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2002-2003 Wet Season Branchiopod Survey Report, Lawrence Livermore National Laboratory, Site 300, Alameda and San Joaquin Counties, California

W. Weber, J. Woollett

November 16, 2004

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Ninety-Day Findings Report
USFWS Permit # TE-016591-2
LLNL PO#: B530185

2002-2003 Wet Season Branchiopod Survey Report

University of California
Lawrence Livermore National Laboratory
Site 300
Alameda and San Joaquin Counties, California

December 3, 2003

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INTRODUCTION

Project Description

Condor Country Consulting performed wet season surveys for listed branchiopods at Site 300 on behalf of The University of California, Lawrence Livermore National Laboratory (LLNL). This survey was the second consecutive wet season survey and completes the requirements of the U. S. Fish and Wildlife Service (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" (Guidelines). The study area is located in eastern Alameda County and western San Joaquin County (**Figure 1, Appendix A**). LLNL is collecting information for the preparation of an EIS covering ongoing explosives testing and related activities on Site 300. Related activities include maintenance of fire roads and annual control burns of approximately 607 hectares (1,500 acres) (Jim Woollett, personal comment). Control burns typically take place on the northern portion of the site.

Purpose of the Survey

Condor Country Consulting conducted surveys for listed branchiopods in the 2002-2003 wet season to complete requirements of the Guidelines (USFWS 1996) used to determine the distribution of federally-listed branchiopods within the study area. The first survey was performed during the previous wet season (2001-2002).

The 2002-2003 wet season survey, combined with the previous season's survey, is intended to provide LLNL with information that will assist them in determining the effects of the proposed action on federally listed branchiopods and provide information useful in the preparation of the associated environmental documentation. It is also expected to satisfy the survey requirements of the USFWS.

For the purpose of this report, the term branchiopod refers specifically to phyllopodous branchiopods (Smith 2001) and not cladocerans. Fairy shrimp, tadpole shrimp, and clam shrimp are all categorized as phyllopodous branchiopods and are currently the only members of the Class Branchiopoda that contain species that are listed under the federal Endangered Species Act. Although cladocerans are branchiopods and were found on the site, they are only referred to by Order in this report because they are not the target species of this study.

Wendy Weber of Condor Country Consulting conducted surveys to determine the distribution of vernal pool branchiopods at Site 300. Verbal approval to conduct the surveys was received from Vincent Griego of the USFWS on December 16, 2002. The written authorization (1-1-03-PR-0691) was received on January 9, 2003 (**Appendix B**).

The following wet season report is submitted in accordance with the conditions of USFWS Permit TE-016591-2 (**Appendix B**). The format of the report follows the format outlined in the Guidelines (USFWS 1996).

METHODOLOGY

Study Area

The Site 300 study area is located on the Midway and Tracy USGS 7.5 minute topographic quadrangle maps (**Figure 1**). The study area encompasses approximately 2,833 hectares (7,000 acres) of the rolling hills and plunging canyons typical of the Altamont Hills (LLNL 2002a). Contributing to the precipitous topography of the southern portion of the site are several rock outcrops. Elevations on the site range from 170 to 525 meters (560 to 1,722 feet) above mean sea level.

Sheep historically grazed Site 300, but no ranching or farming has taken place there since the site was purchased in 1953 (LLNL 2002a). The site is predominantly open space, with only about 142 hectares (350 acres) occupied by structures or pavement. Surrounding land uses include cattle grazing and an off-road vehicle recreation park.

Site 300 contains a diverse mosaic of plant communities including native and introduced grasslands, blue oak and riparian woodlands, coastal sage scrub, and herbaceous wetlands (LLNL 2002a). Non-native grasslands occupy the largest portion of the site, approximately 2,285 hectares (5,647 acres) (LLNL 2002a). Native perennial grasslands, found mainly in the northern half of the site, occupy approximately 293 hectares (723 acres). Blue oak woodlands are found on north-facing slopes in the southern half of Site 300 and occupy about 61 hectares (150 acres). In the southwest corner of the site coastal sage scrub occupies about 44 hectares (108 acres). Riparian woodland is confined to drainages on the southern half of the site. Herbaceous wetlands are scattered throughout the site and occupy a very small percentage of the site.

Pooled aquatic habitat on Site 300 is limited, largely due to the relatively low average rainfall [around 25 centimeters (10 inches) per year] and steep terrain. Seeps, drainages, puddles, and modified vernal pools are the only aquatic habitat found on the site. All of these habitat types provide some potentially suitable habitat for large branchiopods.

Survey Methodology

Upon commencement of this season's survey, Condor Country Consulting assessed the site to determine any new areas of suitable habitat. All suitable habitat was sampled throughout the survey period. Eight new pools, for a total of 22 pools were identified and included in the survey. Two pools that held water on the first survey never contained standing water in subsequent surveys. The ephemeral nature of these pools is an artifact of the timing of the first round of surveys, which corresponded with a heavy rain event. Because these pools were ultimately determined to be unsuitable, they will not be addressed further in this report.

Surveys were conducted according to the methods described in the Guidelines (USFWS 1996). Surveys began on December 23, 2002, after pools had filled to a depth greater than 3 cm (1 in). Sampling occurred every two weeks thereafter until May 5, 2003 when all pools were either dry or had been inundated for at least 120 consecutive days. The surveys performed in the

interim were conducted on the dates listed in **Table 1 (Appendix C)**. Wendy Weber conducted all surveys under the authorization of her permit (Permit TE-016591-2).

Each day's survey data were collected on data sheets (**Appendix D**). All pools were surveyed as they filled through the end of the survey period or until they were dry. A fine-meshed aquarium net attached to a piece of plastic pipe was used to sample the water column. Samples were taken at the surface, throughout the water column, and along the margins and bottom of each pool. Identification of specimens was performed in the field using a 10X hand lens. Living specimens were identified and returned to their respective pools. The branchiopod key developed by Clyde Eriksen and Denton Belk (1999) was employed to confirm identifications. All amphibian eggs and larvae found in samples were immediately released at the point of capture.

Reconnaissance of the study area was performed using a four-wheel-drive truck due to the large area to be covered and the steep terrain on much of the site. Ms. Weber was assisted in locating pools by LLNL biologist Jim Woollett. His familiarity with known pool locations and general navigation of the site were instrumental in ensuring all potential branchiopod habitat was identified and surveyed. Vehicular access to the site proved to be the most feasible way of surveying and was employed throughout the survey period. Each pool identified was mapped by hand on a USGS 7.5 minute topographic map of the area, sampled, and data were recorded on data sheets. Temperature and weather data were taken at the beginning of each survey. Air and water temperature were taken with a technical-grade thermometer. The data recorded for each pool included pool depth and surface area, habitat type, branchiopods observed, amphibians observed, and other aquatic invertebrates observed.

Pool locations and areas (**Table 1, Appendix C**) were recorded with a Trimble Global Positioning System unit after wet season surveys had concluded. The area of each pool was recorded by walking the pool's perimeter at the approximate mean high water line. This information was used to create **Figure 2 and 3 (Appendix A)** with ESRI ArcView™ software. Both figures show the locations of surveyed pools.

HABITAT DESCRIPTIONS

Several disturbed and undisturbed habitat types provide potentially suitable habitat for listed branchiopods on the site, and include vernal pools, puddles in roadbeds, and ephemeral drainages. Rock outcrops on the site were not found to be suitable branchiopod habitat because no pooling was observed there during the habitat reconnaissance.

Vernal Pools

Two natural vernal pools (Pools 4 and 7 in **Figure 2**) are present on the site. Both have been mechanically modified sometime in the past by the construction of a berm on the downslope side of each pool (**Photos 1 and 2**).



Photo 1. Vernal Pool 7 supports populations of *L. occidentalis* and *C. californicus*. March 29, 2002.



Photo 2. Vernal Pool 4 supports populations of *L. occidentalis* and *C. californicus*. March 29, 2002.

According to Jim Woollett, LLNL's principal biologist for Site 300, Pool 7 (**Photo 1**) only begins to fill after 13 cm (5 in) of rain have fallen and requires more rain to reach a depth suitable to support branchiopods. By December 29th, 2002 more than 13 cm (5 in) of rain had fallen (LLNL 2003). Although this pool didn't receive enough rainfall to fill last season, this season Pool 7 filled to a depth of 23cm (9 in) and attained a surface area of 929 square meters (10,006 square feet). The rainfall total on the site, for the period of October 2002 through May 2003, was 22.88 cm (9.01 in) (LLNL 2003) compared to last year's rain total of 17.65 cm (6.95 in) (LLNL 2002b). Both years' rainfall totals are below the average yearly rainfall for the area. Species encountered in this pool include: California fairy shrimp (*Linderiella occidentalis*), California clam shrimp (*Cyzicus californicus*), California red-legged frog (*Rana aurora draytonii*), California tiger salamander (*Ambystoma californiense*), Pacific treefrog (*Hyla regilla*), ostracods, copepods, dytids, cladocerans, chaobatids, culicids, corixids, and microturbellarians.

Vernal Pool 4 depicted in **Photo 2** is the only vernal pool in the study area that filled both seasons. It had a surface area of approximately 1,948 square meters (20,968 ft²) and was greater than 1.5 m (5 ft) deep. This pool is seasonal although it may remain ponded late into the dry season. Species encountered in this pool include: California fairy shrimp, California clam shrimp, California red-legged frog, California tiger salamander, ostracods, copepods, dytids, cladocerans, notonectids, corixids, amphipods, and microturbellarians. Amphipods were only detected during the most recent survey season, while microturbellarians were only detected during the first survey season.

Puddles

Fifteen of the pools sampled for this survey were puddles in roadbeds (**Table 1, Appendix C**). Several pools of this type were altered between last season and this season. Some were graded during regular road maintenance in the dry season and no longer fill. Some were created by the same activity. Some were altered by other forces. Pool 14, which pooled during the previous survey, was eroded on the downhill edge of the pool and roadway, and never filled during this survey season.

Periods of inundation in this habitat type ranged from 14 days to greater than 120 days. Pools 6 and 13 are fed by seeps, increasing their duration of ponding. Species encountered in this habitat type include: California red-legged frog, California tiger salamander, Pacific treefrog, ostracods, dytids, notonectids, corixids, culicids, chaobatids, and chironomids. All of these species were detected in both survey seasons.

Ephemeral Drainages

The habitat suitability of pools within ephemeral drainages is influenced by factors such as the frequency and duration of astatic ponding and the presence or absence of fish. Five ephemeral drainages containing seasonal pools occur on the site. None of these drainages directed flows that would preclude the presence of branchiopods and none contained fish. Pools within the drainages varied in depth and surface area. Species encountered in this habitat type include: California fairy shrimp, California red-legged frog, California tiger salamander, western

spadefoot (*Spea hammondi*), western toad (*Bufo boreas*), Pacific treefrog, ostracods, copepods, cladocerans, dytids, notonectids, corixids, chironomids, culicids, nematodes, chaobatids, amphipods, and microturbellarians. Of these, the spadefoot, toad, treefrog, nematode, chaobatid, culicid, and amphipod were not detected in the first survey season and all were detected in the second survey season.

SURVEY RESULTS

Like the previous year's survey, the 2002-2003 wet season survey effort for Site 300 identified no listed branchiopods on the site.

All pools surveyed are shown in **Figures 2 and 3 (Appendix A)**. Data collected at each pool is summarized in **Table 1 (Appendix C)**. Data collected during each field visit, including weather and temperature, are included on the data sheets in **Appendix D**.

Two branchiopod species that are not listed were observed during surveys. California fairy shrimp and California clam shrimp were positively identified in both vernal pools (Pools 4 and 7) in the study area. California fairy shrimp were identified in Pool 9, confirming the previous year's deduction that this species was the immature fairy shrimp found in this pool in the 2001-2002 wet season.

The distribution of other invertebrates and amphibians detected during these surveys is also reported below.

Sampling Locations

The Site 300 study area is located in Alameda and San Joaquin Counties, on the Midway and Tracy, California, U. S. Geological Survey 7.5 minute topographic quadrangle maps. The locations of the sampled pools (in decimal degree latitude and longitude), their habitat type, and faunal composition identified during surveys is shown in **Table 1 (Appendix C)**.

Study Area Photographs

Because no listed species of branchiopods were observed on the site, no new photographs are provided in this report.

Species Identified and Population Size

Two branchiopod species were identified during the surveys, California fairy shrimp and California clam shrimp. Other animals found in the study area pools include California red-legged frog, California tiger salamander, western spadefoot, western toad, Pacific treefrog, ostracods, copepods, cladocerans, culicids, dytids, notonectids, corixids, chironomids, chaobatids, nematodes, amphipods, and microturbellarians.

Amphibians were observed in several pools. Juvenile California red-legged frogs were seen in Pools 4, 6, 7 and 9. Western spadefoot and western toad were only found in Pool 12. Pacific

treefrogs were found in Pools 6, 7, 9, 12, 13, and 18. California tiger salamander eggs and/or larvae were found in seven of the pools sampled (**Table 1, Appendix C**). Three of the seven pools containing tiger salamanders were also inhabited by branchiopods. No other species of amphibians were detected within the study area.

The populations of each branchiopod species were in the 100s of individuals per species per pool.

California Fairy Shrimp

California fairy shrimp (*Linderiella occidentalis*) were found in vernal pools (4 and 7) and a drainage pool (9) downslope of a vernal pool (7). Because this species requires a minimum of 31 days to reach maturity and given that only ten of the twenty-two pools sampled persisted for at least that long, these ten pools are the only ones with the potential to harbor this species (Eriksen and Belk 1999). Many life history characteristics of California fairy shrimp contribute to the logic of their sparseness on Site 300. This species typically requires 45 days to reach maturity, is the longest lived of all fairy shrimp species that occur in California, and is on average found in pools that are deeper and larger than that of all other fairy shrimp species in California except *Branchinecta conservation*. In short, long lasting pools that are natural vernal pools are most likely to harbor this species and only two pools on the site were long lasting vernal pools. Both contained California fairy shrimp. The only other pool containing this species is in a drainage below one of the vernal pools, a source for cysts to populate this smaller drainage pool.

California Clam Shrimp

Found only in the vernal pools (4 and 7), California clam shrimp (*Cyzicus californicus*) has a very narrow distribution within the study area. The limited distribution of this species is likely due to its habitat requirement for long-lived static pools. Reproductive individuals of this species were only observed during the last three rounds of surveys.

SUMMARY

No listed branchiopods were observed during either of the past two wet season surveys at Site 300. Two species of branchiopod and several species of native amphibian were observed. Both species of branchiopod, California fairy shrimp and California clam shrimp, were found in the two vernal pools on site. California fairy shrimp were found in only one other pool, a drainage pool downslope of one of the vernal pools. The limited distribution of branchiopods on this site is due, in part, to the sparseness of the suitable habitat. Although the site is large, aspects of its topography and geology preclude the formation and persistence of astatic seasonal pools. Even the relatively gentle topography of the northern half of the site contains few areas where water pools for more than two weeks, suggesting that soils there may not contain enough clay to inhibit percolation. Rock outcrops found on the site also did not provide suitable habitat for listed branchiopods.

Amphibians observed incidental to both fairy shrimp surveys include California red-legged frog, California tiger salamander, and Pacific treefrog. In addition, the 2002-2003 survey identified Western spadefoot and Western toad in a pool in the southeast corner of the site.

In summary, no listed branchiopods were observed during either the 2001-2002 or the 2002-2003 wet seasons. Most habitat on the site is marginally suitable for branchiopods and the highly suitable habitat is occupied by the two species of branchiopod that do occur at Site 300.

REFERENCES

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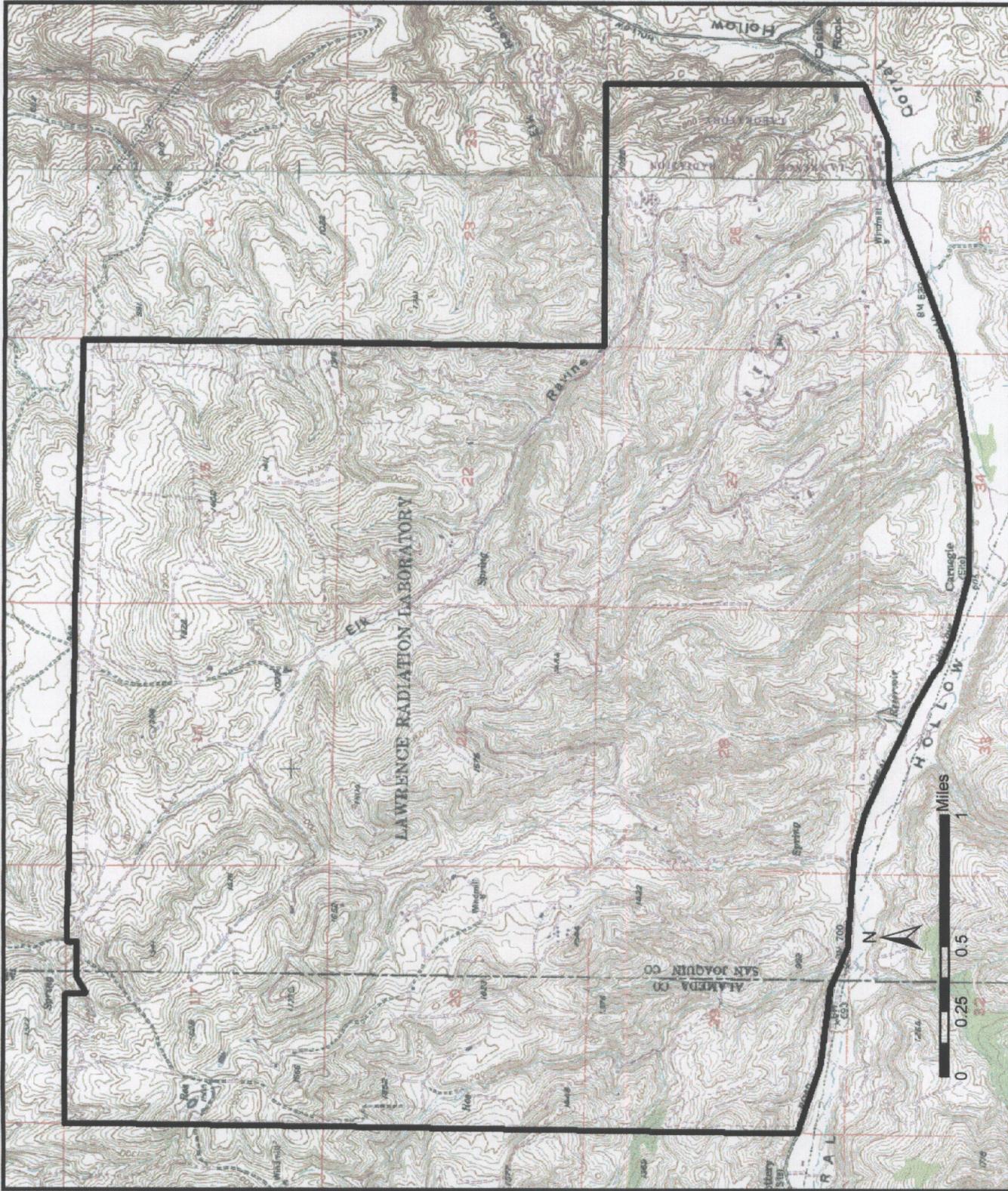
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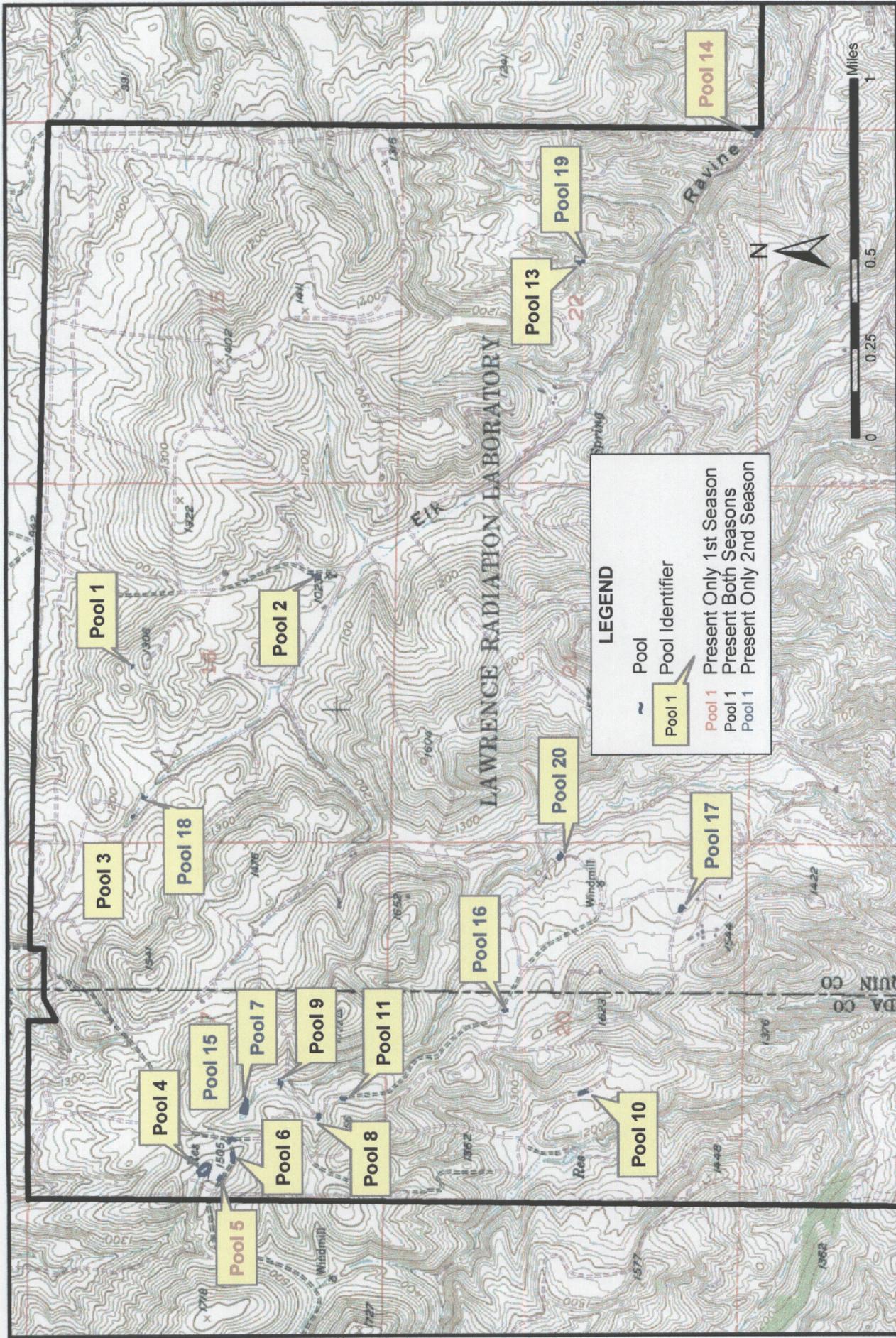
U.S. Fish and Wildlife Service (USFWS). 1996. Interim survey guidelines to permittees for recovery permits under Section 10(a)(1)(A) of the Endangered Species Act for the listed vernal pool branchiopods. USFWS Sacramento Field Office, Sacramento, CA.



University of California,
Lawrence Livermore
National Laboratory

Figure 1. Site 300 Study Area

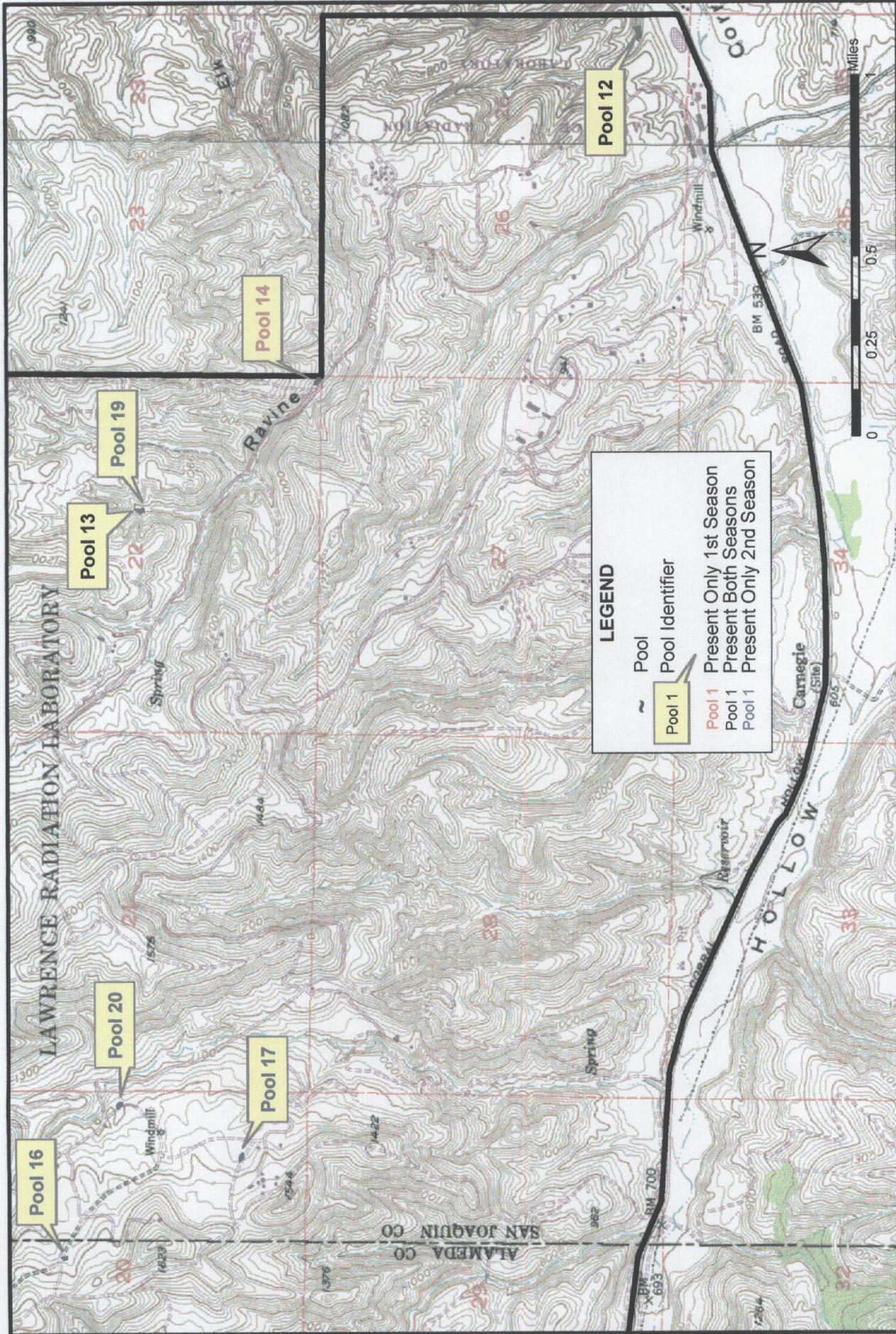
Condor Country Consulting



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Figure 2. Site 300 Northern Pool Locations

Condor Country
Consulting



Condor Country Consulting

Figure 3. Site 300 Southern Pool Locations

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National Laboratory

APPENDIX B

USFWS LETTER OF AUTHORIZATION AND SURVEYOR'S PERMIT



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

IN REPLY REFER TO:
1-1-03-PR-0691

January 8, 2003³

Ms. Wendy Weber
Condor Country Consulting
1627 D Street # 4
Hayward, California 94541

Subject: Authorization to Conduct a Wet-season Survey for Federally-listed Vernal Pool Branchiopods at Alameda and San Joaquin Counties, California (Permit TE-016591-1)

Dear Ms. Weber:

This letter verifies the U. S. Fish and Wildlife Service's (Service) verbal approval on December 16, 2002, of your request, dated, December 16, 2002, to conduct a wet-season survey for federally-listed vernal pool branchiopods at the Lawrence Livermore National Laboratory, site 300 in eastern Alameda and western San Joaquin counties, California. You are authorized, under Service permit TE-016591-1 and this letter, to determine the presence of federally-listed vernal pool branchiopods within the above project area. The wet-season survey shall be conducted during the 2002-2003 wet season and in accordance with the protocols specified in the *Interim Survey Guidelines to Permittees under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods*, dated April 19, 1996. Surveys shall also be conducted following the conditions on permit TE-016591-1, and those stated below.

1. Only Service-approved biologists listed on permit TE-016591-1, or other personnel working under their direct supervision, may conduct wet-season surveys for the federally-listed vernal pool branchiopods at the Lawrence Livermore National Laboratory, site 300 property in eastern Alameda and western San Joaquin counties, California.
2. You must notify the Service within 10 working days by letter or telephone of any new locality, or any new information regarding the range, distribution, ecology, or other pertinent life history data for any of the federally-endangered or threatened species, State-listed species, and rare or sensitive species obtained during the course of the permittee's authorized activities under this permit.

This information also shall be submitted to the California Department of Fish and Game (CDFG), using completed California Native Species Field Survey Forms or their equivalent, no more than 90 calendar days after completing the last field visit of the season at each project site. Each form shall have an accompanying scale map of the site

Ms. Wendy Weber

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(such as a photocopy of a portion of the appropriate 7.5 minute U.S. Geological Survey map) and shall provide at least the following information for a single species: township, range, and quarter section; the name of the 7.5' or 15' quadrangle; dates (day, month, year) of field work; number of individuals and life stage (where appropriate) for each species encountered by the permittee; and a description of the habitat by community-vegetation type.

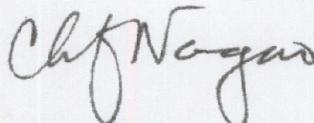
Note: All information obtained during activities conducted under the authority of this permit is required to be submitted to the Service and the CDFG to remain in compliance with section 10(a)(1)(A) permit Terms and Conditions. Failure to report, or disclose upon request by the Service and/or the CDFG, any information obtained during activities conducted under the authority of this permit could result in the revocation, suspension, or non-renewal of this permit. For reporting a new locality or new life history data, the Service contact is Jan C. Knight, Chief, Endangered Species Division, Sacramento Fish and Wildlife Office, phone number (916) 414-6620. The CDFG can be contacted at the following address:

Wildlife Habitat Data Analysis Branch
California Department of Fish and Game - HCD
1416 9th Street, 12th Floor
Sacramento, California 95814
Telephone (916) 324-3812

3. Any changes to the above-specified survey methods, survey times, personnel, or areas to be surveyed will require the permittee to request and receive approval from the Service before any such surveys commence.

Please contact Vincent Griego or Daniel Buford of my staff at (916) 414-6625 if you have any questions concerning this authorization.

Sincerely,


 Jan C. Knight
Chief, Endangered Species Division

cc:
ARD, Portland, OR (Attn: L. Belluomini)
FWS-LE, Sacramento, CA (Attn: S. Pearson)
CDFG, Tracy, CA (Attn: J. Gan)



FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

WENDY WEBER
1627 D STREET, APT. #4
HAYWARD, CA 94541
U.S.A.

2. AUTHORITY-STATUTES
16 USC 1539(A)

REGULATIONS (Attached)
50 CFR 17.22
50 CFR 17.32

3. NUMBER

TE016591-1

AMENDMENT

4. RENEWABLE

YES

NO

5. MAY COPY

YES

NO

6. EFFECTIVE

08/08/2001

7. EXPIRES

11/16/2003

8. NAME AND TITLE OF PRINCIPAL OFFICER (if #1 is a business)

9. TYPE OF PERMIT

THREATENED AND ENDANGERED SPECIES

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

11. CONDITIONS AND AUTHORIZATIONS:

- A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.
- B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.
- C. VALID FOR USE BY PERMITTEE NAMED ABOVE.
- D. Further conditions of authorization are contained in the attached Special Terms and Conditions.

ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS

ANNUAL REPORTS DUE: 1/31
See permit conditions for further reporting requirements.

ISSUED BY

Laura Hill

TITLE

Acting CHIEF - ENDANGERED SPECIES

DATE

08/08/2001

APPENDIX C

TABLE 1

Table 1: Branchiopod Survey Results for Site 300 2001-2002 and 2002-2003 Wet Season

Pool #	Habitat Type	Location (decimal degrees)		Pool Area (m ²)	01' 02'	01' 02'	02' 03'	02' 03'
		Latitude	Longitude		Branch.	Comments	Branch.	Comments
1	Puddle	37.67490467	-121.5405864	53.086	None D	Cor	None D2	Cor
2	Puddle	37.66738551	-121.5358224	117.873	None D	Cor	None D2	Not
3	Drainage	37.67475997	-121.5481448	34.644	None D2	CTS, Ost, Cor, Chi	None	CTS, Cor, Not, Ost, Cul
4	Vernal Pool	37.67175686	-121.5661536	1,948.372	LIOC, CY	CRLF, CTS, Ost, Cop, Dyt, Cla, Not, Cor, Mic	LIOC, CYCA	CRLF, CTS, Ost, Cop, Dyt, Cla, Not, Cor, Amp, Bufflehead, Pied-billed grebe
5	Puddle	37.67110589	-121.5666276	99.944	None D2	CTS, Ost, Not, Chi	Dry	This pool was on a road that was graded and no longer holds water.
6	Puddle	37.67063927	-121.565557	146.218	None	CRLF, CTS, Ost, Dyt, Not, Cor, Chi, Cha	None	CRLF, CTS, PATR, Ost, Cha, Dyt, Not, Cor, Chi
7	Vernal Pool	37.6700827	-121.5629649	929.600	Dry	Never filled this season	LIOC, CYCA	CRLF, CTS, PATR, Mic, Ost, Cla, Cop, Cul, Dyt, Cha
8	Puddle	37.6671512	-121.5634828	13.186	None	PATR, Ost, Cor, Chi	None	PATR, Chi, Ost
9	Drainage	37.66867166	-121.5617178	18.570	ImmFS*	(*Looked like LIOC) CTS, Ost, Cop, Cla, Dyt, Not, Mic	LIOC	CRLF, CTS, PATR, Mic, Ost, Cla, Cop, Cul, Dyt, Cha, Cor, Amp
10	Puddle	37.65635612	-121.5620595	305.660	None D	Cor, Chi	None D2	Not, Cor
11	Puddle	37.6661674	-121.5624918	61.830	None	Dyt, Not, Cor, Cul, Chi	None D2	None
12	Drainage	37.63669735	-121.4951891	140.081	None D	Cor, Chi	None	PATR, WETO, WESP, Cor, Not, Dyt
13	Puddle	37.65683549	-121.5198344	4.965	None	PATR	None	PATR, Dyt
14	Puddle	37.64957731	-121.5130621	40.312	None D	Cor	Dry	This pool was on a road that blew out from runoff and never filled this season.
15	Puddle	37.67090	-121.56463	116.351	NA	Pool non-existent or never filled this year.	None	CTS, Chi, Cha, Ost, Cul, Dyt
16	Puddle	37.65982	-121.55824	42.807	NA	Pool non-existent or never filled this year.	None	Not, Dyt
17	Puddle	37.65234	-121.55284	66.880	NA	Pool non-existent or never filled this year.	None	Dyt
18	Drainage	37.67437	-121.54743	15.480	NA	Pool non-existent or never filled this year.	None	CTS, PATR, Ost, Cul, Not, Chi, Nem
19	Drainage	37.65679	-121.51961	14.954	NA	Pool non-existent or never filled this year.	None D2	Cul
20	Puddle	37.65742	-121.55038	105.021	NA	Pool non-existent or never filled this year.	None D2	Dyt, Cor
21	Puddle	37.67773	-121.53644	18.000	NA	Pool non-existent or never filled this year.	None D	First sampled during rain event but never pooled in subsequent surveys.
22	Puddle	37.63604	-121.55622	70.000	NA	Pool non-existent or never filled this year.	None D	First sampled during rain event but never pooled in subsequent surveys.

KEY: Large Branchiopods

LIOC=*Linderiella occidentalis*

CYCA= *Cyzicus californicus*

ImmFS= Immature fairy shrimp

Other Invertebrates

Ost=Ostracods

Cop=Copepods

Cla=Cladocera

Cul=Culicidae

Dyt=Dyticids

Not=Notonectid

Cor=Corixid

Chi=Chironomid

Mic=Microturbellaria

Amp= Amphipods

Cha=Chaobtidae

Nem=Nematode

Semi-aquatic Vertebrates

CRLF=California Red-legged Frog

CTS=California Tiger Salamander

PATR=Pacific Treefrog

WETO=Western Toad

WESP=Western Spadefoot

APPENDIX D

DATA SHEETS

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet 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: yes no

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

Date: 12/23/02 Time: 12:45 county: San Joaquin Quad: Midway

Collector(s): Wendy Weber Permit #: TE-216591-3

Site/Project Name: Site 300-WNL Pool #: 2

Township: Range: Section: lat. long.

Temperature: Water: 9 °C Air: 12 °C

Pool Depth: at time of sampling: 13 cm
 Surface Area: at time of sampling: 3 m x 20 m

estimated maximum: cm estimated maximum: m x m

Habitat Condition: (circle where appropriate) pool in road

- undisturbed

disturbed: tire tracks garbage discing/plowing

- ungrazed

grazed: cattle light horses moderate sheep heavy other

- land use of habitat:

(Optional) Water Chemistry Data

Alkalinity (total): ppm or mg/l Conductivity: uMHO

Dissolved NH₄: ppt or ppm Dissolved Oxygen: ppm or mg/l

pH: Turbidity: (secchi disc depth) cm or clear to bottom

Salinity: ppt or ppm Total Dissolved Solids (TDS): ppm

Notes:

1/6/03

Ca 147 mg/l

Ca 160 mg/l

Ca 100 mg/l

1/28/03

dry

3/25/03 dry

5/5/03 dry

2/11/03

dry

4/8/03 dry

2/26/03

dry

4/10/03 dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet

Wet Season Survey

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: *none*
(note reproductive status)

Notostracans: *none*
(note reproductive status)

(Optional) Species Observations:

- Cladocerans: yes no
- Conchostracans: yes no
- Copepods: yes no
- Ostracods: yes no
- Fish: yes no
- Frogs: yes no
- Salamanders: yes no
- Waterfowl: yes no
- Other (specify) _____

- Insects: (adult or larvae)
- Anisoptera: yes no
- Zygoptera: yes no
- Hydrophilidae: yes no
- Dytiscidae: yes no
- Corixidae: yes no
- Notonectidae: yes no
- Belostomatidae: yes no
- Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species

Individuals

Accession/Catalog #

Pool #

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: none
 (note reproductive status)

Notostracans: none
 (note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
 Conchostracans: yes no
 Copepods: yes no
 Ostracods yes no
 Fish yes no
 Frogs yes no
 Salamanders yes no
 Waterfowl yes no

Insects: (adult or larvae)

Anisoptera: yes no
 Zygoptera: yes no
 Hydrophilidae: yes no
 Dytiscidae: yes no
 Corixidae: yes no
 Notonectidae: yes no
 Belostomatidae: yes no

Other (specify) _____
CTS eggs

Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Species</u>	<u># Individuals</u>	<u>Accession/Catalog #</u>	<u>Pool #</u>
<u>4/22/03</u>	<u>dry</u>		
<u>5/5/03</u>	<u>dry</u>		

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: none
 (note reproductive status)

Notostracans: none
 (note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
 Conchostracans: yes no
 Copepods: yes no
 Ostracods yes no
 Fish yes no
 Frogs yes no
 Salamanders yes no
 Waterfowl yes no
 Other (specify) _____

Insects: (adult or larvae)

Anisoptera: yes no
 Zygoptera: yes no
 Hydrophilidae: yes no
 Dytiscidae: yes no
 Corixidae: yes no
 Notonectidae: yes no
 Belostomatidae: yes no
 Other (specify) _____

CTS eggs

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals		Accession/Catalog #	Pool #
2/25/03	^{°Caw} 10°C	^{°Ca} 10°C	<u>Cm all p</u> 5ft.	<u> spp -</u> 3 juv. CRLF, L10C 1000's, CYCA 100's, clad, ost, cope, noto, cor., amphipod CTS eggs, buffle head (pied) gre
3/11/03	14°C	17°C	4.7ft	5 J CRLF, CTS eggs
10 mm 3/25/03	10°	17°	4.5ft	L10C 1000's repro, CYCA 100's repro, ost, clad, cope, noto, cor.
4/8/03	11°	11°	4.5ft	3 J CRLF, CTS eggs & larvae L10C 1000's repro, CYCA 1000's repro, ost, clad, cope, noto, cor, dyt.

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet 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: 12/23/02 Time: 11:00 County: Alameda Quad: Midway

Collector(s): Wendy Weber Permit #: TE-016591-3

Site/Project Name: Site 300 - LLNL Pool #: 5

Township: _____ Range: _____ Section: _____ lat. _____ long. _____

Temperature: Water: 7 °C Air: 10 °C

Pool Depth: at time of sampling: 3 cm Surface Area: at time of sampling: 3 m x 6 m

estimated maximum: _____ cm estimated maximum: _____ m x _____ m

Habitat Condition: (circle where appropriate) pool in road

- undisturbed
- ungrazed
- land use of habitat:
- disturbed: tire tracks garbage discing/plowing
- grazed: cattle horses sheep other _____
- light moderate heavy

(Optional) Water Chemistry Data

Alkalinity (total): _____ ppm or mg/l Conductivity: _____ uMHO
 Dissolved NH₄: _____ ppt or ppm Dissolved Oxygen: _____ ppm or mg/l
 pH: _____ Turbidity: (secchi disc depth) _____ cm or: clear to bottom _____
 Salinity: _____ ppt or ppm Total Dissolved Solids (TDS): _____ ppm

Notes:

cm deep Cw Ca spp
 1/6/03 less than 3 cm
 1/29/03 dry 3/25/03 dry
 2/11/03 dry 4/8/03 dry
 2/25/03 dry 4/22/03 dry
 3/11/03 dry

(USF&WS rev. 4/96)

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: none
 (note reproductive status)

Notostracans: none
 (note reproductive status)

(Optional) Species Observations: none

Cladocerans: yes no
 Conchostracans: yes no
 Copepods: yes no
 Ostracods yes no
 Fish yes no
 Frogs yes no
 Salamanders yes no
 Waterfowl yes no
 Other (specify) _____

Insects: (adult or larvae)

Anisoptera: yes no
 Zygoptera: yes no
 Hydrophilidae: yes no
 Dytiscidae: yes no
 Corixidae: yes no
 Notonectidae: yes no
 Belostomatidae: yes no
 Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Species</u>	<u># Individuals</u>	<u>Accession/Catalog #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: NONE
 (note reproductive status)

Notostracans: NONE
 (note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
 Conchostracans: yes no
 Copepods: yes no
 Ostracods yes no
 Fish yes no
 Frogs yes no
 Salamanders yes no
 Waterfowl yes no
 Other (specify) _____
CTS eggs

Insects: (adult or larvae)

Anisoptera: yes no
 Zygoptera: yes no
 Hydrophilidae: yes no
 Dytiscidae: yes no
 Corixidae: yes no
 Notonectidae: yes no
 Belostomatidae: yes no
 Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	<u># Individuals</u>	<u>Accession/Catalog #</u>	<u>Pool #</u>
<u>3/25/03</u> <u>OCW</u> <u>Ca</u> <u>depth (cm)</u> <u>egg.</u>	<u>9^o</u>	<u>16^o</u>	<u>21</u>
<u>4/8/03</u> <u>9^o</u>	<u>15^o</u>	<u>17</u>	<u>CTS larvae, Chaob.</u>
			<u>CTS larvae</u>

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: none
(note reproductive status)

Notostracans: none
(note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
Conchostracans: yes no
Copepods: yes no
Ostracods yes no
Fish yes no
Frogs yes no HYRE
Salamanders yes no
Waterfowl yes no
Other (specify) _____

Insects: (adult or larvae)
Anisoptera: yes no
Zygoptera: yes no
Hydrophilidae: yes no
Dytiscidae: yes no
Corixidae: yes no
Notonectidae: yes no
Belostomatidae: yes no
Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals		Accession/Catalog #	Pool #
	<u>water</u>	<u>air</u>		
3/11/03	12°C	14°C	<u>depth</u> 10 cm	<u>sp.</u> 100 100's repro, CYCA 100's small, CTS & HYRE larvae, 1 J CRLF, ost, clad, cope, cul, micro, dyt.
3/25/03	8°	18°	10 cm	CYCA 100's repro, CTS & HYRE larvae, ost, cope, clad, cul, dyt
4/8/03	12°	14°	10 cm in holes only	Chaob, micro(?) gran, pointy end, row. CYCA 10's repro, CTS & HYRE larvae, dyt.
4/22/03	dry			
5/9/03	dry			

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
 (note reproductive status)

Notostracans:
 (note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
 Conchostracans: yes no
 Copepods: yes no
 Ostracods yes no
 Fish yes no
 Frogs yes no
 Salamanders yes no
 Waterfowl yes no
 Other (specify) _____

Insects: (adult or larvae)

Anisoptera: yes no
 Zygoptera: yes no
 Hydrophilidae: yes no
 Dytiscidae: yes no
 Corixidae: yes no
 Notonectidae: yes no
 Belostomatidae: yes no
 Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species # Individuals Accession/Catalog # Pool #

3/26/03 2 2 depth (cm) Spp

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

XV

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: 1/6/03 Time: 11:00am County: Alameda Quad: Midway

Collector(s): W. WEBER Permit #: TE-016591-3

Site/Project Name: Site 300-11NL Pool #: 9

Township: _____ Range: _____ Section: _____ lat. _____ long. _____

Temperature: Water: 9 °C Air: 15 °C

Pool Depth: at time of sampling: >45 cm Surface Area: at time of sampling: 1 m x 2 m

estimated maximum: _____ cm estimated maximum: _____ m x _____ m

Habitat Condition: (circle where appropriate) drainage swale

- undisturbed
- ungrazed
- land use of habitat: _____
- disturbed: tire tracks garbage discing/plowing bermed
- grazed: cattle horses sheep other _____
 light moderate heavy

(Optional) Water Chemistry Data

Alkalinity (total): _____ ppm or mg/l Conductivity: _____ uMHO
 Dissolved NH₄: _____ ppt or ppm Dissolved Oxygen: _____ ppm or mg/l
 pH: _____ Turbidity: (secchi disc depth) _____ cm or: clear to bottom _____
 Salinity : _____ ppt or ppm Total Dissolved Solids (TDS): _____ ppm

Notes:

Date	°C ₁₀	°C _a	cm deep	spp.
9:42am 1/29/03	7°C	12°C	745	LIOC 100's breeding CTS eggs (most look unviable)
2/1/03	5°C	13°C	43	CRLF juvenile
2/28/03 (USF&WS rev. 4/98)	9°C	9°C	38	LIOC 100's breeding CTS eggs
5:33/11/03	11°C	14°C	29cm	LIOC 100's breeding, CTS larvae, OST, CUL LIOC 100's breeding, CTS eggs, CRLF juvenile

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: none
 (note reproductive status)

Notostracans: none
 (note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
 Conchostracans: yes no
 Copepods: yes no
 Ostracods yes no
 Fish yes no
 Frogs yes no tree
 Salamanders yes no CTS
 Waterfowl yes no
 Other (specify) _____

Insects: (adult or larvae)
 Anisoptera: yes no
 Zygoptera: yes no
 Hydrophilidae: yes no
 Dytiscidae: yes no
 Corixidae: yes no
 Notonectidae: yes no
 Belostomatidae: yes no
 Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	<u>°Cw</u>	<u># Individuals</u>	<u>Accession/Catalog #</u>	<u>Pool #</u>
		<u>°Ca</u>	<u>depth(cm)</u>	<u>spp.</u>
3/25/03	8°	18°	21	L10C 10's rypro, CTS larvae,
¹⁰ am 4/8/03	9°	13°	5	ost, cope, dyt, cul, cor., chaob.
8:15 4/22/03	dry			
5/5/03	dry			

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
 (note reproductive status)

Notostracans:
 (note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
 Conchostracans: yes no
 Copepods: yes no
 Ostracods yes no
 Fish yes no
 Frogs yes no
 Salamanders yes no
 Waterfowl yes no
 Other (specify) _____

Insects: (adult or larvae)

Anisoptera: yes no
 Zygoptera: yes no
 Hydrophilidae: yes no
 Dytiscidae: yes no
 Corixidae: yes no
 Notonectidae: yes no
 Belostomatidae: yes no
 Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Species</u>	<u># Individuals</u>	<u>Accession/Catalog #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

X

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: 12/23/02 Time: 10:15 County: ALAMEDA Quad: Midway

Collector(s): Wendy Weber Permit #: TE-016591-3

Site/Project Name: Site 300 - LLNL Pool #: 11

Township: _____ Range: _____ Section: _____ lat. _____ long. _____

Temperature: Water: 4 °C Air: 10 °C

Pool Depth: at time of sampling: 8 cm Surface Area: at time of sampling: 3 m x 12 m
estimated maximum: _____ cm estimated maximum: _____ m x _____ m

Habitat Condition: (circle where appropriate) pool in road

- undisturbed
- ungrazed
- land use of habitat: _____
- disturbed: tire tracks garbage discing/plowing
- grazed: cattle light horses moderate sheep heavy other _____

(Optional) Water Chemistry Data

Alkalinity (total): _____ ppm or mg/l Conductivity: _____ uMHO
Dissolved NH₄: _____ ppt or ppm Dissolved Oxygen: _____ ppm or mg/l
pH: _____ Turbidity: (secchi disc depth) _____ cm or: clear to bottom _____
Salinity: _____ ppt or ppm Total Dissolved Solids (TDS): _____ ppm

Notes:

1/6/03 cw Ca cm deep spp.
12°C w 14°C air 5cm 2x10

1/29/03 dry
2/11/03 dry

3/25/03 dry 5/8/03 dry

(USF&WS rev. 4/96)

2/25/03 dry
3/11/03 dry

4/8/03 dry
4/22/03 dry

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

This form is being returned to serve as part of the 90-day report. Yes No

Required color plates and/or photographs for the project are included. Yes No

NO SHRIMP OR OTHER LIFE

Date: 12/20/78
Collector(s): W. J. ...
Site: ...

Location: Range: Section: Lat: Long: ...

Temperature: Water: Air: ...
Pool Depth: ...
Time of sampling: ...

Estimated maximum: ...
Habitat Condition: (circle where appropriate) ...

undisturbed
disturbed: tree trunks
girdled: light
horsetails: moderate
other: heavy

(Optional) Water Chemistry Data
Alkalinity (total): ...
Dissolved Nitrate: ...
Dissolved Oxygen: ...

Total Dissolved Solids (TDS): ...
pH: ...

Notes: ...

plates only
plates only
plates only

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet 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: 12/27/02 Time: 2pm County: San Joaquin ~~Alameda~~ Quad: Midway

Collector(s): Wendy Weber Permit #: TE-016591-3

Site/Project Name: Site 300-LLNL Pool #: 12

Township: _____ Range: _____ Section: _____ lat. _____ long. _____

Temperature: Water: 7 °C Air: 15 °C

Pool Depth: at time of sampling: 750 cm Surface Area: at time of sampling: 5 m x 50 m

estimated maximum: _____ cm estimated maximum: _____ m x _____ m

Habitat Condition: (circle where appropriate) pool on drainage

- undisturbed
- ungrazed
- disturbed: tire tracks garbage discing/plowing
- grazed: cattle horses sheep other _____
- light moderate heavy

- land use of habitat: drainage dammed by road

(Optional) Water Chemistry Data

Alkalinity (total): _____ ppm or mg/l Conductivity: _____ uMHO
 Dissolved NH₄: _____ ppt or ppm Dissolved Oxygen: _____ ppm or mg/l
 pH: _____ Turbidity: (secchi disc depth) _____ cm or: clear to bottom _____
 Salinity: _____ ppt or ppm Total Dissolved Solids (TDS): _____ ppm

Notes:

Date	Depth	Species	°C _w	°C _a
1/6/03	>50 cm	cor. birds, notonectids		
1/28/03	20 cm	cor., noto.	12	17
2/11/03	20 cm	cor, noto, beetle	7	14
2/25/03	+25 cm	noto, CTS + HYRE	14°C	14°C
3/11/03	+25 cm	noto, cor, HYRE(A)	19°C	20°C

11:17 Jan

11:25 Jan

(USF&WS rev. 4/96)

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: none
(note reproductive status)

Notostracans: none
(note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
 Conchostracans: yes no
 Copepods: yes no
 Ostracods yes no
 Fish yes no
 Frogs yes no
 Salamanders yes no
 Waterfowl yes no
 Other (specify) _____

Insects: (adult or larvae)

Anisoptera: yes no
 Zygoptera: yes no
 Hydrophilidae: yes no
 Dytiscidae: ~~yes~~ no
 Corixidae: ~~yes~~ no
 Notonectidae: ~~yes~~ no
 Belostomatidae: yes no
 Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals		Accession/Catalog #	Pool #
	$^{\circ}C_w$	$^{\circ}C_a$		
3/25/03	12	23	depth (cm) 25	spp. Cor, noto, HYRE(A), WESP tadpoles
^{DIV 2} 4/8/03	14 $^{\circ}$	20 $^{\circ}$	15cm	Cor, HYRE WETO tadpoles,
yes 4/22/03	12 $^{\circ}$	16 $^{\circ}$	15cm	WESP tadpoles
5/5/03				Cor, noto, HYRE, WETO, & WESP tadpoles

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
 (note reproductive status)

Notostracans:
 (note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
 Conchostracans: yes no
 Copepods: yes no
 Ostracods yes no
 Fish yes no
 Frogs yes no
 Salamanders yes no
 Waterfowl yes no
 Other (specify) _____

Insects: (adult or larvae)

Anisoptera: yes no
 Zygoptera: yes no
 Hydrophilidae: yes no
 Dytiscidae: yes no
 Corixidae: yes no
 Notonectidae: yes no
 Belostomatidae: yes no
 Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
<u>water</u> 3/11/03 20°C	<u>air</u> 20°C	<u>depth</u> 3cm	<u>spp.</u> HYRE egg + larvae, dyt.
3/25/03 dry			
4/8/03 dry			
4/22/03 dry			
5/5/03 dry			

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: none
 (note reproductive status)

Notostracans:
 (note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
 Conchostracans: yes no
 Copepods: yes no
 Ostracods yes no
 Fish yes no
 Frogs yes no
 Salamanders yes no
 Waterfowl yes no
 Other (specify) _____

Insects: (adult or larvae)

Anisoptera: yes no
 Zygoptera: yes no
 Hydrophilidae: yes no
 Dytiscidae: yes no
 Corixidae: yes no
 Notonectidae: yes no
 Belostomatidae: yes no
 Other (specify) _____

C.T.S. eggs

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals		Accession/Catalog #	Pool #
	<u>°Cw</u>	<u>°Ca</u>		
3/25/03	8°	18°	3	OSA
4/8/03	9°	13°	2	none
4/22/03	dry			
5/5/03	dry			

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: NONE
 (note reproductive status)

Notostracans: NONE
 (note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
 Conchostracans: yes no
 Copepods: yes no
 Ostracods yes no
 Fish yes no
 Frogs yes no
 Salamanders yes no
 Waterfowl yes no
 Other (specify) _____

Insects: (adult or larvae)

Anisoptera: yes no
 Zygoptera: yes no
 Hydrophilidae: yes no
 Dytiscidae: yes no
 Corixidae: yes no
 Notonectidae: yes no
 Belostomatidae: yes no
 Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Species</u>	<u># Individuals</u>	<u>Accession/Catalog #</u>	<u>Pool #</u>
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**U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey**

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: none
(note reproductive status)

Notostracans: none
(note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
Conchostracans: yes no
Copepods: yes no
Ostracods yes no
Fish yes no
Frogs yes no
Salamanders yes no
Waterfowl yes no
Other (specify) _____

Insects: (adult or larvae)

Anisoptera: yes no
Zygoptera: yes no
Hydrophilidae: yes no
Dytiscidae: yes no
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Other (specify) _____

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans: none
(note reproductive status)

Notostracans: none
(note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
Conchostracans: yes no
Copepods: yes no
Ostracods yes no
Fish yes no
Frogs yes no
Salamanders yes no
Waterfowl yes no

Insects: (adult or larvae)

Anisoptera: yes no
Zygoptera: yes no
Hydrophilidae: yes no
Dytiscidae: yes no
Corixidae: yes no
Notonectidae: yes no
Belostomatidae: yes no

Other (specify) _____

Other (specify) _____

CFS eggs

Voucher Specimens

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<u>Species</u>	<u># Individuals</u>		<u>Accession/Catalog #</u>	<u>Pool #</u>
	<u>oC_W</u>	<u>oC_a</u>	<u>depth (cm)</u>	<u>Spq.</u>

~~3/26/03~~
4/22/03 dry
5/5/03 dry

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

X

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: 12/13/02 Time: 1:20 County: San Joaquin Quad: Midway

Collector(s): Wendy Weber Permit #: TE-014591-3

Site/Project Name: Site 300-LNL Pool #: 19

Township: _____ Range: _____ Section: _____ lat. _____ long. _____

Temperature: Water: 13 °C Air: 12 °C

Pool Depth: at time of sampling: 7 cm Surface Area: at time of sampling: 1 m x 4 m
 estimated maximum: _____ cm estimated maximum: _____ m x _____ m

Habitat Condition: (circle where appropriate) pool on swale/dry

- undisturbed
- ungrazed
- disturbed: tire tracks garbage discing/plowing
- grazed: cattle light horses moderate sheep heavy other _____

- land use of habitat: In drainage

(Optional) Water Chemistry Data

Alkalinity (total): _____ ppm or mg/l Conductivity: _____ uMHO
 Dissolved NH₄: _____ ppt or ppm Dissolved Oxygen: _____ ppm or mg/l
 pH: _____ Turbidity: (secchi disc depth) _____ cm or: clear to bottom _____
 Salinity: _____ ppt or ppm Total Dissolved Solids (TDS): _____ ppm

Notes:

none

<u>1/6/03</u>	<u>0°C w</u>	<u>0°C a</u>	<u>cm deep</u>	<u>spp.</u>	<u>5/5/03 dry</u>
	<u>10°C w</u>	<u>10°C a</u>	<u>10cm</u>	<u>mosquito larvae</u>	<u>4/22/03 dry</u>
					<u>4/8/03 dry</u>
<u>1/28/03</u>	<u>dry</u>	<u>2/25/03</u>	<u>dry</u>	<u>3/11/03</u>	<u>dry</u>
<u>1/11/03</u>	<u>dry</u>			<u>3/25/03</u>	<u>dry</u>

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

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

Species Observed: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status)

Notostracans:
(note reproductive status)

(Optional) Species Observations:

Cladocerans: yes no
Conchostracans: yes no
Copepods: yes no
Ostracods yes no
Fish yes no
Frogs yes no
Salamanders yes no
Waterfowl yes no
Other (specify) _____

Insects: (adult or larvae)

Anisoptera: yes no
Zygoptera: yes no
Hydrophilidae: yes no
Dytiscidae: yes no
Corixidae: yes no
Notonectidae: yes no
Belostomatidae: yes no
Other (specify) _____

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

<u>Species</u>	<u># Individuals</u>	<u>Accession/Catalog #</u>	<u>Pool #</u>
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U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

XV

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: 1/16/03 Time: _____ County: San Joaquin Quad: Midway

Collector(s): W. WEBER Permit #: TE-016591-03

Site/Project Name: Site 300-LLNL Pool #: ~~21~~ 20

Township: _____ Range: _____ Section: _____ lat. _____ long.

Temperature: Water: 12 °C Air: 15 °C

Pool Depth: at time of sampling: 15 cm estimated maximum: _____ cm
 Surface Area: at time of sampling: 3 m x 10 m estimated maximum: _____ m x _____ m

Habitat Condition: (circle where appropriate)

- undisturbed
- ungrazed
- land use of habitat: _____
- disturbed: tire tracks
- garbage
- discing/plowing
- grazed: cattle
- light
- horses
- moderate
- sheep
- heavy
- other _____

(Optional) Water Chemistry Data

Alkalinity (total): _____ ppm or mg/l Conductivity: _____ uMHO
 Dissolved NH₄: _____ ppt or ppm Dissolved Oxygen: _____ ppm or mg/l
 pH: _____ Turbidity: (secchi disc depth) _____ cm or: clear to bottom _____
 Salinity: _____ ppt or ppm Total Dissolved Solids (TDS): _____ ppm

Notes: °Cw °Ca an deep app
1/29/03 19 20 3 bottle of corixid
2/11/03 dry 3/25/03 dry 5/5/03 dry
2/25/03 dry 4/8/03 dry
3/14/03 dry 4/22/03 dry

(USF&WS rev. 4/96)

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

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Notostracans: none
(note reproductive status)

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

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	<u>0^ouo</u>	<u>2^oCa</u>	<u>depth (cm)</u>	<u>app.</u>
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3/25/03