the GLA 2000 Report.

Seasonal Feature 49a

The approximate location of Seasonal Feature 49a is depicted on Slide 266 of the BRC *Complete Vernal Pools 1st Edition* and Slide 267 provides an oblique aerial photograph of this feature. The oblique aerial photograph was taken on December 28, 2010, immediately following approximately two weeks of rainfall that accounted for 647-percent of normal rainfall for December. GLA has revisited the area depicted on Slide 267 and has not detected areas exhibited notable depressional topography, soils characteristics or vegetation consistent with regular ponding or prolonged ponding.

Seasonal Feature 49b

The approximate location of Seasonal Feature 49b is depicted on Slide 266 of the BRC *Complete Vernal Pools 1st Edition* and Slide 267 provides an oblique aerial photograph of this feature. The oblique aerial photograph was taken on December 28, 2010, immediately following approximately two weeks of rainfall that accounted for 647-percent of normal rainfall for December. GLA has revisited the area depicted on Slide 267 and has not detected areas exhibited notable depressional topography, soils characteristics or vegetation consistent with regular ponding or prolonged ponding.

Seasonal Feature 6

During surveys in 2011, GLA determined that Seasonal Feature 6 was located on the Newport-Mesa Unified School District property. No surveys were performed or will be performed as part of the Project.

CONCLUSIONS

Of the 49 seasonal features surveyed, according to the 1996 USFWS survey guideline, for the determination of the presence or absence of federally-listed vernal pool branchiopods, 8 seasonal features (Seasonal Features VP1, VP2, VP3, E, G, H, I, and J) were conclusive for the presence federally endangered San Diego fairy shrimp (*Branchinecta sandiegonensis*). Any future activity that has potential to impact these occupied seasonal features, and therefore, the listed species, will require an Incidental Take Permit through the U.S. Fish and Wildlife Services under Section 7 or 10 of the federal Endangered Species Act of 1973 (ESA). No further protocol surveys are required for these seasonal features.

The non-listed versatile fairy shrimp (*Branchinecta lindahli*) occupied an additional 26 seasonal features (Table 3), based on completed protocol surveys. An additional 7 seasonal features were void of fairy shrimp and 3 were considered unsuitable habitat for listed vernal pool branchiopods. Therefore, these 36 seasonal features are not subject to future survey requirements for federally-listed branchiopods or have any restrictions or requirements under the ESA.

Four seasonal features (L, Q, BB, and II) contained small number of fairy shrimp cysts that did not hatch during the culturing process. The wet-season survey revealed that under normal rainfall these seasonal features were incapable of sufficient inundation for a duration that could have allowed for the completion of fairy shrimp reproduction. It is, therefore, that we conclude that Seasonal Features L, Q, BB, and II contain unlikely fairy shrimp habitat.

Lastly, Seasonal Features 24b, 49a, 49b were not surveyed since they were not detected in the field by GLA during surveys in 2011. Another feature, Seasonal Feature 6, is located outside the Project site on the Newport-Mesa Unified School District property and was not surveyed. These 4 seasonal features are not subject to future survey requirements for federally-listed branchiopods or have any restrictions or requirements under the ESA.

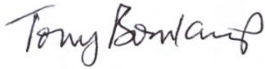
It is our opinion that completed protocol surveys were conducted for all seasonal features on the Newport Banning Ranch in accordance with the USFWS 1996 survey guidelines. Additionally, the 2012 dry-season surveys included the extra step of culturing cysts, when present in a seasonal feature, and identification of the branchiopods, once maturity was reached. This proved critical for several features that lack reliable hydrologic conditions for branchiopods. With these efforts combined, it is our opinion that surveys for listed branchiopods are complete for the Project Site.

Ms. Christine Medak

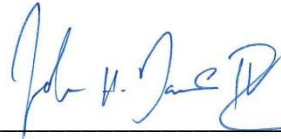
*Subject: Summary of Protocol Surveys for Federally-Listed Vernal Pool Branchiopods
Conducted on Newport Banning Ranch*

If you have any questions regarding this report, please contact Mr. Bomkamp at (949) 837-0404, ext. 42, or Mr. Davis IV at (805) 963-0651, ext. 3524.

Sincerely,



Tony Bomkamp, MS
Glenn Lukos Associates, Inc.
Senior Biologist



John H. Davis IV, MS, CE
Dudek
Senior Ecologist

Att.: References

Figure 1: Site Location

Figure 2: Biological Survey Area

Figure 3: Summary of Survey Results

90-Day Dry-Season Protocol Survey Report for Federally-Listed Vernal Pool Branchiopods on the Newport Banning Ranch.

Ms. Christine Medak

Subject: Summary of Protocol Surveys for Federally-Listed Vernal Pool Branchiopods
Conducted on Newport Banning Ranch

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Ms. Christine Medak

*Subject: Summary of Protocol Surveys for Federally-Listed Vernal Pool Branchiopods
Conducted on Newport Banning Ranch*

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Figure 1
Site Location

SOURCE: Copyright© 2009 ESRI
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Summary of Protocol Surveys for Federally-Listed Vernal Pool
Branchiopods Conducted on Newport Banning Ranch

NEWPORT BANNING RANCH

DUDEK



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Figure 2
Biological Survey Area



Figure 3
Summary of Survey Results

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January 29, 2013

7248

U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
Attn: Recovery Permit Coordinator
6010 Hidden Valley Road
Carlsbad, California 92011

Subject: 90-Day Dry-Season Protocol Survey Report for Federally-Listed Vernal Pool Branchiopods on the Newport Banning Ranch, City of Newport Beach and Unincorporated Orange County, Orange County, California. Permit Numbers TE139634-2 and TE60147A-0.

Dear Recovery Permit Coordinator:

This report is intended to fulfill reporting requirements in accordance with the Section 10(a)(1)(A) permit and also to provide a summary of a dry-season survey for fairy shrimp for Newport Banning Ranch property (Project Site). This report includes the survey methods and results; Figures (*Appendix A*); Photo Plates (*Appendix B*); Examination of Soil Samples from an Orange County, CA Site for Fairy Shrimp Cysts and Cyst Culturing Results – Ecological Restoration Service (*Appendix C*); U.S. Fish and Wildlife Service Vernal Pool Data Sheets, Dry-Season Survey (*Appendix D*); and California Department of Fish and Wildlife (formerly the California Department of Fish and Game), California Native Species Field Survey Form (*Appendix E*).

Dudek senior wildlife biologist Brock A. Ortega (permit number TE813545) submitted a Notification of Dry Season Survey for Vernal Pool Branchiopods – Newport Banning Ranch Project, Orange County, California to U.S. Fish and Wildlife Service (USFWS) Carlsbad office recovery permit coordinator Ms. Susie Tharratt on October 29, 2012. Survey approval was received from the USFWS Carlsbad office via email from Ms. Susie Tharratt on October 31, 2012.

This report documents the results of a dry-season survey for vernal pool branchiopods for the Newport Banning Ranch, located in the City of Newport Beach and unincorporated Orange County, California. The dry-season survey soil collection was performed by Dudek biologists Thomas Liddicoat (TE139634-2) and Heather Moine (TE60147A-0). Soil samples were submitted to Ecological Restoration Service biologist Charles Black (TE835549-8) to process the

dry soil samples for the presence of fairy shrimp cysts and to culture cysts to identify to species level, as permitted as a special condition in his 10(a)(1)(A) permit.

Surveys focused on the determination of presence/absence for the federally listed endangered San Diego fairy shrimp (*Branchinecta sandiegonensis*) and the federally listed endangered Riverside fairy shrimp (*Streptocephalus woottoni*) in accordance with the April 19, 1996, *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* (USFWS 1996). Samples were collected from within 34 seasonal features throughout the approximately 401.07-acre Project Site. Non-listed versatile fairy shrimp (*Branchinecta lindahli*) and federally endangered San Diego fairy shrimp were detected.

PROJECT LOCATION AND EXISTING CONDITIONS

The Newport Banning Ranch property (Project Site) covers approximately 401.07 acres and is located in the City of Newport Beach and unincorporated Orange County, *Appendix A – Figure 1*. The Project Site is located north of Pacific Coast Highway (PCH), east of the Santa Ana River, south of 19th Street (extended), and west of existing residential and commercial/industrial areas. The Project Site is situated within un-sectioned areas of Township 6 South, and Range 10 West of the U.S. Geological Survey (USGS) Newport Beach 7.5' Topographic quadrangle map. Coordinates for the site in longitude and latitude are as follows: 33.634102°, -117.943283°.

The Project Site has been utilized as an active oil field for over 70 years where ongoing oil extraction operations along with remnant oil wells and pipelines occur throughout the site. The site includes flat lowlands throughout the western portion of the property; south and west facing slopes located east of the lowlands, a southwest facing bluff overlooking the Newport Shores residential area, a large mesa that encompasses the eastern portion of the site, and two arroyos that bisect the mesa. All of the seasonal features are located on the mesa. While the mesa may have supported natural vernal pools prior to widespread disturbance of the mesa by the oil field operations the vast majority of seasonal features that currently occupy the mesa have been created in the course of oil field operations and maintenance, such as oil exploration, oil pad development/abandonment, excavation, soil remediation, and storm water control. The location of each seasonal feature discussed herein is depicted on *Appendix A – Figure 2 and Figure 3*.

Soil Types

Based on review of the Orange County U.S. Department of Agriculture Natural Resources Conservation Service soil survey map (USDA-NRCS 2012), the primary soils within the Project

Site include beaches, Bolsa silt loam, Capistrano sandy loam, Marina loamy sand, Myford sandy loam, Pits, Riverwash, and Tidal Flats. Beaches are narrow, sandy, and stony areas along the Pacific Ocean that are not stable and may change from sandy to stony or from stony to sandy during storms. The Bolsa series consists of somewhat poorly drained soils on alluvial fans. The Capistrano series consists of well-drained soils formed in sedimentary alluvium of the coastal foothills. The Marina series consists of gently sloping to moderately steep soils on short rolling dune-like slopes formed in old sand dunes near the coast. The Myford series consists of moderately well drained soils on marine terraces formed in sandy sediments. The Pit series consists of very deep, poorly drained soils that formed in fine-textured alluvium weathered from extrusive and basic igneous rocks on flood plains and in basins. Riverwash consists of areas of unconsolidated alluvium, generally stratified and varying widely in texture; sandy, gravelly, or cobbly. Tidal Flats are nearly level areas adjacent to bays and lagoons along the coast, periodically covered by tidal overflow, poorly drained and high in salts.

Vegetation Communities, Basin/Swale, and Land Cover Types

Vegetation on site is a mixture of native scrub, grassland, treed wetlands, wetland, and invasive/ornamental communities. The seasonal features are ephemerally wet depressions located on the upland mesa within the eastern half of the Project Site. A majority of the seasonal features area either road-rut type depressions, void of vegetation, or located adjacent to frequently traveled access roads.

Plant species observed within the 34 seasonal features included hyssop loosestrife (*Lythrum hyssopifolia*), common brassbuttons (*Cotula coronipifolia*), clustered tarweed (*Deinandra fasciculata*), annual fescue (*Vulpia myuros*), annual rabbitsfoot grass (*Polypogon monspeliensis*), salt sandspurry (*Spergularia marina*), willow baccharis (*Baccharis salicina*), annual yellow sweetclover (*Melilotus indicus*), curly dock (*Rumex crispus*), Spanish false fleabane (*Pulicaria paludosa*), western goldentop (*Euthamia occidentalis*), mule fat (*Baccharis salicifolia*), soft brome (*Bromus hordeaceus*), shortpod mustard (*Hirschfeldia incana*), Cuman ragweed (*Ambrosia psilostachya*), salt heliotrope (*Heliotropium curassavicum*), alkali seaheath (*Frankenia salina*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), Menzies' goldenbush (*Isocoma menziesii*), Jersey cudweed (*Pseudognaphalium luteoalbum*), Canadian horseweed (*Conyza canadensis*), star-thistle (*Centaurea melitensis*), fivehorn smotherweed (*Bassia hyssopifolia*), prickly Russian thistle (*Salsola tragus*), red brome (*Bromus madritensis* ssp. *rubens*), prairie plantain (*Plantago elongata*), saltgrass (*Distichlis spicata*), pale spikerush (*Eleocharis palustris*), hare barley (*Hordeum murinum* ssp. *leporinum*), ripgut brome (*Bromus diandrus*), longbeak stork's bill (*Erodium botrys*), and redstem stork's bill (*Erodium cicutarium*).

PREVIOUS BRANCHIOPOD STUDIES

Over the course of several years, Glenn Lukos Associates (GLA) conducted numerous focused wet-season and one dry-season survey for fairy shrimp within 49 of the 53 seasonal features that have inundated (i.e. ponded) to varying degrees during winter seasons that experience substantial rain fall. Wet-season surveys were conducted in 2000 and 2007 through 2012. A dry-season survey was conducted by GLA for a single feature in 2011. During these surveys, protocol level surveys were completed at 15 of the seasonal features. Results are included in the *Summary of Protocol Surveys for Federally-Listed Vernal Pool Branchiopods Conducted on Newport Banning Ranch* report (Dudek 2013). Detailed results of these surveys are available in the focused survey reports that have been submitted to the USFWS for each survey.

This 2012 dry-season protocol survey was conducted for the remaining 34 seasonal features in November and December of 2012, which also included cyst analysis, culturing, and identification.

SURVEY METHODOLOGY

Soil Sample Collection

USFWS protocol level dry-season sampling was conducted according to protocol requirements by Dudek biologists Thomas Liddicoat and Heather Moine on November 1, 2012 from 0715 to 1800. Field conditions were slightly overcast clearing in the afternoon, temperatures ranged from 61°F to 69°F, and winds averaged 2 miles per hour from the east southeast.

Soil samples were collected from the bottom of each seasonal feature when the soil was very dry and a small 6-inch hand trowel was used to excavate ten samples (approximately 100 milliliter each) of soil. Samples were collected equidistantly along two perpendicular transects (lengthwise [transect A] and widthwise [transect B]), incorporating the deepest region of the seasonal feature, and thoroughly sampling the seasonal feature surface area. If neither transect passed within the deepest region of the seasonal feature, another sample was taken to specifically include it; however no more than ten samples were extracted from any seasonal feature during surveys.

Immediately after sample collection, the soil was carefully placed into a brown paper lunch-sized bag and labeled according to seasonal feature, transect, and position (e.g., H-A-1, H-A-2, H-B-1, H-B-2, etc.). Sample bags from each seasonal feature were then placed into a larger bag or box for organization. Samples collected from the seasonal features were submitted to Charles Black of Ecological Restoration Service in November 2012.

Soil Processing for Cyst Presence

The samples were processed per the USFWS April 19, 1996 *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* (USFWS 1996), modified by Ecological Restoration Service as described below. Charles Black of Ecological Restoration Service is authorized by the USFWS to process dry samples for the presence of fairy shrimp cysts and to culture cysts to identify to species level as special conditions of his 10(a)(1)(A) permit.

Samples were hydrated for approximately 2-10 hours in tap water, then washed through a set of sieves. Material passing through a Number 45 (.0139") USA Standard Testing Sieve, A.S.T.M.E.-11 specification and caught on a Number 70 (.0083") Sieve was rinsed into a container with approximately 50 ml of a saturated brine solution to float organic material, including fairy shrimp cysts. The material floating on the brine was decanted onto a paper filter on a filter funnel, and water was removed through the filter paper by vacuum suction. The material left on the paper was examined under a 6.3-570x power Olympus SZX9 Zoom Stereo Microscope. Distinctive fairy shrimp cysts, if present, were individually counted (if less than approximately 50) or estimated (for larger numbers) by examining ¼ or ½ subsections of the filter and multiplying the subset by the appropriate factor. The presences of ostracod shells and cladoceran ephippia were also noted in samples.

Culturing Cysts

Recovered cysts were combined by seasonal feature (where total numbers for all samples were less than 1,000) or partial samples were combined (where total numbers for samples were greater than 1,000) and hydrated with approximately 4 liters of Arrowhead Mountain Spring Water in plastic food serving containers and placed in a semi-sunny location in the Mission Hills area of San Diego, CA.

After four to five days, when hatched nauplii were observed, cultures were fed twice daily with a tablespoon of a yeast culture made by dissolving approximately ¼ teaspoon of yeast in warm water with approximately ¼ teaspoon of added sugar. Mature individuals were observed in most cultures after approximately one week from commencement of feeding, and were removed, identified, and preserved in a 95% ethyl alcohol (Everclear) solution. Mature male San Diego fairy shrimp (*Branchinecta sandiegonensis*) can be distinguished from versatile fairy shrimp (*Branchinecta lindahli*) by distinctive differences in distal antennae. Female San Diego fairy shrimp can be distinguished by paired medio-dorsal humps on anterior thoracic segments, compared with single humps that extend further back on versatile fairy shrimp females.

Please view the attached dry season report by Ecological Restoration Service for more detailed information regarding dry season analysis, *Appendix C*.

DRY-SEASON SURVEY RESULTS

Cyst Presence and Other Aquatic Invertebrates

Distinctive *Branchinecta* cysts were present in one or more samples from 26 of the 34 seasonal features, *Table 1* and *Appendix A – Figure 3*. Numbers of cysts per sample (where present) ranged from 1 to an estimated 2,800. Total numbers of cysts summed for all ten samples of individual seasonal features ranged from 1 to an estimated 20,000. There was a positive relationship between the average number of cysts from all ten samples of a seasonal feature and the percentage of the ten samples that had cysts present.

Ostracod shells were found in 15 seasonal features, all of which also had fairy shrimp present. Ostracod shells were not found in an additional 11 seasonal features where *Branchinecta* cysts were found. Cladoceran ephippia were found in two seasonal features, both of which had ostracod shells and *Branchinecta* cysts.

Cultured Cysts

Hatched fairy shrimp were cultured from 21 of 26 cultures where cysts had been recovered, *Table 1*. Generally, numbers of hatched shrimp were proportional to numbers of cysts cultured. In several cases, with very small numbers of cysts recovered, several more shrimp were produced than cysts were counted. This is probably due to a few cysts being covered by organic material, and thus being missed during examination.

Federally endangered San Diego fairy shrimp were identified from a single seasonal feature, H, *Table 1*. Other seasonal features contained non-listed versatile fairy shrimp. No seasonal features contained a mixture of these fairy shrimp species.

Table 1
Summary of Cyst, Ostracod, and Cladoceran Ehippia
Presence in Seasonal Features, and Culturing Results for 2012 Dry-Season Survey

Seasonal Feature ID	Total Numbers of Cysts Present in 10 Samples	Ostracods Present	Cladoceran Ehippia Present	Number of Individuals Identified from Cultures			
				Versatile Fairy Shrimp (<i>Branchinecta lindahl</i>)		San Diego Fairy Shrimp (<i>Branchinecta sandiegonensis</i>)	
				Males	Females	Males	Females
C	4,966	✓	✓	11	5		
D	5,291			9	3		
F	0						
H	653					12	10
K	3	✓			1		
L	2	✓		None*			
M	845	✓		10	2		
N	1			None*			
P	625			10			
Q	1	✓		None*			
R	0						
S	0						
U	0						
W	1	✓		2			
X	56	✓		6	4		
Y	70	✓		9	2		
Z	35	✓		6	5		
AA	0						
BB	4	✓		None*			
CC	20,000	✓		3	8		
DD	16	✓	✓	4	2		
EE	10			8	1		
FF	1			2	4		
GG	2			2	1		
HH	3			1			
II	3	✓		None*			
JJ	0						
KK	19	✓		5	7		
LL	409			9	4		
MM	4,211	✓		5	3		
NN	0						
OO	20			2	11		
PP	62			2	6		
QQ	0						

* - Unsuccessful hatching. Cysts identified as *Branchinecta* sp.

Recovery Permit Coordinator

*Subject: 90-Day Dry-Season Protocol Survey Report for Federally-Listed Vernal Pool
Branchiopods on the Newport Banning Ranch*

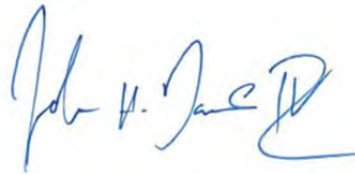
I certify that the information presented in this survey report and attached appendices fully and accurately represents my work.

If you have any questions regarding this letter report, or need any additional information, please feel free to call me at (805) 963-0651, ext. 3522 or hmoine@dudek.com or John H. Davis IV at (805) 963-0651, ext. 3524 or jdavis@dudek.com.

Sincerely,



Heather Moine
Biologist/Environmental Scientist



John H. Davis IV, MS, CE
Senior Ecologist

*Att.: Appendix A – Figures
Appendix B – Photo Plates
Appendix C – Examination of Soil Samples from an Orange County, CA Site for Fairy Shrimp Cysts and Cyst
Culturing Results – Ecological Restoration Service
Appendix D – U.S. Fish and Wildlife Service Vernal Pool Data Sheets, Dry-Season Survey
Appendix E – California Department of Fish and Wildlife, California Native Species Field Survey Form*

*cc: Michael Mohler, Newport Banning Ranch LLC
Scientific Collecting Permit Coordinator, Wildlife Branch, California Department of Fish and Wildlife
Thomas Liddicoat, Dudek*

Recovery Permit Coordinator

Subject: 90-Day Dry-Season Protocol Survey Report for Federally-Listed Vernal Pool Branchiopods on the Newport Banning Ranch

LITERATURE CITED

Dudek. 2013. *Summary of Protocol Surveys for Federally-Listed Vernal Pool Branchiopods Conducted on Newport Banning Ranch, City of Newport Beach and Unincorporated Orange County, California.*

USDA-NRCS (United States Department of Agriculture-Natural Resources Conservation Service). 2012. *Web Soil Survey*. National Cooperative Soil Survey. <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. Accessed 2012.

USFWS (United States Fish and Wildlife Service). 1996. *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods*. Sacramento, California. USFWS Sacramento Field Office. April 19.

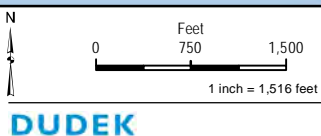
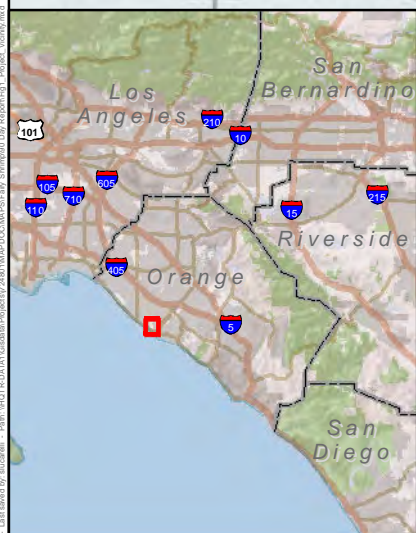
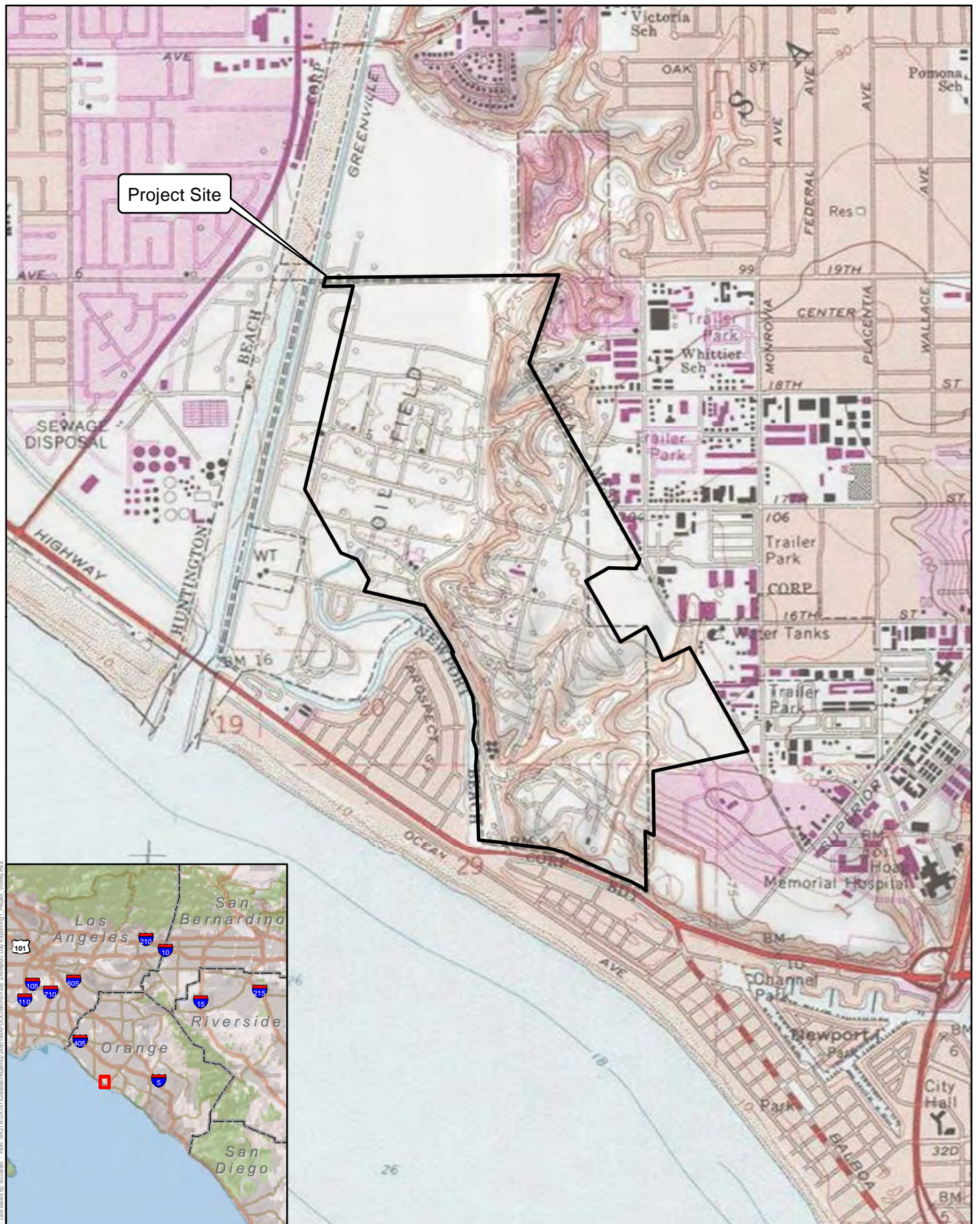
Recovery Permit Coordinator

*Subject: 90-Day Dry-Season Protocol Survey Report for Federally-Listed Vernal Pool
Branchiopods on the Newport Banning Ranch*

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APPENDIX A

Figures



SOURCE: Copyright© 2011 National Geographic Society, i-cubed
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NEWPORT BANNING RANCH

Figure 1
Site Location

90-Day Dry-Season Protocol Survey Report for Federally-Listed
Vernal Pool Branchiopods on the Newport Banning Ranch

Date: 10/24/2013 - Created by: slucarelli - Path: \\H0176\DATA\Geospatial\Projects\2480\MAPDOC\MAPS\Fig1.mxd - Project: Vernal.mxd



APPENDIX B

Photo Plates

APPENDIX B

Photo Plates



Photo 1. Seasonal Feature C during dry-season survey, November 1, 2012.



Photo 2. Seasonal Feature C during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 3. Seasonal Feature D during dry-season survey, November 1, 2012.



Photo 4. Seasonal Feature D during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 5. Seasonal Feature F during dry-season survey, November 1, 2012.



Photo 6. Seasonal Feature F during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 7. Seasonal Feature H during dry-season survey, November 1, 2012.



Photo 8. Seasonal Feature H during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 9. Seasonal Feature K during dry-season survey, November 1, 2012.



Photo 10. Seasonal Feature K during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 11. Seasonal Feature L during dry-season survey, November 1, 2012.



Photo 12. Seasonal Feature L during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 13. Seasonal Feature M during dry-season survey, November 1, 2012.



Photo 14. Seasonal Feature M during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 15. Seasonal Feature N during dry-season survey, November 1, 2012.



Photo 16. Seasonal Feature N during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 17. Seasonal Feature P during dry-season survey, November 1, 2012.



Photo 18. Seasonal Feature P during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 19. Seasonal Feature Q during dry-season survey, November 1, 2012.



Photo 20. Seasonal Feature R during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 21. Seasonal Feature S during dry-season survey, November 1, 2012.



Photo 22. Seasonal Feature U during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 23. Seasonal Feature W during dry-season survey, November 1, 2012.



Photo 24. Seasonal Feature W during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 25. Seasonal Feature X during dry-season survey, November 1, 2012.



Photo 26. Seasonal Feature X during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 27. Seasonal Feature Y during dry-season survey, November 1, 2012.



Photo 28. Seasonal Feature Y during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 29. Seasonal Feature Z during dry-season survey, November 1, 2012.



Photo 30. Seasonal Feature Z during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 31. Seasonal Feature AA during dry-season survey, November 1, 2012.



Photo 32. Seasonal Feature AA during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 33. Seasonal Feature BB during dry-season survey, November 1, 2012.



Photo 34. Seasonal Feature BB during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 35. Seasonal Feature CC during dry-season survey, November 1, 2012.



Photo 36. Seasonal Feature CC during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 37. Seasonal Feature DD during dry-season survey, November 1, 2012.



Photo 38. Seasonal Feature DD during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 39. Seasonal Feature EE during dry-season survey, November 1, 2012.



Photo 40. Seasonal Feature EE during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 41. Seasonal Feature FF during dry-season survey, November 1, 2012.



Photo 42. Seasonal Feature FF during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 43. Seasonal Feature GG during dry-season survey, November 1, 2012.



Photo 44. Seasonal Feature GG during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 45. Seasonal Feature HH during dry-season survey, November 1, 2012.



Photo 46. Seasonal Feature HH during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 47. Seasonal Feature II during dry-season survey, November 1, 2012.



Photo 48. Seasonal Feature II during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 49. Seasonal Feature JJ during dry-season survey, November 1, 2012.



Photo 50. Seasonal Feature JJ during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 51. Seasonal Feature KK during dry-season survey, November 1, 2012.



Photo 52. Seasonal Feature KK during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 53. Seasonal Feature LL during dry-season survey, November 1, 2012.



Photo 54. Seasonal Feature LL during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 55. Seasonal Feature MM during dry-season survey, November 1, 2012.



Photo 56. Seasonal Feature MM during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 57. Seasonal Feature NN during dry-season survey, November 1, 2012.



Photo 58. Seasonal Feature NN during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 59. Seasonal Feature OO during dry-season survey, November 1, 2012.



Photo 60. Seasonal Feature OO during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 61. Seasonal Feature PP during dry-season survey, November 1, 2012.



Photo 62. Seasonal Feature PP during dry-season survey, November 1, 2012.

APPENDIX B

Photo Plates



Photo 63. Seasonal Feature QQ during dry-season survey, November 1, 2012.



Photo 64. Seasonal Feature QQ during dry-season survey, November 1, 2012.

APPENDIX C

*Examination of Soil Samples from an Orange
County, CA Site for Fairy Shrimp Cysts and
Cyst Culturing Results –
Ecological Restoration Service*

Examination of Soil Samples from an Orange County, CA Site for Fairy Shrimp Cysts and Cyst Culturing Results

Chuck Black
Ecological Restoration Service
San Diego, CA 92103
(619) 944-1964
27 December, 2012

10(a)(1)(A) permit
TE835549-8
Effective to 3/9/2015

Introduction

Ecological Restoration Service was contracted by Dudek Engineering and Environmental, Encinitas, CA in November 2012 to process soil samples collected by from 34 seasonally ponding basins at the Newport Banning Ranch site, Orange County, CA, for determination of the presence of fairy shrimp cysts, and for culturing of *Branchinecta* cysts for identification to the species level of any cysts found.

Methods

Soil Processing for Cyst Presence

Ten individually packaged, approximately 100 ml dry soil samples per pool, collected by Thomas Liddicoat [10(a)(1)(A) permit number TE139634-2] and Heather Moine [10(a)(1)(A) permit number TE60147A-0] from the Newport Banning Ranch site, were delivered to Ecological Restoration Service in November 2012. The samples were processed per the U.S. Fish and Wildlife Service (USFWS) April 19, 1996 Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods, modified by Ecological Restoration Service as described below. Charles Black of Ecological Restoration Service is authorized by the U.S. fish and Wildlife Service to process dry samples for the presence of fairy shrimp cysts and to culture cysts to identify to species level as special conditions of his 10(a)(1)(A) permit. These samples were hydrated for approximately 2-10 hours in tap water, then washed through a set of sieves. Material passing through a Number 45 (.0139”) USA Standard Testing Sieve, A.S.T.M.E.-11 specification and caught on a Number 70 (.0083”) Sieve was rinsed into a container with approximately 50 ml of a saturated brine solution to float organic material, including fairy shrimp cysts. The material floating on the brine was decanted onto a paper filter on a filter funnel, and water was removed through the filter paper by vacuum suction. The material left on the paper was examined under a 6.3-570x power Olympus SZX9 Zoom Stereo Microscope. Distinctive fairy shrimp cysts, if present, were individually counted (if less than approximately 50) or estimated (for larger numbers) by examining ¼ or ½ subsections of the filter and multiplying the subset by the

appropriate factor. The presences of ostracod shells and cladoceran ephippia were also noted in samples.

Results

Cyst Presence

Distinctive *Branchinecta* cysts were present in one or more samples from 26 of the 34 basins (Table 1). Numbers of cysts per sample (where present) ranged from 1 to an estimated 2800. Total numbers of cysts summed for all ten samples of individual basins ranged from 1 to an estimated 20,000. There was a positive relationship between the average number of cysts from all ten samples of a pool and the percentage of the ten samples that had cysts present (Figure 1).

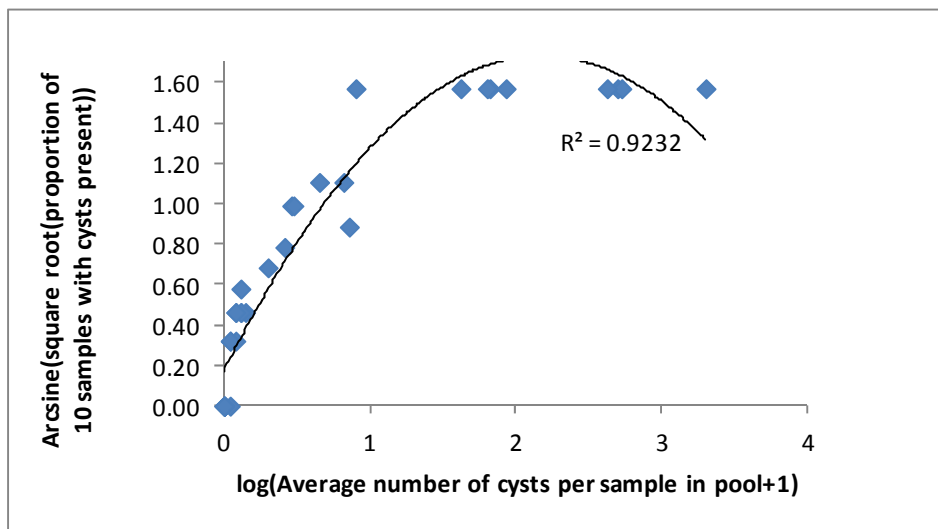


Figure 1 – Percentage of 10 samples per pool with cysts present versus average numbers of cysts per ten samples, values transformed for statistical purposes.

Other Aquatic Invertebrates

Ostracod shells were found in 15 basins (Table 2), all of which also had fairy shrimp present. Ostracod shells were not found in an additional 11 basins where *Branchinecta* cysts were found. Cladoceran ephippia were found in two basins (Table 2), both of which had ostracod shells and *Branchinecta* cysts.

Culturing of Cysts

Methods

Recovered cysts were combined by pool (where total numbers for all samples were less than 1000) or partial samples were combined (where total numbers for samples were greater than 1000) and hydrated with approximately 4 liters of Arrowhead Mountain Spring Water in plastic food serving containers and placed in a semi-sunny location in the Mission Hills area of San Diego, CA. Daily maximum and minimum temperatures during the culturing period at Lindbergh Field, approximately 5 miles from culturing site, are shown in Figure 2.

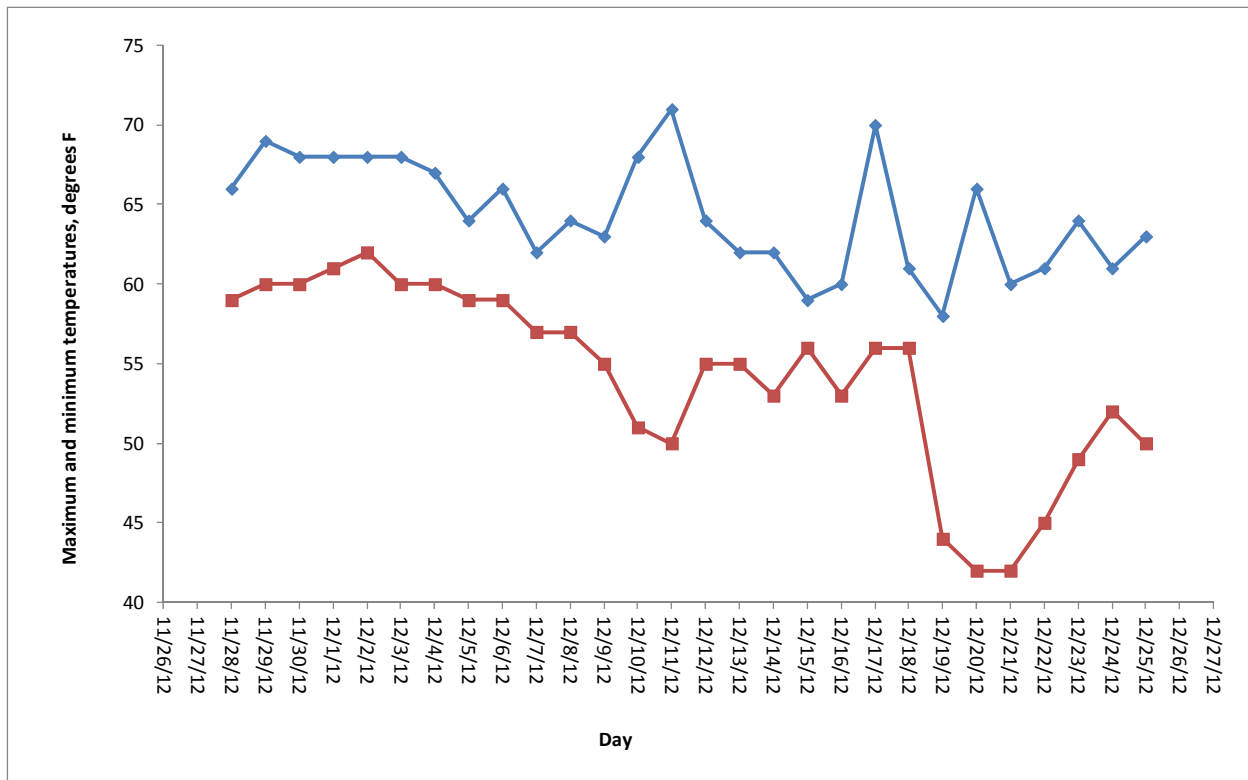


Figure 2 – Daily maximum and minimum temperatures at Lindbergh Field, San Diego, over the culturing period.

After four to five days, when hatched nauplii were observed, cultures were fed twice daily with a tablespoon of a yeast culture made by dissolving approximately $\frac{1}{4}$ teaspoon of yeast in warm water with approximately $\frac{1}{4}$ teaspoon of added sugar. Mature individuals were observed in most cultures after approximately one week from commencement of feeding, and were removed, identified, and preserved in a 95% ethyl alcohol (Everclear) solution. Mature male San Diego shrimp (*Branchinecta sandiegonensis*) can be distinguished from Lindahl's shrimp (*Branchinecta lindahli*) by distinctive differences in distal antennae. Female San Diego shrimp can be distinguished by paired medio-dorsal humps on anterior thoracic segments, compared with single humps that extend further back on Lindahl's shrimp females.

Results

Hatched fairy shrimp were cultured from 21 of 26 cultures where cysts had been recovered (Table 2). Generally, numbers of hatched shrimp were proportional to numbers of cysts cultured. In several cases, with very small numbers of cysts recovered, several more shrimp were produced than cysts were counted, This is probably due to a few cysts being covered by organic material, and thus being missed during examination.

San Diego fairy shrimp were identified from a single basin (basin h, Table 1). Other basins contained Lindahl's shrimp. No basins contained a mixture of the species.

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

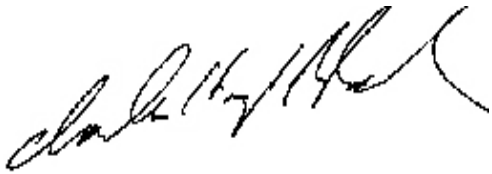
A handwritten signature in black ink, appearing to read "Charles H. H. H.", is written in a cursive style.

Table 1 - Numbers of Branchinecta cysts found in individual samples

Pool	Sample no	cysts	Pool	Sample no	cysts	Pool	Sample no	cysts	Pool	Sample no	cysts	Pool	Sample no	cysts	Pool	Sample no	cysts	Pool	Sample no	cysts
aa	a	1	0	dd	a	1	0	h	a	1	4	kk	a	1	1	n	a	1	1	0
aa	a	2	0	dd	a	2	6	h	a	2	1	kk	a	2	0	n	a	2	0	0
aa	a	3	0	dd	a	3	0	h	a	3	21	kk	a	3	1	n	a	3	0	0
aa	a	4	0	dd	a	4	0	h	a	4	160	kk	a	4	1	n	a	4	0	0
aa	a	5	0	dd	a	5	1	h	a	5	24	kk	a	5	3	n	a	5	0	0
aa	b	1	0	dd	b	1	0	h	b	1	21	kk	b	1	0	n	b	1	0	0
aa	b	2	0	dd	b	2	0	h	b	2	22	kk	b	2	7	n	b	2	0	0
aa	b	3	0	dd	b	3	0	h	b	3	360	kk	b	3	3	n	b	3	0	0
aa	b	4	0	dd	b	4	2	h	b	4	28	kk	b	4	3	n	b	4	0	0
aa	b	5	0	dd	b	5	7	h	b	5	12	kk	b	5	0	n	b	5	0	0
bb	a	1	0	ee	a	1	1	hh	a	1	1	l	a	1	0	nn	a	1	0	0
bb	a	2	3	ee	a	2	0	hh	a	2	0	l	a	2	0	nn	a	2	0	0
bb	a	3	1	ee	a	3	1	hh	a	3	0	l	a	3	0	nn	a	3	0	0
bb	a	4	0	ee	a	4	3	hh	a	4	0	l	a	4	0	nn	a	4	0	0
bb	a	5	0	ee	a	5	0	hh	a	5	0	l	a	5	0	nn	a	5	0	0
bb	b	1	0	ee	b	1	0	hh	b	1	0	l	b	1	0	nn	b	1	0	0
bb	b	2	0	ee	b	2	0	hh	b	2	2	l	b	2	0	nn	b	2	0	0
bb	b	3	0	ee	b	3	5	hh	b	3	0	l	b	3	0	nn	b	3	0	0
bb	b	4	0	ee	b	4	0	hh	b	4	0	l	b	4	0	nn	b	4	0	0
bb	b	5	0	ee	b	5	0	hh	b	5	0	l	b	5	2	nn	b	5	0	0
c	a	1	396	f	a	1	0	ii	a	1	1	ll	a	1	5	oo	a	1	0	0
c	a	2	600	f	a	2	0	ii	a	2	0	ll	a	2	20	oo	a	2	1	0
c	a	3	280	f	a	3	0	ii	a	3	2	ll	a	3	80	oo	a	3	4	0
c	a	4	360	f	a	4	0	ii	a	4	0	ll	a	4	20	oo	a	4	8	0
c	a	5	480	f	a	5	0	ii	a	5	0	ll	a	5	54	oo	b	1	1	0
c	b	1	560	f	b	1	0	ii	b	1	0	ll	b	1	52	oo	b	2	0	0
c	b	2	750	f	b	2	0	ii	b	2	0	ll	b	2	48	oo	b	3	0	0
c	b	3	480	f	b	3	0	ii	b	3	0	ll	b	3	70	oo	b	4	2	0
c	b	4	200	f	b	4	0	ii	b	4	0	ll	b	4	40	oo	b	5	3	0
c	b	5	860	f	b	5	0	ii	b	5	0	ll	b	5	20	oo	b	6	1	0
cc	a	1	1600	ff	a	1	0	jj	a	1	0	m	a	1	4	p	a	1	2	0
cc	a	2	2200	ff	a	2	0	jj	a	2	0	m	a	2	11	p	a	2	7	0
cc	a	3	2500	ff	a	3	0	jj	a	3	0	m	a	3	101	p	a	3	11	0
cc	a	4	2000	ff	a	4	0	jj	a	4	0	m	a	4	37	p	a	4	1	0
cc	a	5	2500	ff	a	5	0	jj	a	5	0	m	a	5	440	p	a	5	1	0
cc	b	1	2400	ff	b	1	0	jj	b	1	0	m	b	1	32	p	b	1	98	0
cc	b	2	1800	ff	b	2	0	jj	b	2	0	m	b	2	62	p	b	2	221	0
cc	b	3	1000	ff	b	3	0	jj	b	3	0	m	b	3	87	p	b	3	222	0
cc	b	4	1200	ff	b	4	0	jj	b	4	0	m	b	4	19	p	b	4	60	0
cc	b	5	2800	ff	b	5	1	jj	b	5	0	m	b	5	52	p	b	5	2	0
d	a	1	475	gg	a	1	0	k	a	1	1	mm	a	1	110	pp	a	1	0	0
d	a	2	240	gg	a	2	0	k	a	2	1	mm	a	2	400	pp	a	2	0	0
d	a	3	1230	gg	a	3	0	k	a	3	0	mm	a	3	500	pp	a	3	2	0
d	a	4	1400	gg	a	4	1	k	a	4	0	mm	a	4	360	pp	a	4	39	0
d	a	5	28	gg	a	5	0	k	a	5	0	mm	a	5	600	pp	a	5	15	0
d	b	1	800	gg	b	1	0	k	b	1	0	mm	b	1	41	pp	b	1	0	0
d	b	2	36	gg	b	2	1	k	b	2	0	mm	b	2	380	pp	b	2	1	0
d	b	3	502	gg	b	3	0	k	b	3	0	mm	b	3	780	pp	b	3	2	0
d	b	4	380	gg	b	4	0	k	b	4	0	mm	b	4	240	pp	b	4	0	0
d	b	5	200	gg	b	5	0	k	b	5	1	mm	b	5	800	pp	b	5	3	0

Table 2- Summary of cyst, ostracod, and cladoceran ehippia presence in pools, and culturing results

Pool	Total numbers of cysts present in 10 samples	Ostracods present	Cladoceran ehippia present	Numbers of individuals identified from cultures			
				Branchinecta lindahli		Branchinecta sandiegonensis	
				<u>males</u>	<u>females</u>	<u>males</u>	<u>females</u>
aa	0						
bb	4	x		none			
c	4966	x	x	11	5		
cc	20000	x		3	8		
d	5291			9	3		
dd	16	x	x	4	2		
ee	10			8	1		
f	0						
ff	1			2	4		
gg	2			2	1		
h	653					12	10
hh	3			1			
ii	3	x		none			
jj	0						
k	3	x			1		
kk	19	x		5	7		
l	2	x		none			
ll	409			9	4		
m	845	x		10	2		
mm	4211	x		5	3		
n	1			none			
nn	0						
oo	20			2	11		
p	625			10			
pp	62			2	6		
q	1	x		none			
qq	0						
r	0						
s	0						
u	0						
w	1	x		2			
x	56	x		6	4		
y	70	x		9	2		
z	35	x		6	5		

APPENDIX D

***U.S. Fish and Wildlife Service Vernal Pool
Data Sheets, Dry-Season Survey***

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1210 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: C

Township: 6S Range: 10W Section: 20 33.6326434548 lat. -117.94433405 long.

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	<input type="checkbox"/> scrape/soil excavation
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>loam</u>
----------------------------------	----------------------------------	---------------------------------------	------------------------------------	-------------------

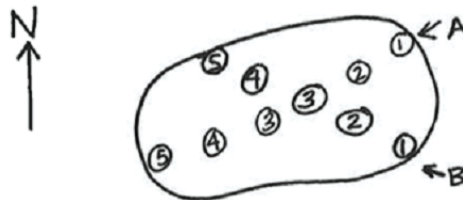
Notes:

Due to pool size, deviated from protocol soil sample volume, 50ml x 10.

Pool Depth: 10 cm (estimated maximum) Surface Area: 3.31 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/500ml
		Ten 50 ml samples were combined for cyst analysis, culturing, & identification		
C	500	Branchinecta sp.	4,966	more than
		16 B. lindahli identified during culturing		200 cysts/
		Ostracods - present		500 ml soil
		Cladoceran ephippia - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1320 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: D

Township: 6S Range: 10W Section: 20 33.6334716772 -117.94375849 lat. _____ long.

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

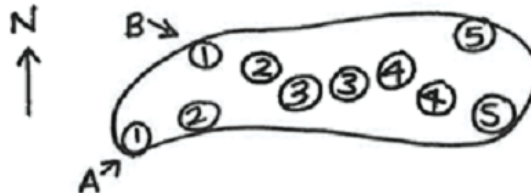
☐ hardpan ☐ claypan ☐ cobbly/rocky ☐ lava flow other clay loam

Notes:

Pool Depth: 5 cm (estimated maximum) Surface Area: 9.65 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
D	1,000	Branchinecta sp.	5,291	more than
		12 B. lindahli identified during culturing		200 cysts/
				1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1145 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: F

Township: 6S Range: 10W Section: 20 33.6328896337 -117.942356771 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
		<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	<input type="checkbox"/> heavy	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

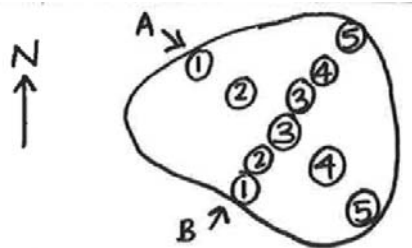
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>loam</u>
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Notes:

Pool Depth: 4 cm (estimated maximum) Surface Area: 121.01 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml)
		Ten 10 ml samples were combined		
		for cyst analysis, culturing, & identification		
F	1,000	-	None	None

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1340 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: H

Township: 6S Range: 10W Section: 20 33.6338535811 -117.942562527 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
		<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	<input type="checkbox"/> heavy	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

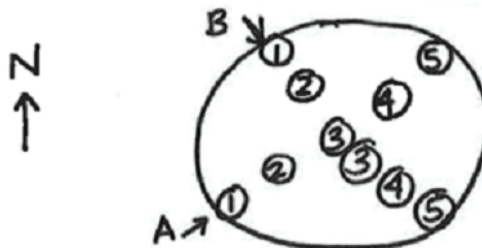
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>loam</u>
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Notes:

Pool Depth: 3 cm (estimated maximum) Surface Area: 86.77 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
H	1,000	Branchinecta sp.	653	more than
		22 B. sandiegonensis identified during culturing		200 cysts/
				1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1420 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: K

Township: 6S Range: 10W Section: 20 33.6340760126 -117.941773803 lat. _____ long.

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	<small>mammal mounds/maintenance</small> <input type="checkbox"/> other _____
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

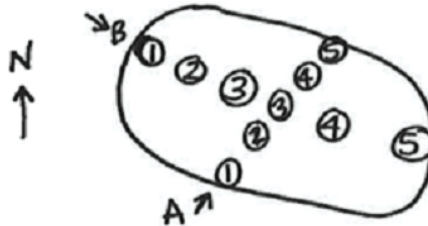
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>loam</u>
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Notes:

Pool Depth: 4 cm (estimated maximum) Surface Area: 57.65 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
K	1,000	Branchinecta sp.	3	1-25 cysts/
		1 B. lindahli identified during culturing		1,000 ml soil
		Ostracods - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1405 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: L

Township: 6S Range: 10W Section: 20 33.6341949008 -117.941789283 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	<small>mammal mounds/maintenance</small> <input type="checkbox"/> other _____
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

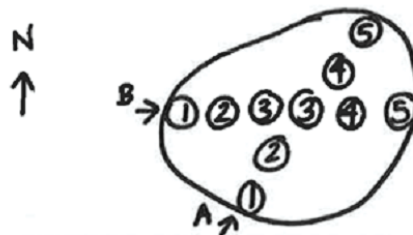
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>loam</u>
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Notes:

Pool Depth: 5 cm (estimated maximum) Surface Area: 11.84 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
L	1,000	Branchinecta sp.	2	1-25 cysts/
		0 Branchinecta sp. identified during culturing		1,000 ml soil
		Ostracods - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no X yes

Required color slides and/or photographs for the project site are included: _____ no X yes

Date: 11/1/12 Time: 1435 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: M

Township: 6S Range: 10W Section: 20 33.6346539413 -117.94145478 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

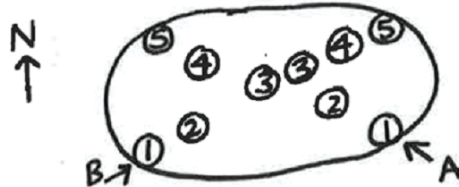
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>loam</u>
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Notes:

Pool Depth: 4 cm (estimated maximum) Surface Area: 56.50 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
M	1,000	Branchinecta sp.	845	more than
		12 B. lindahli identified during culturing		200 cysts/
		Ostracods - present		1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1450 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: N

Township: 6S Range: 10W Section: 20 33.6346074478 -117.942030818 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

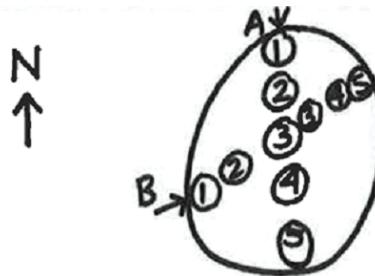
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>loam</u>
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Notes:

Pool Depth: 7.6 cm (estimated maximum) Surface Area: 116.91 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
N	1,000	Branchinecta sp.	1	1-25 cysts/
		0 Branchinecta sp. identified during culturing		1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1720 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: P

Township: 6S Range: 10W Section: 20 33.6351618882 -117.942292703 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

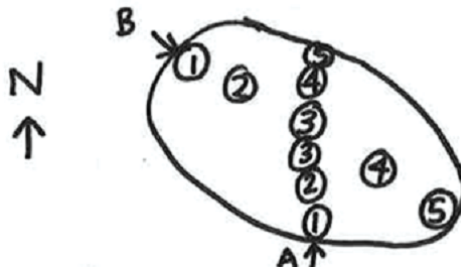
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>sandy loam/clay loam</u>
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Notes:

Pool Depth: 7.6 cm (estimated maximum) Surface Area: 37.30 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined		
		for cyst analysis, culturing, & identification		
P	1,000	Branchinecta sp.	625	more than
		10 B. lindahli identified during culturing		200 cysts/
				1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1705 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: Q

Township: 6S Range: 10W Section: 20 33.635037623 -117.942648188 lat. _____ long.

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	other _____
			<input type="checkbox"/> light	<input type="checkbox"/> moderate	<input checked="" type="checkbox"/> heavy

- land use of habitat: road rut

Pool Bottom Surface: (circle where appropriate)

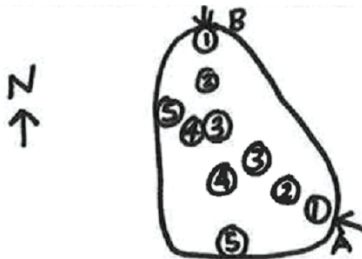
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <small>asphalt/compact earthen road shoulder</small> _____
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Notes:

Pool Depth: 5 cm (estimated maximum) Surface Area: 18.13 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
Q	1,000	Branchinecta sp.	1	1-25 cysts/
		0 Branchinecta sp. identified during culturing		1,000 ml soil
		Ostracods - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1655 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: R

Township: 6S Range: 10W Section: 20 33.6352092271 -117.942725278 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep
			<input type="checkbox"/> light	<input type="checkbox"/> moderate
				<input checked="" type="checkbox"/> heavy

- land use of habitat: road rut

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <small>Highly compacted soil on dirt road shoulder</small> _____
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Notes:

Due to narrow shape of pool, 3 samples were collected along the width.

Pool Depth: 5 cm (estimated maximum) Surface Area: 24.17 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



U.S Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey Soil Analysis

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml)
		Ten 100 ml samples were combined		
		for cyst analysis, culturing, & identification		
R	1,000	-	None	None

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1645 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: S

Township: 6S Range: 10W Section: 20 33.6356690332 -117.942680296 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: roadside rut

Pool Bottom Surface: (circle where appropriate)

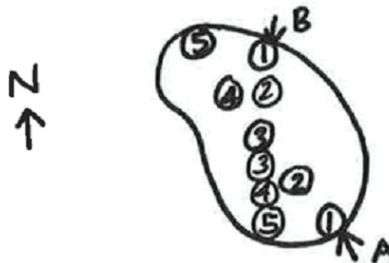
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>Gravel and soil highly compacted</u>
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Notes:

Pool Depth: 4 cm (estimated maximum) Surface Area: 11.90 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml)
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
S	1,000	-	None	None

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no X yes

Required color slides and/or photographs for the project site are included: _____ no X yes

Date: 11/1/12 Time: 1635 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: U

Township: 6S Range: 10W Section: 20 33.6360751861 -117.942644246 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>unvegetated</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input type="checkbox"/> moderate	

- land use of habitat: road rut

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>asphalt parking area</u>
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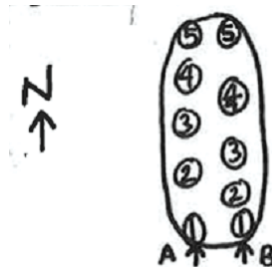
Notes:

Concrete/asphalt-difficult to collect samples. Frequently driven area.

Pool Depth: 4 cm (estimated maximum) Surface Area: 9.01 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml)
		Ten 100 ml samples were combined		
		for cyst analysis, culturing, & identification		
U	1,000	-	None	None

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 0815 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: W

Township: 6S Range: 10W Section: 20 33.6282611351 lat. -117.939569538 long.

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	<input type="checkbox"/> mammal mounds
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	<input type="checkbox"/> other <u> </u>
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	<input type="checkbox"/> heavy

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

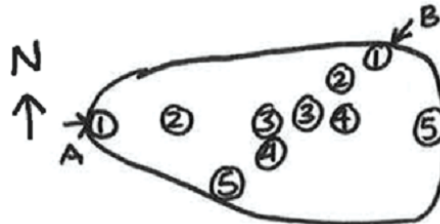
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>loam</u>
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Notes:

Pool Depth: 10 cm (estimated maximum) Surface Area: 1,066.20 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
W	1,000	Branchinecta sp.	1	1-25 cysts/
		2 B. lindahli identified during culturing		1,000 ml soil
		Ostracods - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1550 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: ☒

Township: 6S Range: 10W Section: 20 33.6386198632 lat. long. -117.944341996

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>unvegetated</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input type="checkbox"/> moderate	

- land use of habitat: road rut

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>clay loam</u>
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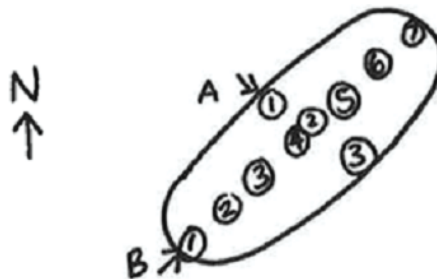
Notes:

Extends to upland area. Due to pool shape, 3 samples collected from width.

Pool Depth: 8 cm (estimated maximum) Surface Area: 27.08 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
X	1,000	Branchinecta sp.	56	51-100 cysts/
		10 B. lindahli identified during culturing		1,000 ml soil
		Ostracods - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no X yes

Required color slides and/or photographs for the project site are included: _____ no X yes

Date: 11/1/12 Time: 1600 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: Y

Township: 6S Range: 10W Section: 20 33.637956545 lat. -117.944567657 long.

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep
			<input type="checkbox"/> light	<input type="checkbox"/> moderate
				<input checked="" type="checkbox"/> heavy

- land use of habitat: road rut

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>clay loam</u>
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Notes:

Pool Depth: 7 cm (estimated maximum) Surface Area: 4.96 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
Y	1,000	Branchinecta sp.	70	51-100 cysts/ 1,000 ml soil
		11 B. lindahli identified during culturing		
		Ostracods - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no X yes

Required color slides and/or photographs for the project site are included: _____ no X yes

Date: 11/1/12 Time: 1615 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: Z

Township: 6S Range: 10W Section: 20 33.6366716278 -117.944073045 lat. _____ long.

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	<small>excavated pipeline area</small> other _____
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

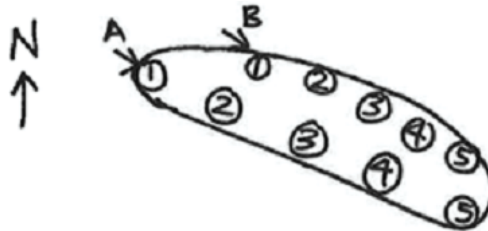
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>clay loam and sandy loam</u>
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Notes:

Pool Depth: 10 cm (estimated maximum) Surface Area: 28.96 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
Z	1,000	Branchinecta sp.	35	26-50 cysts/
		11 B. lindahli identified during culturing		1,000 ml soil
		Ostracods - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no X yes

Required color slides and/or photographs for the project site are included: _____ no X yes

Date: 11/1/12 Time: 1510 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: AA

Township: 6S Range: 10W Section: 20 33.6346830052 -117.945096631 lat. _____ long.

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>loam</u>
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Notes:

Pool Depth: 6.5 cm (estimated maximum) Surface Area: 9.99 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml)
		Ten 100 ml samples were combined		
		for cyst analysis, culturing, & identification		
AA	1,000	-	None	None

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no X yes

Required color slides and/or photographs for the project site are included: _____ no X yes

Date: 11/1/12 Time: 1300 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: BB

Township: 6S Range: 10W Section: 20 33.6336946663 -117.944395838 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

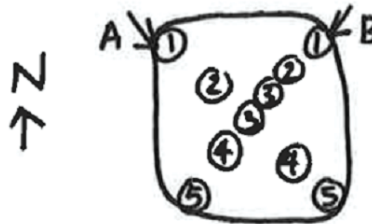
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>sandy loam</u>
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Notes:

Pool Depth: 4 cm (estimated maximum) Surface Area: 7.80 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
BB	1,000	Branchinecta sp.	4	1-25 cysts/
		0 Branchinecta sp. identified during culturing		1,000 ml soil
		Ostracods - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1240 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: CC

Township: 6S Range: 10W Section: 20 33.6330437278 -117.944981759 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	<input type="checkbox"/> scrape/excavation
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

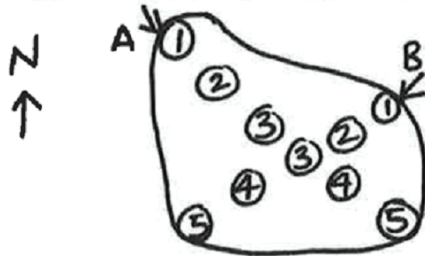
☐ hardpan ☐ claypan ☐ cobbly/rocky ☐ lava flow other sandy clay loam

Notes:

Pool Depth: 15.2 cm (estimated maximum) Surface Area: 10.79 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
CC	1,000	Branchinecta sp.	20,000	more than
		11 B. lindahli identified during culturing		200 cysts/
		Ostracods - present		1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1225 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: DD

Township: 6S Range: 10W Section: 20 33.6323472801 -117.944387485 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

☐ hardpan ☐ claypan ☐ cobbly/rocky ☐ lava flow other loam

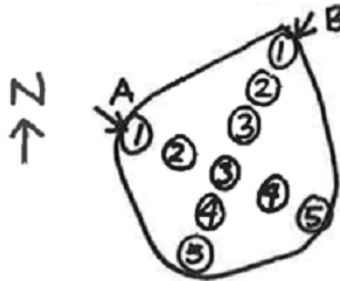
Notes:

Pool appears larger in field than appears on figure/map.

Pool Depth: 4.5 cm (estimated maximum) Surface Area: 12.13 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
DD	1,000	Branchinecta sp.	16	1-25 cysts/
		6 B. lindahli identified during culturing		1,000 ml soil
		Ostracods - present		
		Cladoceran ephippia - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1200 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: EE

Township: 6S Range: 10W Section: 20 33.6324538548 -117.943930146 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>highly compacted well pad</u>
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Notes:

Pool Depth: 6 cm (estimated maximum) Surface Area: 12.88 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
EE	1,000	Branchinecta sp.	10	1-25 cysts/
		9 B. lindahli identified during culturing		1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1050 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: FF

Township: 6S Range: 10W Section: 20 33.6314838289 -117.945152311 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

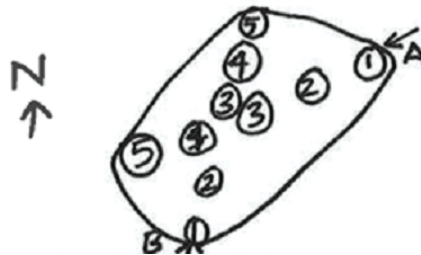
☐ hardpan ☐ claypan ☐ cobbly/rocky ☐ lava flow other loam

Notes:

Pool Depth: 3 cm (estimated maximum) Surface Area: 20.73 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
FF	1,000	Branchinecta sp.	1	1-25 cysts/
		6 B. lindahli identified during culturing		1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no X yes

Required color slides and/or photographs for the project site are included: _____ no X yes

Date: 11/1/12 Time: 1100 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: GG

Township: 6S Range: 10W Section: 20 33.6307200434 -117.944335444 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input checked="" type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>unvegetated</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input type="checkbox"/> moderate	

- land use of habitat: road rut complex

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>sandy loam</u>
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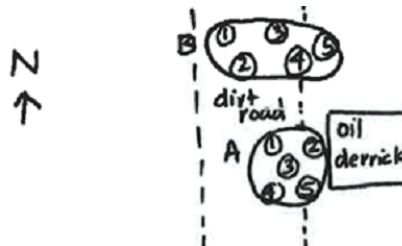
Notes:

Survey methods deviate from protocol. 5 samples each rut in low spots.

Pool Depth: 8 cm (estimated maximum) Surface Area: 11.12 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
GG	1,000	Branchinecta sp.	2	1-25 cysts/
		3 B. lindahli identified during culturing		1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1530 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: HH

Township: 6S Range: 10W Section: 20 33.6325182733 -117.947438662 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>clay loam</u>
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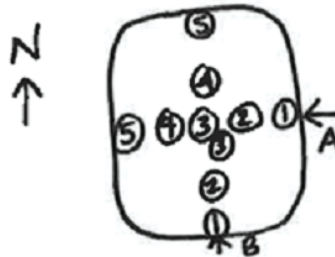
Notes:

Gravel/sandbag berm adjacent. Pool extends into road.

Pool Depth: 7.6 cm (estimated maximum) Surface Area: 29.54 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
HH	1,000	Branchinecta sp. 1 B. lindahli identified during culturing	3	1-25 cysts/ 1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no X yes

Required color slides and/or photographs for the project site are included: _____ no X yes

Date: 11/1/12 Time: 1040 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: II

Township: 6S Range: 10W Section: 20 33.6312928423 -117.94679922 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	<input type="checkbox"/> scrape/excavation
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

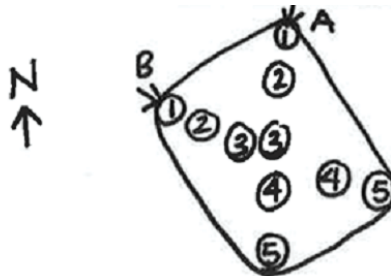
☐ hardpan ☐ claypan ☐ cobbly/rocky ☐ lava flow other sandy loam

Notes:

Pool Depth: 3+ cm (estimated maximum) Surface Area: 9.57 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
II	1,000	Branchinecta sp.	3	1-25 cysts/
		0 Branchinecta sp. identified during culturing		1,000 ml soil
		Ostracods - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1030 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: JJ

Township: 6S Range: 10W Section: 20 33.6305241192 -117.946395975 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: roadside rut

Pool Bottom Surface: (circle where appropriate)

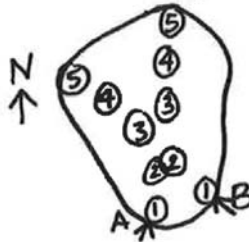
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>loamy sand</u>
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Notes:

Pool Depth: 4 cm (estimated maximum) Surface Area: 19.54 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml)
		Ten 100 ml samples were combined		
		for cyst analysis, culturing, & identification		
JJ	1,000	-	None	None

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 1015 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: KK

Township: 6S Range: 10W Section: 20 33.6295938347 -117.945227035 lat. _____ long.

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

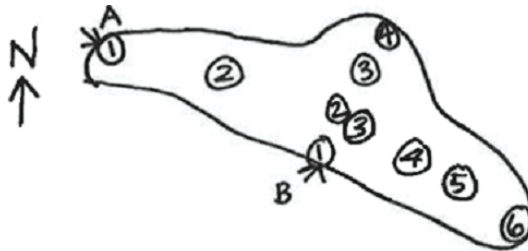
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>clay loam</u>
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Notes:

Pool Depth: 4 cm (estimated maximum) Surface Area: 69.24 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
KK	1,000	Branchinecta sp.	19	1-25 cysts/
		12 B. lindahli identified during culturing		1,000 ml soil
		Ostracods - present		

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 0950 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: LL

Township: 6S Range: 10W Section: 29 33.6274954334 lat. -117.944694938 long.

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>sandy clay loam</u>
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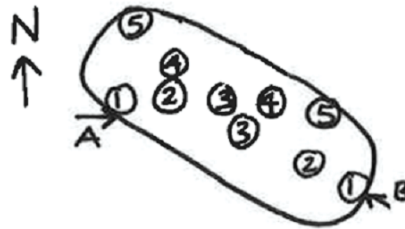
Notes:

Due to small pool size, 10 samples collected 50ml each.

Pool Depth: 4 cm (estimated maximum) Surface Area: 2.44 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/500ml
		Ten 50 ml samples were combined		
		for cyst analysis, culturing, & identification		
LL	500	Branchinecta sp.	409	more than
		13 B. lindahli identified during culturing		200 cysts/
				500 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 0940 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: MM

Township: 6S Range: 10W Section: 29 33.6268329548 -117.944696522 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	<input type="checkbox"/> small mammal mounds
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>sandy clay loam</u>
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Notes:

Pool Depth: 4 cm (estimated maximum) Surface Area: 13.13 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
MM	1,000	Branchinecta sp.	4,211	more than
		8 B. lindahli identified during culturing		200 cysts/
		Ostracods - present		1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 0910 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: NN

Township: 6S Range: 10W Section: 29 33.6271070213 -117.943863166 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

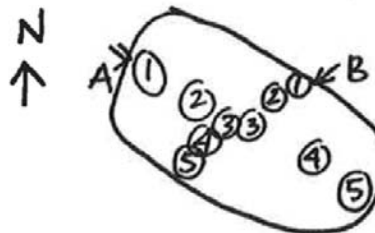
<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>sandy loam</u>
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Notes:

Pool Depth: 7 cm (estimated maximum) Surface Area: 12.32 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml)
		Ten 100 ml samples were combined		
		for cyst analysis, culturing, & identification		
NN	1,000	-	None	None

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 0925 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: OO

Township: 6S Range: 10W Section: 29 33.6264871663 lat. -117.943812794 long.

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>sandy loam</u>
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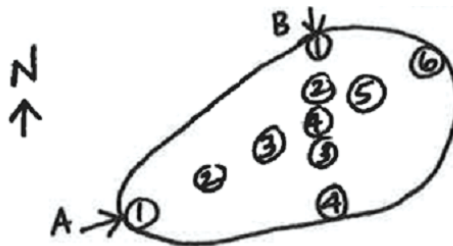
Notes:

Due to pool size, 10 samples collected 50ml each.

Pool Depth: 5.5 cm (estimated maximum) Surface Area: 3.82 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/500ml
		Ten 50 ml samples were combined		
		for cyst analysis, culturing, & identification		
OO	500	Branchinecta sp.	20	1-25 cysts/
		13 B. lindahli identified during culturing		500 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 0900 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: PP

Township: 6S Range: 10W Section: 29 33.6264296779 -117.942459837 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input checked="" type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	other <u>maintenance</u>
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

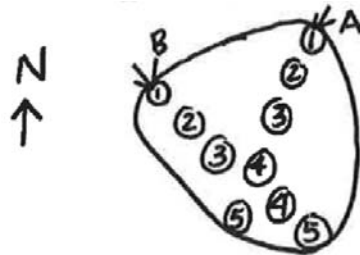
☐ hardpan ☐ claypan ☐ cobbly/rocky ☐ lava flow other loam

Notes:

Pool Depth: 3 cm (estimated maximum) Surface Area: 4.38 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml) #/1,000ml
		Ten 100 ml samples were combined for cyst analysis, culturing, & identification		
PP	1,000	Branchinecta sp.	62	51-100 cysts/
		8 B. lindahli identified during culturing		1,000 ml soil

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Genus (/species)</u>	<u># Cysts</u>	<u>Catalog/Accession #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ☒ yes

Required color slides and/or photographs for the project site are included: _____ no ☒ yes

Date: 11/1/12 Time: 0830 County: Orange Quad: Newport Beach

Collector(s): Thomas Liddicoat and Heather Moine Permit #: TE 139634-2 and TE 60147A-0

Site/Project Name: Newport Banning Ranch Pool #: QQ

Township: 6S Range: 10W Section: 20 33.6287332594 -117.94090746 lat. _____ long. _____

Habitat Condition: (circle where appropriate)

<input type="checkbox"/> undisturbed	<input checked="" type="checkbox"/> disturbed	<input type="checkbox"/> tire tracks	<input type="checkbox"/> garbage	<input type="checkbox"/> discing/plowing	
<input type="checkbox"/> ungrazed	<input type="checkbox"/> grazed:	<input type="checkbox"/> cattle	<input type="checkbox"/> horses	<input type="checkbox"/> sheep	other <u>small mammal mounds</u>
			<input type="checkbox"/> light	<input checked="" type="checkbox"/> moderate	<input type="checkbox"/> heavy

- land use of habitat: ephemeral basin

Pool Bottom Surface: (circle where appropriate)

<input type="checkbox"/> hardpan	<input type="checkbox"/> claypan	<input type="checkbox"/> cobbly/rocky	<input type="checkbox"/> lava flow	other <u>sandy loam</u>
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Notes:

Pool Depth: 5 cm (estimated maximum) Surface Area: 13.14 m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



**U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis**

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml)
		Ten 100 ml samples were combined		
		for cyst analysis, culturing, & identification		
QQ	1,000	-	None	None

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)

Cysts

Catalog/Accession #

Pool #

APPENDIX E

*California Department of Fish and Wildlife,
California Native Species Field Survey Form*

For Office Use Only

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 11/01/2012

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: Branchinecta sandiegonensis

Common Name: San Diego fairy shrimp

Species Found? ☒ Yes ☐ No If not, why? _____

Total No. Individuals 22 Subsequent Visit? ☐ yes ☒ no

Is this an existing NDDDB occurrence? ☒ no ☐ unk.
Yes, Occ. # _____

Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Heather Moine

Address: 621 Chapala Street
Santa Barbara, CA 93101

E-mail Address: hmoine@dudek.com

Phone: (805) 963-0651

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

22
adults # juveniles # larvae # egg masses # unknown
☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Orange County Landowner / Mgr.: Newport Banning Ranch LLC

Quad Name: Newport Beach Elevation: 103 feet

T 6S R 10W Sec 20, _____ 1/4 of _____ 1/4, Meridian: ☐ H ☐ M ☐ S ☐ Source of Coordinates (GPS, topo. map & type): GPS

T _____ R _____ Sec _____, _____ 1/4 of _____ 1/4, Meridian: ☐ H ☐ M ☐ S ☐ GPS Make & Model Trimble Geo-XT

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☒ Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☒

Coordinates: Lat. 33.6338535811 Long: -117.942562527

Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:

Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):

Soil samples collected during dry-season protocol survey, U.S. Fish and Wildlife Service, April 19, 1996, Intern Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods (USFWS 1996).

Cysts observed during soil processing. Hatched fairy shrimp were cultured from the recovered cysts and identified as San Diego fairy shrimp (*Branchinecta sandiegonensis*).

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☒ Fair ☐ Poor

Immediate AND surrounding land use: Seasonal feature is within an active oil field which has been performing extraction operations for over 50 years

Visible disturbances: Adjacent to frequently traveled dirt road

Threats:

Comments:

Determination: (check one or more, and fill in blanks)

- ☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☒ By another person (name): Charles Black (TE835549-8)
☐ Other: _____

Photographs: (check one or more)

	Slide	Print	Digital
Plant / animal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagnostic feature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

May we obtain duplicates at our expense? yes ☐ no ☐

