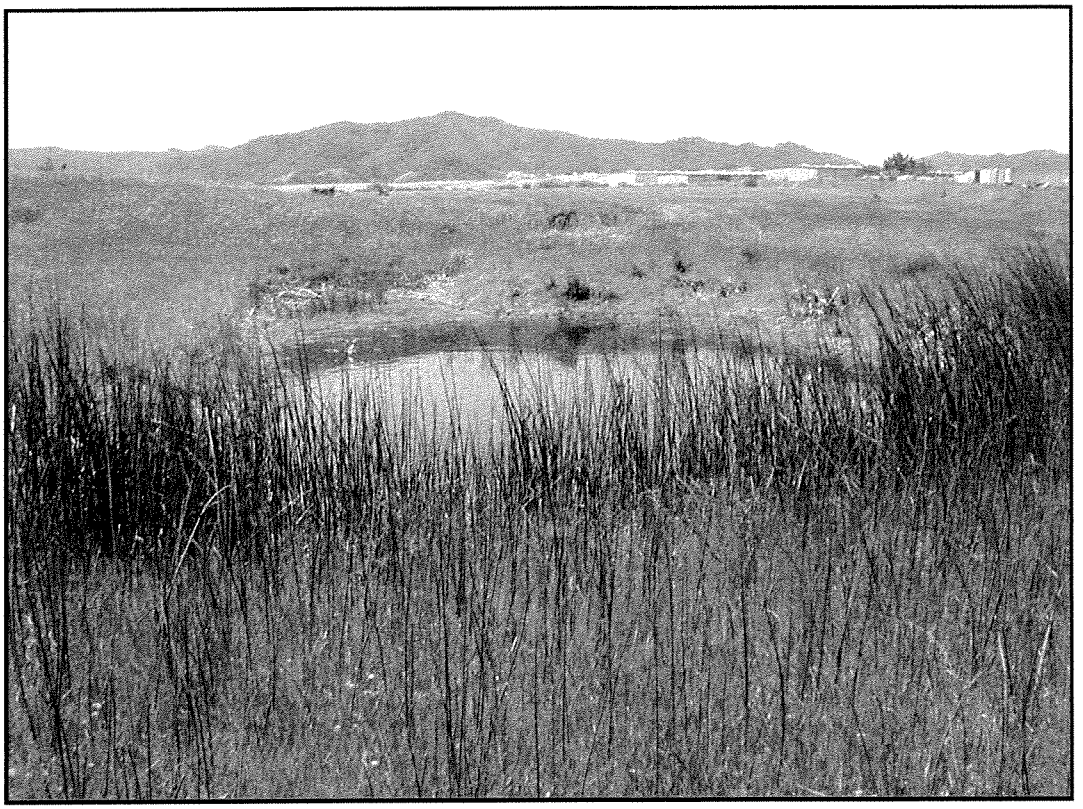
Final Report

Unocal San Luis Obispo Tank Farm Phase II Biological Resources Studies



Prepared for:
Union Oil Company of California

Prepared by:
Rincon Consultants, Inc.

October 10, 2003

rincon

Environmental Scientists Planners Engineers

Unocal San Luis Obispo Tank Farm Phase II Biological Resources Studies

Vernal Pool Fairy Shrimp Dry Season Survey
Initial Morro Shoulderband Snail Survey

Final Report

Prepared for:

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October 10, 2003

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Phase II Biological Resources Studies

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1.0 INTRODUCTION AND PURPOSE

The Union Oil Company of California (Unocal) requested a work plan for biological resources studies to support the development of an ecological risk assessment for the approximately 365-acre San Luis Obispo Former Tank Farm (SLO Tank Farm). Rincon Consultants, Inc., initially conducted a Phase I spring/summer 2003 seasonal field survey for aquatic invertebrates, benthic invertebrates, and special-status species (*Unocal San Luis Obispo Tank Farm Phase I Biological Resources Studies*, September 10, 2003). The Phase I studies did not detect any state or federal listed rare, threatened, or endangered invertebrates, vertebrates, or plants at the site. Southwestern pond turtle, a state species of concern, was observed in the creek. Three special status plant species and several occurrences of native perennial bunchgrass were found within the site.

The Phase I field effort was conducted too late to detect vernal pool branchiopods (fairy shrimp); therefore the purpose of the Phase II studies was to conduct a dry season sample collection of soil to identify fairy shrimp cysts and to begin the initial survey for the Morro shoulderband snail. A Phase II Work Plan was developed by Rincon Consultants (Appendix A) and ratified by the Ecological Risk Working Group (ERWG) at a meeting on August 6, 2003. Rincon Consultants conducted the Phase II Work Plan field work during August 2003 and laboratory study during September 2003. This report presents the methods and results of the Phase II Work Plan biological resources studies for the dry season fairy shrimp and initial Morro shoulderband snail surveys.

2.0 METHODS

Phase II studies included a dry season sampling program for fairy shrimp to determine possible presence in selected ponded areas of the SLO Tank Farm and a field survey of all suitable habitat for Morro shoulderband snail. Two special-status fairy shrimp species (*Branchinecta lynchi* Eng et al., 1990, and *B. longiantenna* Eng et al., 1990) have the potential to occur at the proposed project site. In addition, two non-listed fairy shrimp species (*B. lindahli* Packard, 1883 and *Linderiella occidentalis* (Dodds, 1924)) are known from the proposed project vicinity. The following describes the specific survey methodology for each task completed under the Phase II Work Plan.

2.1 Fairy Shrimp

Rincon Consultants prepared a 10-day notification letter (Appendix B) requesting permission to collect soil samples from the potential special-status shrimp habitats at the former Unocal Tank Farm site from the Ventura Branch of the United States Fish and Wildlife Service (USFWS). Permission was granted on August 9, 2003 (Appendix B).

Field Sampling Methods. EcoAnalysts lead biologist Christopher Rogers and Rincon Consultants biologists David Wolff and Jason Kirschenstein collected the soil samples under the EcoAnalysts, Inc. 10(A) 1(a) permit (#TE-796284-3) on August 12 and 13, 2003, from potential special-status shrimp habitats at the proposed project site per the USFWS (1996) *Interim Survey Guidelines to Permittees*. A hand trowel was used to take approximately one liter of soil from the

potential habitats, unless taking such a large quantity would have been injurious to the habitat. Each soil sample was placed in a plastic zip-lock bag, labeled with the locality number assigned in the field, and taken to EcoAnalysts, Inc. California laboratory for analysis. Data sheets detailing the date, time, location, habitat condition and use, soil material, pool depth, and other environmental conditions were documented and are included in Appendix C. Figure 1 indicates the location and results of the dry season survey.

Some areas previously identified as potential habitat were not sampled during this study because of the presence of large amounts of apparent hydrocarbon in the habitats (i.e. all soil was black and tarry, or pools of black liquid substances were present). Some habitats that contained small amounts (i.e. blackened soil patches) of apparent hydrocarbon were sampled (potential habitats 28, 34 and 35); however, if the majority of the pool bottom contained apparent hydrocarbon, then it was not sampled due to the inability of most Crustacea to live with hydrocarbon pollutants (for example: Leifer et al., in press; Gerhardt et al., 2002; Burger & Gochfeld, 1992; Krebs & Burns, 1977; Teal et al., 1992 – *See Appendix D for literature citing*).

Other habitats were not sampled because they were permanently inundated, or contained plants that required permanently wet soil. The cysts of special-status fairy shrimp species must dry out before they can hatch. If the cysts do not dry out, they will be invaded by fungus and decay. Other sites were not sampled because the size and depth as well as vegetation was indicative of either too short an inundation duration to support special-status shrimp species, or only the soil would be saturated and no standing water would be present during the wet-season.

Laboratory Analysis. Soil samples were prepared for examination in the laboratory by dissolving the clumps of soil in water and sieving the material through 300- and 150- µm pore size screens. The small size of these screens ensures that the cysts from the shrimp species will be retained. The portion of each sample retained in the screens was dissolved in a brine solution to separate the organic material from the inorganic material. The organic fraction was then examined under a microscope.

Scanning electron micrographs and reference specimens were used to identify shrimp cysts to the lowest justifiable taxon. Cysts from the genus *Branchinecta* were identifiable only to genus level, due to cyst character overlap among species, and the potential for three species, *B. longiantenna, B. lindahli,* and *B. lynchi* to occur in this region. Cysts from the genus *Linderiella* are readily separated from *Branchinecta* cysts by their dense covering of spines.

Culture Analysis. Adult shrimp were reared from the recovered cysts using methods following U.S. Environmental Protection Agency (1985), Belk, et al. (1990), Maeda-Martinez, et al., (1995a and 1995b), and Jawahar and Dumont (1995). All dry cysts were removed from the filtered debris left over from the soil sieving. These undamaged cysts were placed in a hatching chamber. A combination of de-chlorinated tap water and de-ionized water with an ultimate conductivity of 30 µS (microsiemens) was added to the chamber, which was then incubated at 9-12 °C, 14-17°C, 9-22°C and 23-27°C.

Nauplii (newly hatched shrimp) were transferred to 2.5-liter culture chambers. Nauplii were fed a standard *Daphnia* food that includes: fish food, fish oil, baker's yeast, and the alga

Selenastrum capricornutum. The nauplii were then reared to maturity. Adult shrimp reared from culture were killed in 90% ethyl alcohol, and examined under a stereo dissection microscope. Identifications were made based upon comparisons with specimens in EcoAnalysts' collections, the original species descriptions and professional experience.

2.2 Morro Shoulderband Snail

Permission to survey for this endangered species under the USFWS *Protocol Survey Guidelines for the Morro shoulderband snail (Helminthoglypta walkeriana)* (June 2003) was acquired on August 4, 2003. Field work commenced August 12, and was completed by 3:00 PM on August 13. The initial site survey included a 100% walkover through suitable habitat searching for live snails and empty snail shells.

3.0 RESULTS

All tasks under the Phase II Work Plan have been completed and the results are detailed in this report. In summary, the federally threatened species *Branchinecta lynchi* was found in high densities in 75% of the sampled locations of suitable habitat. All associated wetland habitats within the individual occupied habitat's complex are also considered 'occupied habitat.' The initial survey for Morro shoulderband snail did not find any sign of this endangered species. Appendix D contains the reports prepared by EcoAnalysts documenting their findings.

3.1 Fairy Shrimp

Shrimp cysts belonging to the genus *Branchinecta* were identified from 27 of the 36 potential habitats surveyed on the proposed project site (Table 1). Cysts of the non-listed fairy shrimp species *Linderiella occidentalis* were found in eleven of the potential habitats. No shrimp cysts, indeed no crustacean cysts, ephippia or eggs, or flatworm cysts, were found in any of the sampling locations that contained apparent hydrocarbon deposits.

Table 1. Vernal Pool Crustacean Cysts Per Habitat Location

Sample Location No. (See Figure 1)	*Branchinecta lynchi* (# of cysts)	*Linderiella occidentalis* (# of cysts)	In a shared wetland complex with Location Nos.
1	100+	ND *	--
2	ND	ND	--
3	ND	ND	--
4	100+	100+	--
5	100+	100+	--
6	100+	100+	2, 3
7	100+	ND	--
8	100+	ND	--
9	100+	ND	--
10	100+	ND	11
11	100+	ND	10
12	100+	100+	--
13	100+	ND	--
14	ND	ND	--
15	ND	ND	--
16	ND	ND	--
17	100+	ND	19

Vernal Pool Fairy Shrimp (Federal Threatened)

Table 1. Vernal Pool Crustacean Cysts Per Habitat Location

California fairy shrimp (not listed)

Sample Location No. (See Figure 1)	*Branchinecta lynchi* (# of cysts)	*Linderiella occidentalis* (# of cysts)	In a shared wetland complex with Location Nos.
18	ND	ND	--
19	100+	100+	17
20	100+	ND	--
21	ND	ND	--
22	100+	100+	--
23	100+	100+	24
24	100+	100+	23
25	100+	ND	26, 27
26	100+	ND	25, 27
27	100+	ND	25, 26
28	100+	ND	--
29	100+	100+	30, 31, 32
30	100+	100+	29, 31, 32
31	100+	ND	29, 30, 32
32	100+	ND	29, 30, 31
33	ND	ND	--
34	100+	ND	--
35	100+	100+	--
36	ND	ND	--

** ND=Not Detected*

The *Branchinecta* cysts were cultured and determined to be the federally threatened *B. lynchi*. Cultured material and remaining cysts were deposited at the Bohart Museum of Entomology, at University of California, Davis. The *B. lynchi* and the *L. occidentalis* cysts occurred in extremely high densities, indicating that the species is well established in the habitats where the cysts were found. The cysts of *L. occidentalis* were found in lower quantities, but were still abundant. This is typical as the cysts of *L. occidentalis* are densely covered in long spines, which tend to attach to debris camouflaging the cyst. *Branchinecta* cysts are smooth, and do not adhere to debris.

All associated wetland habitats within an occupied habitat's complex are also considered as 'occupied habitat' because water moves between sampling locations within complexes, particularly during years with heavy rainfall. The sampling locations included in complexes with the identified occupied habitat in this study are listed in Table 1. It should be stressed however, that wetland habitat complex determinations were made when the sampling locations were dry, and hydrological connectivity should be verified when the sampling locations are inundated, preferably during a higher than normal rainfall year (such as an El Niño event), to accurately assess the connectivity of the habitats.

All habitats sampled are artificial or are natural habitats that were altered during past modifications to the landscape for the maintenance of the Tank Farm when it was a functioning facility years ago. Regardless of the origins of the habitats, they are currently functioning as special-status shrimp habitat (i.e. as seasonal wetlands) without outside artificial management. It is difficult to estimate how long the populations have been present, however the density of the cysts bank suggests that these shrimp have been present for many years time.

3.2 Morro Shoulderband Snail

Potential habitat for the Morro shoulderband snail was observed in various portions of the northern and southern parts of the site, however; neither live Morro shoulderband snails nor empty shells were observed. This initial survey by itself is insufficient to determine that the species does or does not occur, and four additional surveys during rains or heavy fog events during the 2003/2004 winter season are necessary to establish presence/absence at this site per the protocol survey guidelines.

N

EXPLANATION

FAIRY SHRIMP SURVEY RESULTS

FS-36	SOIL SAMPLE COLLECTION LOCATIONS
NS	NOT SUITABLE
FS-34	OBSERVED-CYSTS CULTURED TO BRANCHINEATA LYNCHII IN SAMPLE LOCATIONS
	STATE JURISDICTIONAL WETLAND
	NON-STATE JURISDICTIONAL SOIL SAMPLE COLLECTION LOCATIONS

NOTE:

FAIRY SHRIMP SAMPLING PERFORMED BY RINCON CONSULTANTS IN AUGUST 2003 UNDER THE ECOANALYSTS, INC. PERMIT #TE-796284-3 AND LABORATORY ANALYSIS CONDUCTED BY ECOANALYSTS IN SEPTEMBER 2003.

0 250 500 1000 FEET

APPROXIMATE SCALE

NOTE:
STATE WETLANDS DELINEATION BY JENESIS ECOLOGICAL SERVICES, 2003.

FIGURE 1

PHASE II BIOLOGICAL RESOURCES STUDY
FAIRY SHRIMP DRY SEASON
SURVEY RESULTS

FORMER UNOCAL TANK FARM
SAN LUIS OBISPO, CALIFORNIA

PREPARED FOR

UNOCAL CORPORATION
SAN LUIS OBISPO, CALIFORNIA

ENGLAND GEOSYSTEM
ENVIRONMENTAL ENGINEERING

Y:\GIS_PROJECTS\0147 SoilTankFarm\ARC8 MapDocuments\FairyShrimpSurveyMap.mxd 101003

Appendix A

Phase II Ratified Work Plan,

Attachment A-II
Unocal Central Coast Group
San Luis Obispo Tank Farm Biological Resources Studies
Phase II Biological Resources Study Work Plan

1.0 Introduction

The Unocal Central Coast Group has requested a work plan for biological resources studies to support the development of an ecological risk assessment of the San Luis Obispo Tank Farm (SLO Tank Farm). Rincon Consultants, Inc. has prepared this Phase II work plan to capture seasonal data collection opportunities for the vernal pool branchiopods (fairy shrimp) dry season sample collection and the initial survey for the Morro shoulderband snail to accommodate protocol survey timing. Given the need for endangered species permits to conduct these studies, we have engaged a species expert who holds permits for both species to conduct the field survey and soil sample collection. As such, this work plan details the Phase II tasks and provides a summary of future tasks for the Phase III special-status species protocol surveys that can only be conducted in the wet season. This work plan has been developed to meet the data quality objectives (DQO) developed by the study team and the Ecological Risk Working Group.

2.0 Phase I Work Plan Summary

The Phase I studies included a sampling program for aquatic invertebrate (water column and benthic) and vertebrate use of the ponded and riparian areas of the SLO Tank Farm. In addition, the Phase I work included the survey and mapping for rare plants and a black rail breeding season survey. With the exception of the southwestern pond turtle observed in the riparian corridor, no other special-status vertebrates, invertebrates, or the black rail were observed during the Phase I studies. Two rare plants, the Congdon's tarplant and Cambria morning glory, have been identified at the Tank Farm site. Phase I field work is being completed along with the mapping and reporting to complete the Phase I work plan. Phase I focused on six areas representing affected and unaffected aquatic environments that were selected by the study team for sampling. These include the north marsh, SW1, cow pond, western marsh, southwest corner, and reservoir 3. The study areas were expanded for the vertebrate sampling to include all areas of suitable habitat including other ponded areas and the East Fork San Luis Obispo Creek (riparian corridor). The rare plant survey covers the entire Tank Farm site both north and south of Tank Farm Road.

3.0 Phase II Work Plan Tasks

Rincon Consultants will conduct a dry season fairy shrimp soil sample collection and cyst analysis and the initial Morro shoulderband snail habitat assessment and survey. Both of these surveys can be conducted during the dry season. Should fairy shrimp cysts be discovered, then presence would be established and wet season surveys may not be required. Similarly, if Morro shoulderband snails are discovered during the initial survey, then presence would be established and no further surveys would be required. In the event of presence, additional surveys for either the fairy shrimp or snail

would be optional to establish precise distribution on the Tank Farm site. Rincon Consultants will conduct the studies using a subconsultant biologist with valid survey take permits for both species to ensure compliance with applicable state and federal species protection statutes. Any special-status species observed will be recorded in the report. Rincon staff will support the effort by collecting the fairy shrimp samples under the direction of the permitted biologist, who will be conducting the snail surveys concurrent with the soil collection.

3.1 Task II-1: Morro Shoulderband Snail Habitat Assessment and Survey

Christopher Rogers of EcoAnalysts, Inc. is a highly qualified invertebrate ecologist who will conduct field surveys according to U.S. Fish and Wildlife Service (USFWS) protocol guidelines to determine the potential presence of the federally endangered Morro shoulderband snail (*Protocol Survey Guidelines for the Morro shoulderband snail (Helminthoglypta walkeriana) U.S. Fish and Wildlife Service,* June 2003; see attached). The USFWS protocol requires that five (5) surveys without finding the Morro shoulderband snail must be conducted to prove absence. However, once the Morro shoulderband snail is found on a site, all surveys may stop. Typically, if the snails are present, one survey is all that is required. This scope of work includes up to five days to adequately survey the entire Tank Farm site. However, we are targeting completing the initial survey in three days. Mr. Rogers has indicated that the USFWS will authorize him to conduct the initial survey at any time of year. Subsequent surveys to meet the protocol will need to be conducted around rain or substantial fog events.

If no Morro shoulderband snails are observed during the initial survey, then a Phase III work plan will be prepared detailing the tasks for completing the presence/absence surveys. In summary, these surveys will be conducted in the rain or immediately after a rain event to maximize the potential for detecting live snails. The USFWS will require a minimum of four additional visual surveys spaced one week apart. Although the USFWS prefers a minimum of one week between each survey, surveys spaced within a few days of each other are acceptable to take advantage of surveying during rainy weather. If live Morro shoulderband snails or empty Morro shoulderband snail shells are found at any time during the initial or four follow up survey visits, presence has been established and surveying may cease. The methods, results, and all snail species observed during the initial survey will be included in the report.

Task II-2: Fairy Shrimp Dry Season Sample Collection and Analysis

The dry season fairy shrimp survey task will follow the USFWS protocol that requires the collection of dry soil samples from wetland areas representing suitable habitat and laboratory analysis to sift for fairy shrimp egg cysts and culture cysts representing listed genera.(*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,* April 19, 1996; see attached). Fairy shrimp cysts can be identified to the genera level with good accuracy and in some cases to the species level.

Christopher Rogers of EcoAnalysts, Inc. and Rincon staff will collect ten 10 milliliter (ml) soil aliquots (per Service Guidelines) from all areas representing

suitable habitat. If more than 30 locations represent potential suitable special-status vernal pool branchiopod habitat, an amendment to the cost estimate for this work plan will be required for laboratory analysis of the additional samples. The basis for identifying suitable habitats will be the June 25, 2003 State Wetlands Map, however, not all mapped locations will represent suitable vernal pool branchiopod habitat if they remain saturated or moist throughout the dry season. Mr. Rogers will provide the determination of suitability during the surveys. All sample wetland areas will be recorded and mapped for inclusion in the report.

Collected soil samples will be prepared for examination in the EcoAnalysts laboratory by dissolving the clumps of soil in water and sieving the material. The portion of each sample retained in the sieves will be dissolved in a brine solution to separate the organic material from the inorganic material. The organic fraction of the prepared samples will be examined under a microscope to determine the presence of special-status shrimp cysts. Scanning electron micrographs and reference specimens will be used to identify any shrimp cysts to the lowest justifiable taxon. Collected cysts will then be cultured to a stage where identification to species will be feasible.

If no fairy shrimp cysts are discovered during the dry season soil collection and analysis, then the wet season protocol will be required to determine presence/absence of vernal pool branchiopods. The wet season protocol requires dip net sampling all aquatic habitats every two weeks following inundation in the fall/winter. If fairy shrimp are located, then surveys can cease. Absence determinations require sampling every two weeks for 120 days of continuous inundation that typically is from November to April depending on the rainfall pattern during the year the survey is conducted. The wet season protocol will be included in a Phase III work plan that will be refined following the results of the dry season soils analysis phase.

3.3 Task II-3: Accession of Fairy Shrimp Cysts or Adults

As a condition of EcoAnalysts permit, they are required to submit any and all special-status shrimp cysts collected or adults cultured during the course of the surveys according to museum standards and deposited at a public museum, previously approved by the Service to receive and store federally protected species as per Service guidelines. The time necessary for the accession process if needed is included in this work plan.

3.4 Task II-4: Report Preparation

A survey report for the study area will be prepared to detail the findings of the above tasks. The report will include: (1) the methodology of the snail and shrimp studies; (2) a summary of the available existing information and data used in the analysis including a discussion of other recent and historic recorded occurrences of special-status species in the vicinity; (3) a general description and location of the habitats surveyed and soil samples collected; and (4) the results of the study including species lists representing relevant taxa observed. Figures, photographs, and maps will be included to illustrate the findings of the study.

This work plan assumes that the State Wetlands map with topographic overlay will be provided by Unocal in digital form for Rincon use during the study. This work plan assumes that Rincon will provide map data to Unocal who will provide preparation of the report maps. A draft report for ERWG review will be prepared by October 15, 2003.

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

The endangered Conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool tadpole shrimp (*Lepidurus packardi*), and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) were listed on September 19, 1994, under the Endangered Species Act of 1973, as amended (Act) (59 Federal Register 48136). These species are endemic to vernal pools in the Central Valley, coast ranges, and a limited number of sites in the Transverse Range and Riverside County, California. The endangered Riverside fairy shrimp (*Streptocephalus woottoni*) was listed under the Act on August 3, 1993 (58 Federal Register 41391). This species inhabits Riverside, Orange and San Diego Counties, California, and northern Baja California, Mexico. These five species, hereafter referred to as vernal pool branchiopods, are fully protected under the Act. The San Diego fairy shrimp (*Branchinecta sandiegonensis*) is a proposed endangered species. Surveys for all these species should follow the methodologies described in these Interim Survey Guidelines (Guidelines). It is expected that the Guidelines will be revised in the future as additional information becomes available.

These Guidelines are issued as guidance to section 10(a)(1)(A) permittees. Because taking (killing, injuring, harming or harassing) endangered species is strictly prohibited under the Act, a section 10(a)(1)(A) recovery permit must be obtained prior to initiating any surveys or studies that might result in the take of endangered or threatened branchiopods. Failure to obtain this permit may result in violation(s) of section 9 of the Endangered Species Act. Additionally, violation(s) of a section 10(a)(1)(A) permit may result in its non-renewal, suspension or revocation.

For the purposes of these Guidelines, vernal pools and swales are defined as follows:

> Vernal pools and swales are ephemeral wetlands that form in areas of California with Mediterranean climates that have shallow depressions underlain by a substrate of hardpan, clay, or basalt near the surface that restricts the percolation of water. They may be characterized by a barrier to overland flow that causes water to collect and pond. Vernal pools/swales may occur singly, but more typically occur in vernal pool/swale complexes, due to the local hydrology, geology, and topography. Initially, the dry soil in vernal pools/swales becomes wet and starts to saturate during the fall and early winter rains. The second stage in a typical vernal pool cycle is characterized by peak rainfall and inundation of the vernal pools/swales. Vernal pools may remain inundated until spring or early summer, sometimes filling and emptying numerous times during the wet season. The vernal pools gradually dry down during the spring, quite often forming the unique "bathtub ring" of flowers from endemic vernal pool plants blooming profusely at the pool margins. This drying down stage is typified by the production of seeds in the endemic plants and the dispersal of animals from the vernal pools. These pools eventually dry down totally, with the onset of drought conditions. During this final stage, early season and shallow-rooted plants turn brown, and the soil dries and may crack. With average rainfall patterns, vernal pools are typically characterized by a predominantly annual plant community dominated by wetland species.

Note: At this time, vernal pool-associated activities not directed toward the listed species, such as botanical surveys and wetland delineations, are not considered to require a permit. However, persons

conducting such activities should minimize any potential impact on the vernal pool branchiopods or plants by reducing the amount of walking through vernal pools to the lowest extent practical. Persons conducting projects that require permits (e.g., branchiopod or amphibian surveys) should also minimize walking through the pools.

I. Survey Approval

Unless otherwise authorized by the U.S. Fish and Wildlife Service (Service) in writing, these Guidelines shall be utilized for all surveys conducted for the listed vernal pool branchiopods. Any deviations from the methods prescribed by these Guidelines must be approved by the Service before surveys are conducted. The permittee shall provide the appropriate Service Field Office (see XI, Service Contact section) with all of the following information in writing for each project site at least 10 working days prior to the anticipated start date of survey work:

a. The precise location of the project site clearly delineated on either an original or high quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1"=2,000 ft.). The map should contain the project name, type of project by category [the categories are: development, mitigation banking, or other (specify)], the estimated area (acreage) of the project site and an estimated number or area (acreage) of pool/swales on the site, quad name, and county name;

b. Names of all vernal pool biologists and associated personnel with reference to their section 10(a)(1)(A) permit number; and

c. A written request to commence wet season or dry season sampling for each project to be surveyed for the listed vernal pool branchiopods.

II. Sampling Survey Completion

a. Once initiated, surveys conducted pursuant to these Guidelines may be suspended prior to completion if:

1. the presence of one or more of the five listed branchiopods on the subject site is determined through identification at any point within the wet season survey cycle; or

2. it is agreed that one or more of the listed vernal pool branchiopods are present on the subject site.

b. Permission to dry season survey for the listed vernal pool branchiopods requires the completion of both the full wet season survey and the dry season survey, including the complete analysis of all dry soil samples (see V).

c. A complete survey consists of sampling for either:

1. two full wet season surveys done within a 5-year period; or

2. two consecutive seasons of one full wet season survey and one dry season

survey (or one dry season survey and one full wet season survey).

d. Each vernal pool/swale in a vernal pool/swale complex shall be surveyed as per these Guidelines. However, in the case of a large vernal pool/swale complex, the Service may authorize a representative portion or portions of the vernal pool/swale complex to be surveyed as per these Guidelines.

III. Notification of Presence

Should the permittee determine that any of the five listed vernal pool branchiopods are present at a site, the appropriate Service Field Office (see XI, Service Contact section) shall be notified within 10 working days by letter or telephone.

IV. Wet Season Surveys

Wet season survey sampling shall not be conducted at any project site unless the permittee receives prior permission from the Service (see I (c)).

a. Survey Initiation, Frequency, and Termination

1. Surveyors should visit sites after initial storm events to determine when pools/swales have been inundated. A pool/swale is considered to be inundated when it holds greater than 3 cm of standing water 24 hours after a rain event.

2. Pools/swales shall be adequately sampled once every two weeks, beginning no later than two weeks after their initial inundation and continuing until they are no longer inundated, or until they have experienced 120 days of continuous inundation. .

3. In cases where the pools/swales dry and then refill in the same wet season, sampling shall be reinitiated within eight days of refilling every time they meet the 3 cm of standing water criteria and shall continue until they have experienced 120 days of continuous inundation, or until they are no longer inundated.

4. If a vernal pool/swale has already experienced 120 days of continuous inundation, but then dries down and subsequently refills in the same wet season, surveys must be re-initiated in accordance with IV(a)(3) above, each time the vernal pool/swale refills and meets the 3 cm of standing water criteria.

5. Once initiated, surveys conducted pursuant to these Guidelines may be suspended prior to completion if the presence of one or more of the five listed branchiopods on the subject site is determined through identification at any point within the wet season survey cycle

b. Survey Sampling At each wet season visit, representative portions of the pool/swale bottom, edges, and vertical water column shall be adequately

sampled using a seine, dip net or aquarium net appropriate for the size of the pool or swale. Net mesh size shall not be larger than (1/8) inch. Seines shall be examined and emptied of material at least once every five linear meters.

c. Voucher Specimens

1. Voucher specimens shall be collected only once for each individual vernal pool/swale and shall be accessioned to either the California Academy of Sciences (CAS) or the Natural History Museum of Los Angeles County (LACM) (see VIII).

2. Voucher specimens of all listed vernal pool branchiopods captured shall be collected and all other specimens shall be returned in good condition to the vernal pool/swale where they were found as quickly as possible.

3. No more than 20 specimens of each species of listed vernal pool branchiopods from each pool/swale, or less than 10% of the subpopulation present in the pool/swale, whichever is the lesser amount, shall be retained and preserved as voucher specimens.

4. Only sexually mature, adult branchiopods shall be used for purposes of voucher specimens for species identification. The Service will not accept species identifications made using immature specimens.

5. The sample of 20 voucher specimens shall include no less than three specimens of either sex.

V. Dry Season Surveys

Dry season soil sampling shall not be conducted at any project site unless the permittee receives prior written permission from the Service (see I (c)).

a. Soil Collection

Soil shall be collected when it is dry to avoid damaging or destroying cysts which are more fragile when wet. A hand trowel or similar instrument shall be used to collect approximately one liter volume sample per pool/swale of the top 1-3 cm of pool sediment. Whenever possible, soil samples shall be collected in chunks. The trowel shall be used to pry up intact chunks of sediment, rather than loosening the soil by raking and shoveling which can damage cysts.

In southern California there are a number of federally listed plant species (Orcuttia californica, Pogogyne abramsii, and Pogogyne nudiscula) that often co-occur with the fairy shrimp. Removal of soil could damage populations of these plants by inadvertently removing seed. Dry sampling should be minimized or avoided within those vernal pools/swales that are known to, or may, contain these species. The permittee shall contact the Carlsbad Field Office (see XI, Service Contact section) regarding the distribution of these

listed plants species prior to conducting dry sampling in Los Angeles, Orange, Riverside and other southern California counties.

b. Soil Sample Volume

Each soil sample from the 10 soil sample locations shall be labeled, stored, and analyzed individually.

1. A total of 10 soil samples of approximately 100 ml each shall be taken from each pool/swale, for a total soil sample volume of approximately one liter per pool/swale.

2. In the case of a very large playa, dry lake, or vernal pool, the Service may authorize the removal of more than one liter of soil.

3. If a pool has a diameter of less than three meters, the total soil sample taken shall not exceed ½ liter in volume per pool, and the 10 soil samples shall be approximately 50 ml each in volume.

c. Soil Sample Locations

A total of 10 soil samples shall be collected from the following locations within each pool/swale sampled:

1. Starting with one soil sample taken from the edge of the pool/swale, at least four soil samples shall be taken from equidistant points along the longest transect of the pool/swale.

2. Starting with one soil sample taken from the edge of the pool/swale, at least four soil samples shall be taken from equidistant points along the widest transect of the pool/swale.

3. If neither the longest or the widest transect encompasses the deepest part (or parts) of the pool/swale, then at least two soil samples shall be taken from the deepest part (or parts) of the pool/swale..

d. Soil Storage

1. The soil samples from each soil sample location shall be stored in separate bags, labeled with the specific location within the pool/swale from where each soil sample was taken. A sketch of the pool/swale showing the specific location of each soil sample shall be included in the 90-day report.

2. Soil samples containing any residual moisture initially shall be adequately ventilated and allowed to air dry thoroughly before storage of the sample. The bags containing the soil samples shall be kept out of direct sunlight in order to avoid excessively heating the sample.

3. All soil samples shall be retained and stored as directed in V(d)(1) and V(d)

(2) above until the Service is able to provide direction in species-level identification of the cysts of all the aforementioned branchiopod species.

e. Soil Sieving

1. The soil samples shall not be ground, crushed, or otherwise manipulated in order to expedite the sieving process. A relatively short period of pre-soaking the soil sample may be helpful/necessary in order to facilitate the sieving process. Small aliquots (approximately 50 ml in volume) of soil shall be gently washed with water through a graded series of U.S. standard eight inch soil sieves ending in mesh sizes 300 micron (um), and 150 micron (um).

2. Sieves must be thoroughly rinsed and visually inspected for any cysts adhered to the sieves prior to the start of sieving. This process must be repeated for each individual soil sample location. Sieves shall also be rinsed and thoroughly inspected upon completion of sieving soil samples.

f. Soil Examination

1. Washed and sieved soil fractions from the 300 um and 150 um sieves shall be examined under a dissecting microscope for tadpole shrimp and fairy shrimp cysts. The process shall be repeated until all individual soil samples have been examined. All sieved material shall be processed and dried as quickly as possible, preferably within one hour from the initial wetting.

Note: Do not return soil to survey sampling site.

2. All fairy shrimp and tadpole shrimp cysts shall be removed from the soil, separated by cyst type into labeled vials, allowed to air-dry, and then stored dry.

g. Cyst Density

Cyst density information for each soil sample location shall be calculated by dividing the total number of cysts recovered by the total amount of soil from the individual aliquots from that soil sample location. Total cyst density information for each soil sample location shall be reported for each species in terms of: none; 1-25 cysts/100 ml soil; 26-50 cysts/100 ml soil; 51-100 cysts/100 ml soil; 101-199 cysts/100 ml soil; or more than 200 cysts/100 ml soil.

h. Cyst Identification

Each fairy shrimp and tadpole shrimp cyst type shall be identified to genus by a qualified biologist. The Service may require an independent review by a crustacean biologist(s) of any vernal pool branchiopod or cyst identification.

There are two options when a branchiopod cyst identification is made to genus:

1. the survey, pursuant to these Guidelines, may be suspended if it

is agreed one or more of the listed species are present on the project site; or

2. one subsequent complete wet season sampling survey shall be conducted to complete survey requirements.

VI. Cyst Voucher Specimens

A representative sample of each cyst type from each pool/swale shall be accessioned to either CAS or LACM (see VIII).

VII. 90-Day Reports

a. U.S. Fish & Wildlife Service

The permittee shall provide the appropriate Service Field Office (listed in the Service Contact section) with all of the following information in writing, using the appropriate Vernal Pool Data Sheet where applicable as the reporting form, no more than 90 calendar days after completing the last field visit of the season at each project site:

1. The location of the project site clearly delineated on an original or high quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1"=2,000 ft.). The location of the listed vernal pool branchiopods is to be included on the 7.5 minute maps in as precise a manner as possible (e.g., lat/long or location within a section).

2. Five color photographic 35mm slides and/or 3" x 5" photographs of each project site taken during sampling in the wet season; this is to include two slides and/or photographs taken from standing position that portray the general landscape of the site [i.e., two photos from an opposing axis of the site (e.g., north and south compass headings)]; and three slides and/or photographs of representative vernal pools, swales, and other areas within the site sampled for the five listed vernal pool branchiopod species. The following information shall be legibly written on each slide/photograph with permanent ink: precise location of the project site, direction from which photograph was taken, date of photograph, initials of photographer, and initials of the scientific names of any of the five listed vernal pool branchiopod species that were found at the depicted site. Note: Slides and/or photographs only need to be submitted once per project site.

3. The estimated number of individuals of any of the listed vernal pool branchiopods observed in each pool/swale shall be reported in terms of an order of magnitude (e.g., 10's, 100's, 1000's). (*Refer to the Vernal Pool Data Sheet*)

4. The number of individuals of any of the listed vernal pool

branchiopods or cysts preserved from each pool/swale and the name of the institution in which they are accessioned.
(*Refer to the Vernal Pool Data Sheet*)

5. A qualitative description of the vernal pool/swale community. A general list of amphibian species and non-listed vernal pool crustacean species (by common and/or scientific name) encountered at the project site is desirable. For purposes of this permit a full survey for these species is not required. However, if more detailed information is collected, it shall be included in the Vernal Pool Data Sheet. .
(*Refer to the Vernal Pool Data Sheet*)

6. Data collected during each field visit, including: date, air temperature, water temperature, weather conditions (e.g., sunny, overcast), maximum depth of each pool/swale, and size (area in square meters) of each pool/swale.
(*Refer to the Vernal Pool Data Sheet*).

7. (Optional) water chemistry data collected during each field visit, including: alkalinity (total: ppm or mg/l), conductivity (uMHO), dissolved oxygen (ppm or mg/l), dissolved NH4 (ppm or mg/l), pH, salinity (ppt), total dissolved solids (TDS, ppm), and turbidity.
(Refer to the Vernal Pool Data Sheet)

b. California Department of Fish & Game

1. Permittees should consult with the California Department of Fish and Game (916/653-4875) to determine their responsibilities under the California Endangered Species Act and the California Fish and Game Code.

2. The permittee shall supply the California Department of Fish and Game (Natural Diversity Data Base, Staff Zoologist, California Department of Fish and Game, 1416 9th Street, Sacramento, California 95814; telephone 916/322-2494) with completed California Native Species Field Survey Forms, no more than 90 calendar days after completing the last field visit of the season at each project site.

VIII. Accessioning Voucher Specimens

a. All vernal pool branchiopod voucher specimens (including individuals collected and cysts) shall be accessioned into either the California Academy of Sciences (CAS) or the Natural History Museum of Los Angeles County (LACM). All specimens shall be preserved according to the accession standards of the repository which will accession and maintain the specimens. The October 1995 CAS and September 1995 LACM standards are attached to these Interim Survey Guidelines.

b. All vernal pool branchiopod voucher specimens (including individuals collected and cysts), along with a copy of the Vernal Pool Data Sheet containing all of the items listed in VII (a), shall be permanently deposited in the CAS or LACM within 90 calendar days of the

completion of the field survey and the Service shall be supplied with the CAS or LACM catalog numbers given to the specimens.

c. The permittee shall supply the CAS or LACM with a photocopy of their section 10(a)(1)(A) permit to validate that the specimens supplied to them were taken pursuant to a permit. The Service will likely consider refusal by the CAS or LACM to accession any listed branchiopod specimens to be a violation by the permittee of their section 10(a)(1)(A) permit (e.g., if due to improper preservation/storage).

California Academy of Sciences (CAS)
Department of Invertebrate Zoology and Geology, Golden Gate Park,
San Francisco, California 94118; telephone (415) 750-7082

Natural History Museum of Los Angeles County (LACM)
Crustacea Section, Invertebrate Zoology, 900 Exposition Boulevard,
Los Angeles, California 90007; telephone (213) 744-3450

IX. Additional information, limitations, and caveats with respect to these Guidelines are as follows:

a. From time to time, specific circumstances may justify or necessitate revision of these Guidelines, on a case-by-case basis. At the discretion of the Service, such a variance may be allowable under these Guidelines if:

1. the permittee explains to the Service in writing why the variance to the Guidelines is needed and justified; and

2. the Service concurs, in writing, with the variance requested by the permittee.

b. The Service reserves the right to reject vernal pool branchiopod surveys conducted under these protocols as inadequate if:

1. survey methods used are inconsistent with these Guidelines, unless prior written permission (see I, Survey Approval) has been obtained; or

2. other information indicates that the survey is inadequate as determined by the Service.

X. Permit Infractions

The Service may consider any of these actions to be a violation by the permittee of their section 10(a)(1)(A) permit:

a. falsification of any reporting or information;

b. failure to follow the stated Guidelines sampling methodologies;

c. failure to obtain prior permission to commence wet season surveys or failure to obtain written permission to commence dry season surveys (see section I (c));

d. failure to notify the Service within 10 days of a determination of presence of one or more of the listed vernal pool branchiopods on a survey site;

e. failure to accession voucher specimens or improperly accessioned voucher specimens;

f. failure to file completed 90-day reports with the Service within 90 calendar days after completing the last field visit of the season at each project site; or

g. failure to file completed Natural Diversity Data Base forms with the California Department of Fish and Game within 90 calendar days after completing the last field visit of the season at each project site.

Violation(s) of a section 10(a)(1)(A) permit may result in its non-renewal, suspension or revocation.

XI. Service Contact

For the Central Valley hydrographic basin and the coast ranges north of the Santa Cruz County line, the Sacramento Field Office (2800 Cottage Way Room E-1803, Sacramento, California 95825; telephone 916/979-2728) should be contacted regarding vernal pool branchiopod issues.

For areas from Santa Cruz County south to Ventura County, contact the Ventura Field Office (2493 Portola Road - Suite B, Ventura, California 93003; telephone 805/644-1766).

For areas from Los Angeles County south to the U.S.- Mexico border, contact the Carlsbad Field Office (2730 Loker Avenue West, Carlsbad, California 92008; telephone 619/431-9440).

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: ____/____/____ Time: _____ County: _____ Quad: _____

Collector(s): _____ Permit #: _____

Site/Project Name: _____ Pool #: _____

Township: _____ Range: _____ Section: _____ _____lat._____long.

Temperature: Water: _____ oC Air: _____ oC

Pool Depth: Surface Area:

at time of sampling: _____cm at time of sampling: _____m x _____m

estimated maximum: _____cm estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

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

- 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:

http://ventura.fws.gov/SurveyProt/wetseashrimp.htm 7/23/2003

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	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			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 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: ____/____/____ Time: _____ County: _____ Quad: _____

Collector(s): _____ Permit #: _____

Site/Project Name: _____ Pool #: _____

Township: _____ Range: _____ Section: _____ _____lat. _____ long.

Habitat Condition: (circle where appropriate)

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

- land use of habitat:

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other_____

Pool Depth: _____cm (estimated maximum) Surface Area: _____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 Den (#/100

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 #

PROTOCOL SURVEY GUIDELINES

for the

Morro shoulderband snail (*Helminthoglypta walkeriana*)

U.S. Fish and Wildlife Service

June 2003

The following survey guidelines are intended to provide the U.S. Fish and Wildlife Service (Service) with information to assess the presence of the federally endangered Morro shoulderband snail (banded dune snail) (*Helminthoglypta walkeriana*) on a given site. Accurate survey data are needed to provide the Service with sufficient information to respond adequately to requests for applicable Federal incidental take permits under the Endangered Species Act of 1973, as amended (Act). Any person surveying in accordance with these guidelines will require a permit under section 10(a)(1)(A) of the Act.

The California Department of Fish and Game (Department) should be contacted regarding any responsibilities under the Fish and Game Code. For information on the Department's code, please contact the Department's Wildlife Management Division at 1416 Ninth Street, Sacramento, California 95814 or call (916) 654-3796.

The objective of these guidelines is to establish, with a reasonable level of confidence, whether the Morro shoulderband snail is present in proposed project areas and to document known sites discovered during surveys.

I. Need for Survey

To determine the need for survey of a proposed project area, the proposed project must: 1) occur within the known or suspected range of the Morro shoulderband snail or 2) occur within or adjacent to suitable habitat of the Morro shoulderband snail.

The absence of the species may be difficult to ascertain at some sites because live snails are easily hidden and are difficult to locate when in low numbers or because empty shells have been removed.

Therefore, on a case-by-case basis, the Service may conclude, after considering the presence of suitable habitat and proximity to known snail populations, that the habitat on site may support the species.

Whenever survey information is inadequate or lacking on a given site, the project proponent may assume the presence of the species on a given site for the purposes of proceeding with an application for incidental take.

II. Survey Protocol

- Surveys shall be conducted in the rain or immediately after a rain event to maximize the potential for detecting live snails.
- A property shall be subject to a minimum of five (5) visual surveys spaced one (1) week apart. Although the Service prefers a minimum of one week between each survey, surveys spaced within a few days of each other are acceptable to take advantage of surveying during rainy weather.
- Morro shoulderband snails may also be active during periods of dense fogs or heavy dews; however, surveys may be conducted during such conditions only with the concurrence of the Service.
- Morro shoulderband snail surveys should not be conducted during dry weather conditions. It is important not to disturb microclimates in leaf litter where the species may be aestivating.
- For each survey, a combination of two survey methods shall be employed:

a. General habitat assessment: Once the extent of the project site is identified, walk the entire project area, looking for key features and searching in likely places for snails. The general search effort should identify key habitat features within and adjacent to the entire project area.

b. Key features search: More intensive searching of well-defined areas with key habitat features increases the probability of finding Morro shoulderband snails. Search around key habitat features by carefully moving aside branches and stems of plants to visually inspect the soil and leaf litter underneath. Search under rocks, vegetation, downed wood, debris piles, the undersides of branches and leaves, and carefully sift through leaf litter at the base of shrubs and rock outcrops. The table below provides information on general habitats and key features for the Morro shoulderband and several other snail species that may be confused with it.

6. To avoid overlooking areas or plants, key features and search routes may be temporarily marked with pin flags, tape, or other suitable materials which do not cause damage to vegetation or soil. Search time should be distributed evenly in order to cover the entire survey area.

- To avoid disturbing or injuring live snails, carefully sift through soil or leaf litter by hand in a manner that would not injure live snails or their eggs. Identify all live snails and empty snail shells observed, including snail shell fragments, as close to species as possible. Record all survey information on field forms. If unknown specimens or shells are found, mark (flag) those sites as well, in case a later identification is possible.

- When handling is necessary, the permittee shall handle Morro shoulderband snails as efficiently as possible (generally under a minute per snail). Any live Morro shoulderband snail shall be returned to the exact site where it was found, unless it is necessary to move it a few feet out of the path of foot traffic to a suitable area.

- Attractants shall not be used, so as to avoid inadvertently attracting vandals or predators of the Morro shoulderband snail.

- If live Morro shoulderband snails or empty Morro shoulderband snail shells are found at any time during the 5 survey visits, presence has been established and surveying may cease. However, the Service recommends that surveying continue to determine the distribution of the species on a given site.

- A report shall be prepared for each surveyed site that includes the permit number, survey date(s) and time(s); survey location(s) on a map; any photographs of the site; the weather conditions during the survey; a description of recent weather conditions, including temperature, and date and amount of most recent precipitation; a description of the habitat; names of surveyor(s); number of person-hours spent searching for the species per hectare searched (i.e., survey effort); a copy of any field notes and a description of the survey methods and results, including any locations of Morro shoulderband snails and their shells; a description of the habitat characteristics at each site where a Morro shoulderband snail is found; and the possible threats to the species observed at the site. The report shall be sent to the Field Supervisor, Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, California, 93003.

- Based on our assessment of the survey report and information in our records, the Service may determine that a given site does not contain the Morro shoulderband snail. However, despite conducting a survey according to these guidelines, should a Morro shoulderband snail be found on the project site before or during a project, the project proponent should halt the activity which may result in take of the Morro shoulderband snail, and contact the Service to determine his/her responsibilities under the Act.

- Because information is lacking on the ability of the species to colonize unoccupied habitat, the Service is not establishing a time frame in which an adequate survey is considered valid. However, the Service should be contacted if more than two (2) years lapse between an accepted negative survey and an action which may affect the habitat of the Morro shoulderband snail on a given site.

- Specific circumstances may justify or necessitate exceptions or revisions of these survey guidelines on a case-by-case basis. At the discretion of the Service, such revisions may be allowable under this protocol if: the surveying biologist explains to the Service in writing why exceptions or revisions of this protocol are needed and justified; and the Service concurs with such revision in writing.

- The Service reserves the right to reject survey results as inadequate if: the specific methods described above are not implemented as determined by the Service and prior written exception has not been obtained; or the survey methods which were used are inconsistent with current guidelines.

- These survey guidelines are subject to change based on any new information on survey techniques. Therefore, the permittee is responsible for contacting the Service at least 5 days prior to conducting a survey to determine whether guidelines have been modified.

If you have questions about these survey guidelines, please contact Della Snyder at the Ventura Fish and Wildlife Office at (805) 644-1766.

III. Species Habitats

Helminthoglypta walkeriana

Morro shoulderband or Banded dune snail

Habitats Used: Coastal areas: Coastal dune scrub vegetation on sandy soils with 10% slope. May use areas with dense veldt grass or ice plant. Inland areas: Coastal sage scrub; *Opuntia* cactus; fennel; in grasslands and swales with shrubs that provide canopy and leaf litter.

Key Features: Leaf litter under *Ericameria, Eriogonum, Baccharis,* and other shrubs with canopy shelter and thick leaf litter. Under rocks, debris piles, downed wood, woody debris, at the base of fence posts in moist pockets.

Helix aspersa

Common garden snail or Brown garden snail

Habitats Used: Introduced species; found in both cultivated and wild situations

Key Features: Under rocks, woody debris, on trunks and stems of green vegetation, in moist swales.

Helminthoglypta umbilicata

Big Sur shoulderband

Habitats Used: Typically found more inland in grassland and coastal sage scrub plant communities

Key Features: Moist leaf litter under Oak, Eucalyptus, Sycamore or Poison Oak, in leaf litter under shrubs, debris piles and woody debris

Helminthoglypta fieldi

Surf shoulderband

Habitats Used: Coastal dune scrub plant communities.

Key Features: Range extends south of the San Luis Range to Pt. Arguello. Leaf litter under scrub vegetation

Appendix B

USFWS Request To Survey and Approval Letters

Rincon Consultants, Inc.
1530 Monterey Street, Suite D
San Luis Obispo, California 93401

805 547 0900
FAX 547 0901

info@rinconconsultants.com
www. rinconconsultants.com

July 28, 2003

Diane Noda, Field Supervisor
U.S. Fish and Wildlife Service, Ventura Field Office
2493 Portola Road, Suite B
Ventura, CA 93003

SUBJECT: Request for Approval to Conduct Vernal Pool Branchiopods Dry Season Sample Collection at the Unocal San Luis Obispo Former Tank Farm Site, San Luis Obispo, California

Dear Ms. Noda:

On behalf of Unocal Corporation, Central Coast Group, Rincon Consultants, Inc. and Christopher Rogers of EcoAnalysts, Inc. request approval to conduct the dry season sample collection for listed vernal pool branchiopods at the subject former tank farm site. Christopher Rogers will be the lead investigator and the work will be conducted under his fairy shrimp permit number TE-796284-3. David Wolff of Rincon Consultants is trained and experience in fairy shrimp survey and identification, who has been named on two other prior company permits will assist Mr. Rogers in the collection of the samples.

The study area includes the approximately 365-acre Unocal San Luis Obispo former tank farm site located to the north and south of Tank Farm Road between South Higuera and Broad streets in San Luis Obispo, California. The site falls on the north edge of the USGS Pismo Beach 7.5 minute quadrangle map. Attached copy of the USGS map delineates the survey area.

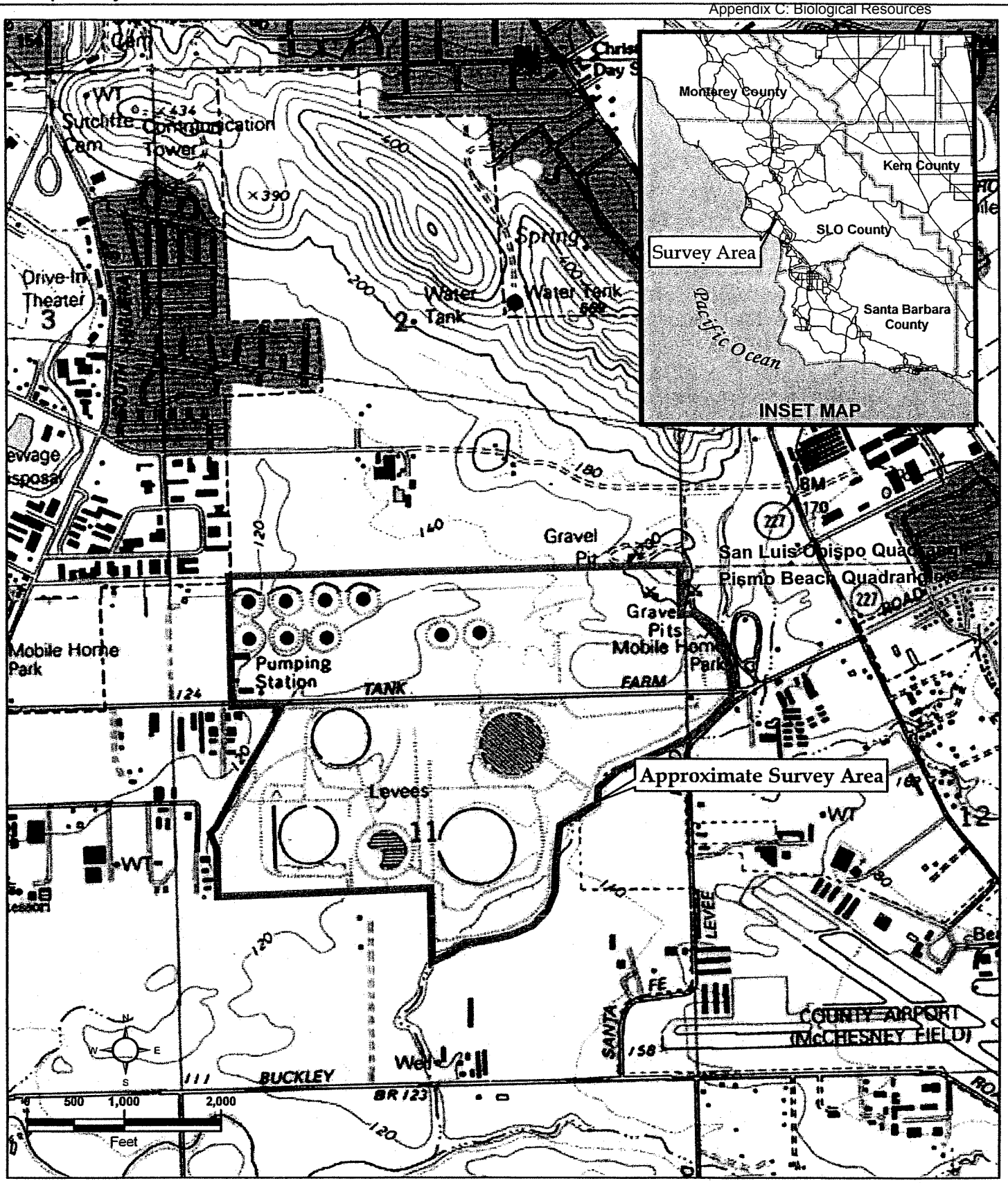
Given Mr. Rogers schedule and to accommodate his out of town travel, we are scheduled to commence the dry season sample collection on August 11, 2003. We would appreciate your written approval by that time. Thank you for your assistance with this survey effort.

Sincerely yours,
RINCON CONSULTANTS, INC.

David K. Wolff
Manager, Biological Resources Group
Certified Professional Wetland Scientist

Enclosure (1): Survey Area Map

cc: Doug Threloff, USFWS
Christopher Rogers, EcoAnalysts
John Ljung, Unocal Corporation



Site Location on
USGS Quad Map

Figure 1

Uno

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

In Reply, refer to:

August 8, 2003

David K. Wolff
Rincon Consultants, Inc.
1530 Monterey Street, Suite D
San Luis Obispo, California 93401

Subject: Request to Begin Dry Season Surveys for Listed Vernal Pool Branchiopods in San Luis Obispo County, California (Permit Number TE-796284-3)

Dear Mr. Wolff:

This letter is in response to your request, dated July 28, 2003, and received in our office on July 30, 2003, for authorization to conduct dry season sampling for listed vernal pool branchiopods at the approximately 365-acre, former Unocal San Luis Obispo tank farm site. The site is located between South Higuera and Broad Streets in San Luis Obispo, California. Christopher Rogers would be the lead investigator and the work would be conducted under his permit number TE-796284-3. You requested to commence sampling on August 11, 2003.

We hereby authorize you to conduct the requested survey for federally-listed vernal pool branchiopods within the above-mentioned project area. The dry-season survey shall be conducted during the 2003 dry season (typically June - August) 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-796284-3. Please report any observations of listed branchiopods to us by phone or facsimile within 90 days of an observation. Please refer to your permit for other reporting requirements and any special conditions that must be met.

Please contact Steve Kirkland of my staff at (805) 644-1766 if you have any questions regarding this letter.

Sincerely,

for Christopher Kofron
Division Chief, San Luis Obispo

Appendix C

Vernal Pool Dry Season Survey Data Sheets

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 2,3 N

Date: August / 12 /2003 **Time:** 9:54 AM **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS1

Township: 31S **Range:** 12E **Section:** 11 **Lat.** 35° 14'55.15N **Long.** 120° 39' 44.83" W

Habitat Condition: (circle where appropriate)

- undisturbed	(disturbed)	tire tracks	garbage	discing/plowing	
- ungrazed	(grazed)	(cattle)	horses	sheep	other_____
			light	moderate	heavy

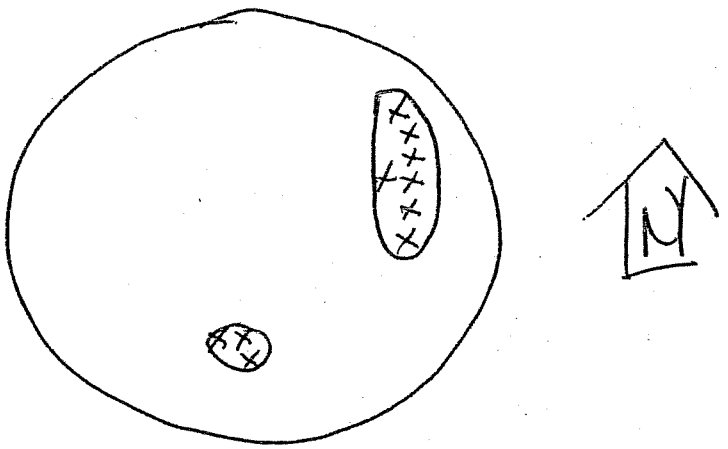
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted Clay

Pool Depth: 12" cm (est. maximum) **Surface Area:** 30 x 10 (3.5 x 4.5) m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	100	B. Lynchi / [redacted]	100+/[redacted]	100+

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 4N 5N

Date: August / 12 /2003 **Time:** _____ **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS2

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

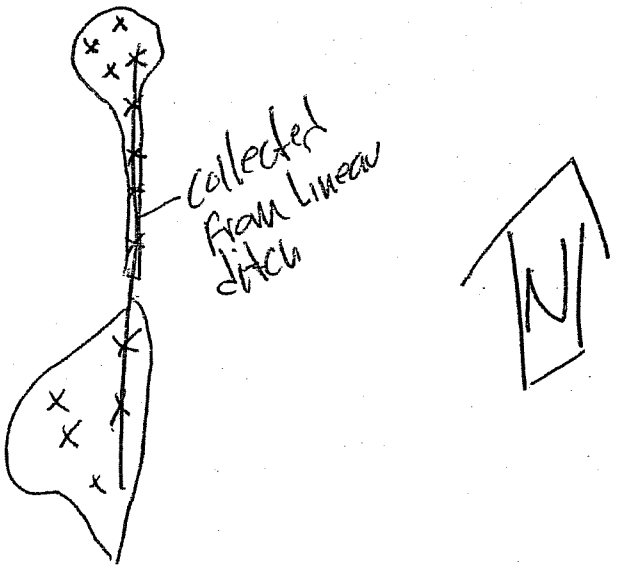
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted clay

Pool Depth: <1' cm (est. maximum) **Surface Area:** See map m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	10		0	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11 – 13				

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 6N

Date: August / 12 /2003 **Time:** 10:30 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS3

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

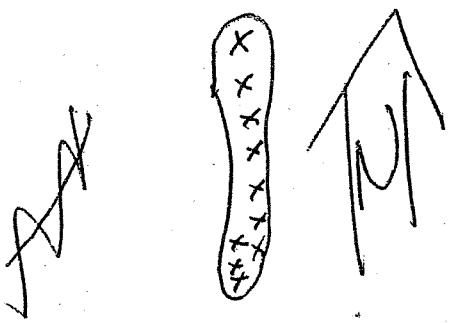
- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	cattle	horses	sheep	other_____
			light	moderate	heavy
- *Land Use of Habitat*:	Former oil	tank farm;	tanks removed	grazing, open space	

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted clay

Pool Depth: 2 1' cm (est. maximum) **Surface Area:** See map m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations



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	10			
2				
3				
4				
5				
6				
7				
8				
9				
10				

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 Pict 7N

Date: August / 12 /2003 **Time:** 10:40AM **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS4

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

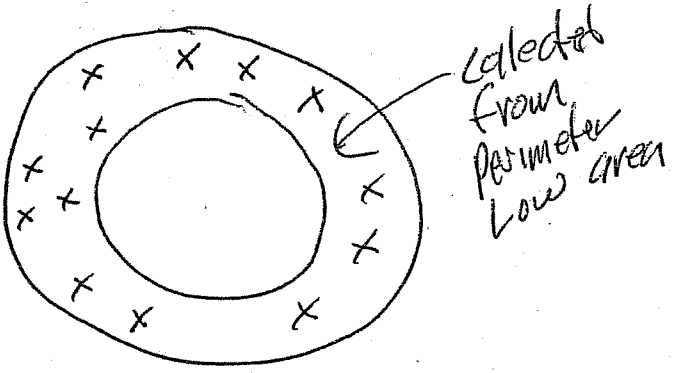
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other compacted clay

Pool Depth: <1" cm (est. maximum) **Surface Area:** see map m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	100	BRLY /LIOC	100+/100+	100+

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 GN

Date: August / 12 /2003 **Time:** 11:00 AM **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS6

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

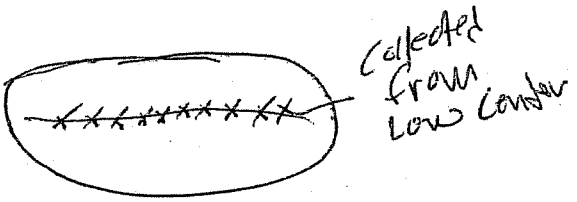
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted Clay

Pool Depth: 21" cm (est. maximum) **Surface Area:** _____ m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	100	BRLY / LIOC	100+/100+	100+

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 10 ph

Date: August / 12 /2003 **Time:** 11:26 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** F57

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

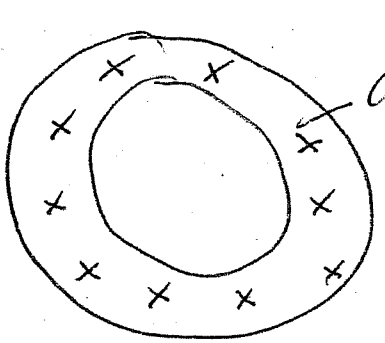
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted Clay

Pool Depth: <1' cm (est. maximum) **Surface Area:** See map m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	600	BRLY	100+	11

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 11 N

Date: August / 12 /2003 **Time:** 11:30 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS8

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

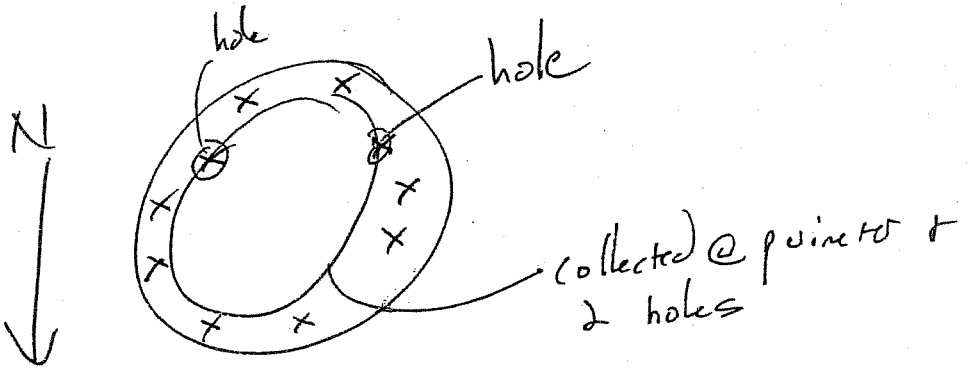
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted clay

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	100	BRLY	100+	11

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 12 slides

Date: August / 12 /2003 **Time:** 11:50 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FSA

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

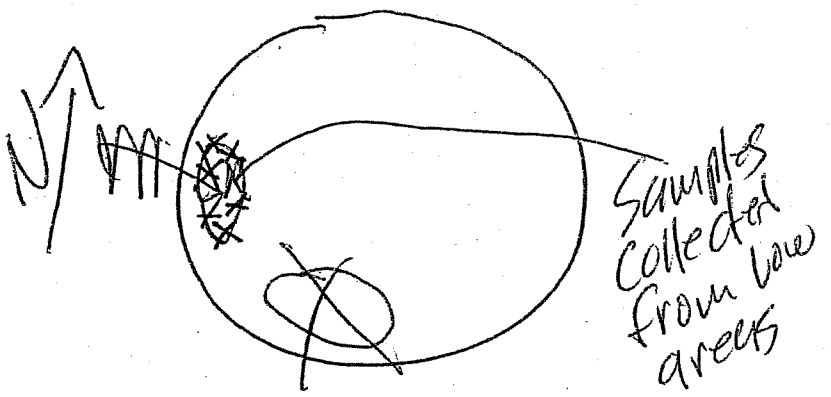
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted clay

Pool Depth: 41 cm (est. maximum) **Surface Area:** _____ m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densi (#/100ml)
1	100	BRCA	100+	11

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 1300

Date: August / 12 /2003 **Time:** 1207 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS10

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted Clay

Pool Depth: 2 1' cm (est. maximum) **Surface Area:** See Map m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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)
[redacted]	100	BRLY	100+	11

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 14N

Date: August / 12 /2003 **Time:** 12:32 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS 11

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

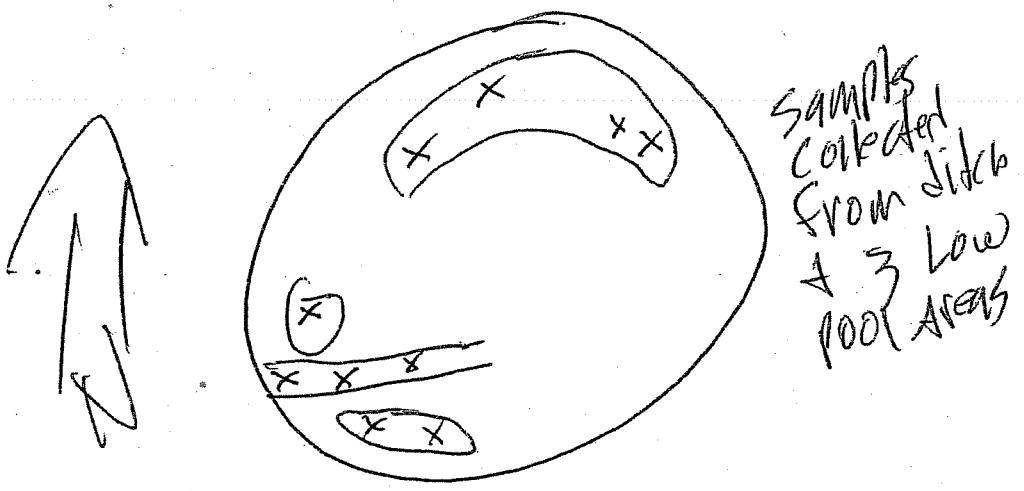
- *Land Use of Habitat*: Former oil tank farm; tanks removed ~~grazing~~, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Campsite dg

Pool Depth: 1'-2' cm (est. maximum) **Surface Area:** _____ m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	100	BRLY	100+	1

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 15 W

Date: August / 12 /2003 **Time:** 12:43PM **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS12

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

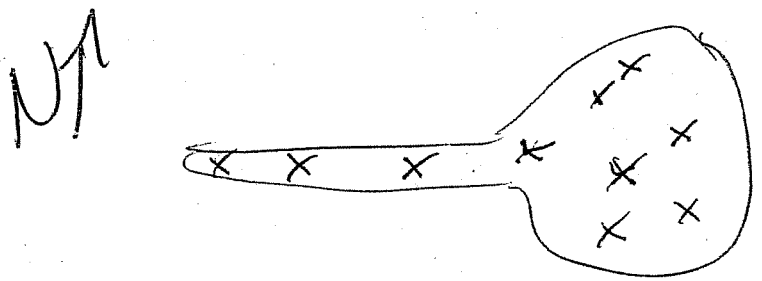
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted dry

Pool Depth: 1'-2' cm (est. maximum) **Surface Area:** See Map m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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	100	BRK / LEOC	100+/100+	100+

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 16 w

Date: August / 12 /2003 **Time:** 12:48 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** F513

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

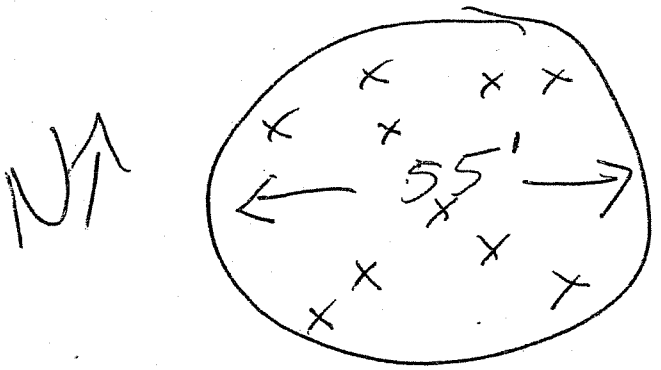
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted clay

Pool Depth: 11" cm (est. maximum) **Surface Area:** Seeing m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit… (#/100ml)
1	100	BRLY	100+	100+

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 17W

Date: August / 12 /2003 **Time:** 2:31PM **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS14

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

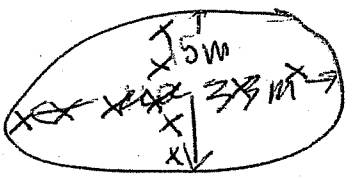
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted Clay

Pool Depth: <1' cm (est. maximum) **Surface Area:** _____ m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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	10		0	
2	11		1	
3	11			
4	11			
5	11			
6	11			
7	11			
8	6			
10	6			
10	6			

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 18W

Date: August / 12 /2003 **Time:** 2:44PM **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS15

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

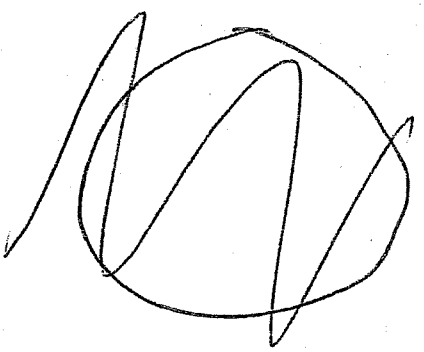
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

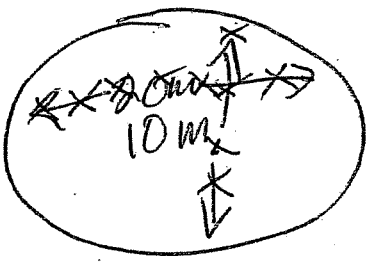
Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted Clay

Pool Depth: <1" cm (est. maximum) **Surface Area:** _____ m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	10		0	
2	11			
3	11			
4	11			
5	11			
6	11			
7	11			
8	11			
9	11			
10	11			

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: August / 12 /2003 **Time:** 2:52 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS16 19W

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

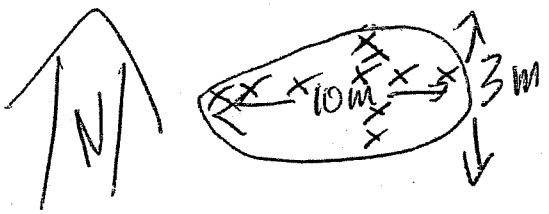
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted Clay

Pool Depth: <1' cm (est. maximum) **Surface Area:** _____ m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densi… (#/100ml)
1	10		0	
2				
3				
4				
5				
6				
7				
8				
9				
10				

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 ZON

Date: August / 12 /2003 **Time:** 3:43 PM **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS17

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

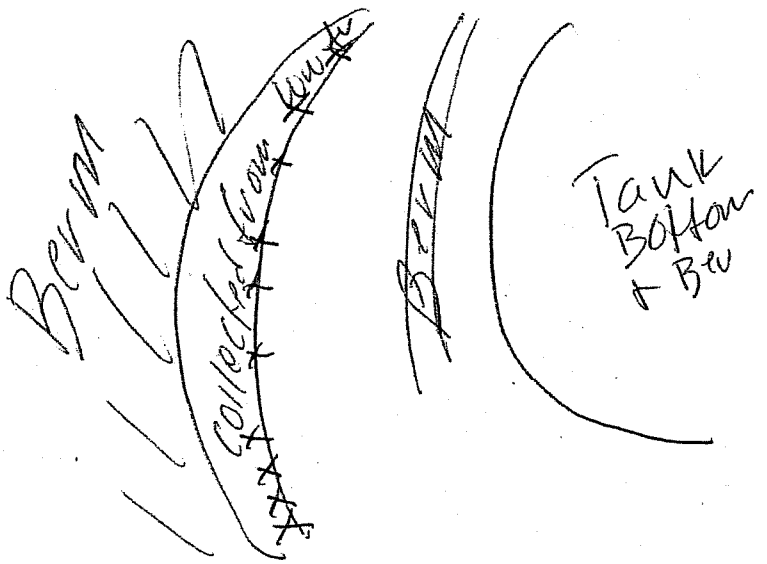
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted Clay

Pool Depth: 1-2' cm (est. maximum) **Surface Area:** See Map m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	100	BRLY /	100+	100+

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 205

Date: August / 12 /2003 **Time:** 401 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** PS18

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

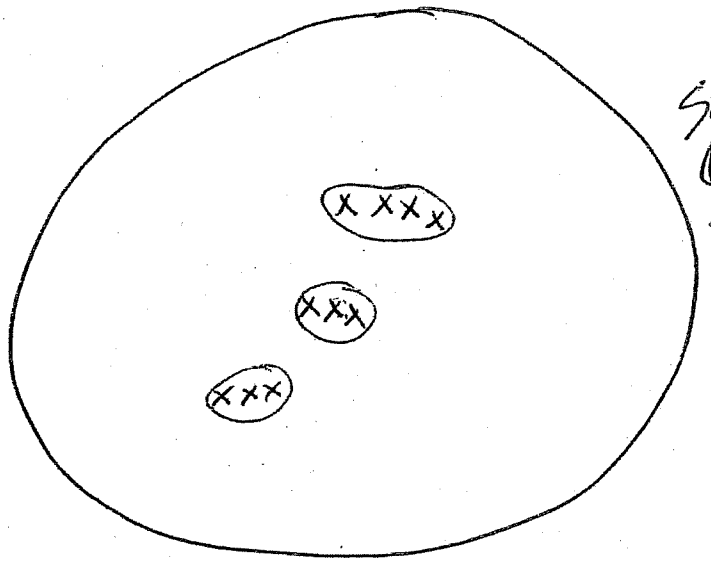
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted Clay

Pool Depth: <1' cm (est. maximum) **Surface Area:** _____ m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations



Samples collected from small low areas estimated 5m x 5m

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	10		0	
2				
3				
4				
5				
6				
7				
8				
9				
10				

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 2

Required color slides and/or photographs for the project site are included: _____ no _____ yes 21W

Date: August / 12 /2003 **Time:** 1p.m. **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS19

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

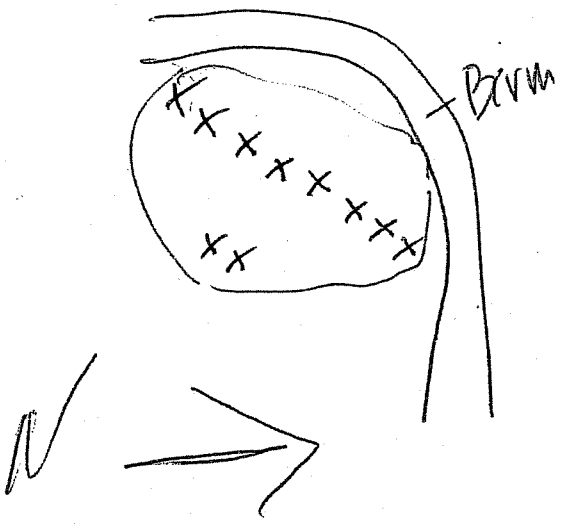
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted clay

Pool Depth: 2 1' cm (est. maximum) **Surface Area:** seemal m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations



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	100	BRLY/LIOC	100+/100+	100+

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 11/6 2305

Required color slides and/or photographs for the project site are included: _____ no _____ yes 24E

Date: August / 12/2003 **Time:** 4:34 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS20

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

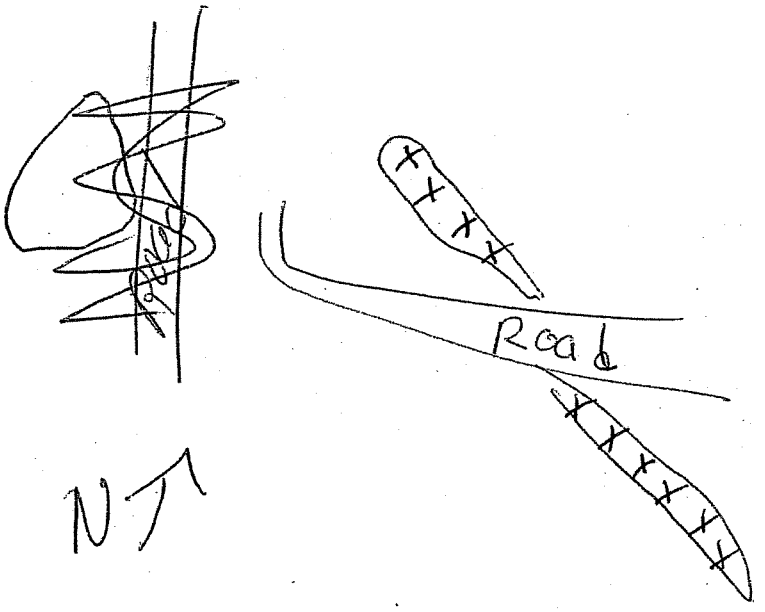
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted Clay

Pool Depth: 1' cm (est. maximum) **Surface Area:** See map m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	100	BRLY	100+	11

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 255

Date: August / 12 /2003 **Time:** 4:40 PM **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS21

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

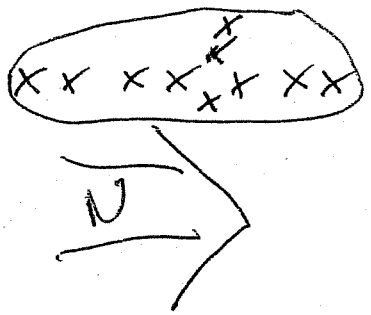
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other Compacted Clay

Pool Depth: 21" cm (est. maximum) **Surface Area:** _____ m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations



21 x 8m

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 Densit… (#/100ml)
1	10		0	
2				
3				
4				
5				
6				
7				
8				
9				
10				

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 265

Date: August / 12 /2003 **Time:** 4:47 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS22

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

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

- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other_____

Pool Depth: 1'-2' cm (est. maximum) **Surface Area:** See Map m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations

See map

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	100	BRLY / LZOC	100+/100+	100+

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 27 N

Date: August / 13 /2003 **Time:** 9:00 am **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS23

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

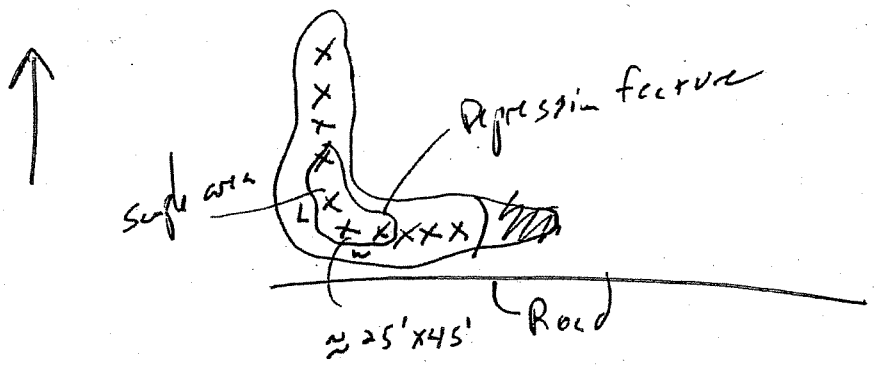
Pool Bottom Surface: (circle where appropriate)

hardpan (claypan) cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations

– see map



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	100	BRLY / LIOC	100f / 100f	100f

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 28 E

Date: August / 13 /2003 **Time:** 9:10 am **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS 24

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

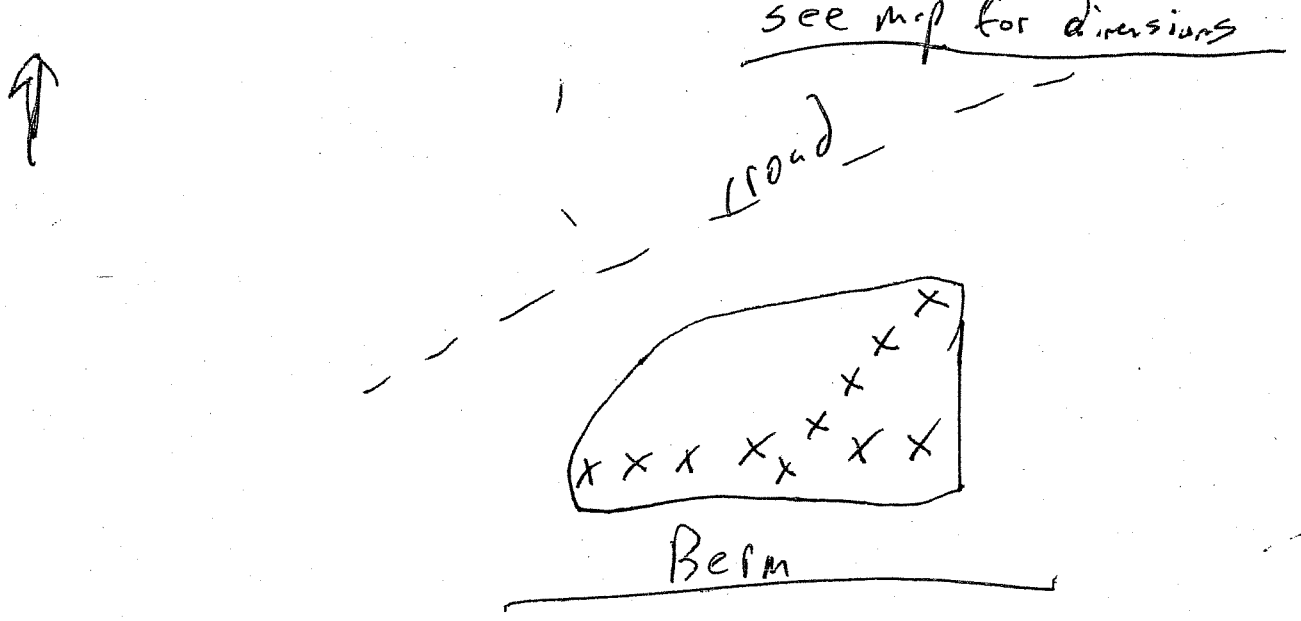
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan (claypan) cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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	100	BRLY/LIOC	100+/100+	100+

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 29 N

Date: August / 13 /2003 **Time:** 9:30 am **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS25

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan (claypan) cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations

see map for pool dimensions

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	100	BRLY	100+	11

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 30 E

Date: August / 13 /2003 **Time:** 9:40 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS26

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan (claypan) cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations

see map for pond dimensions

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	100	BRLY	100+	"

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 31 S

Date: August / 13 /2003 **Time:** _____ **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS27

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan (claypan) cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations

See map for pond divisions

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	100	BRLY	1004	11

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 325

Date: August / 13 /2003 **Time:** 10:25 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #** B28

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

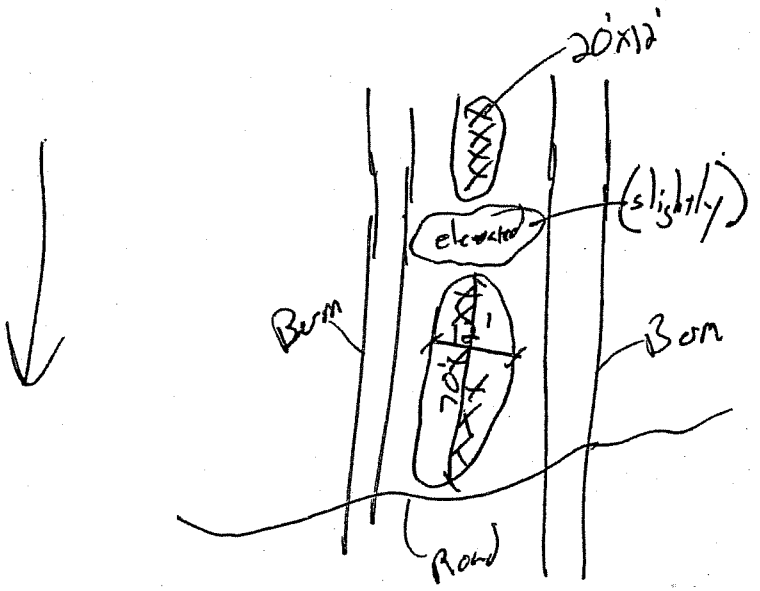
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan (claypan) cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations



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	100	BRLY	100+	1

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 33 E

Date: August / 13 /2003 **Time:** 11:10am **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS29

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

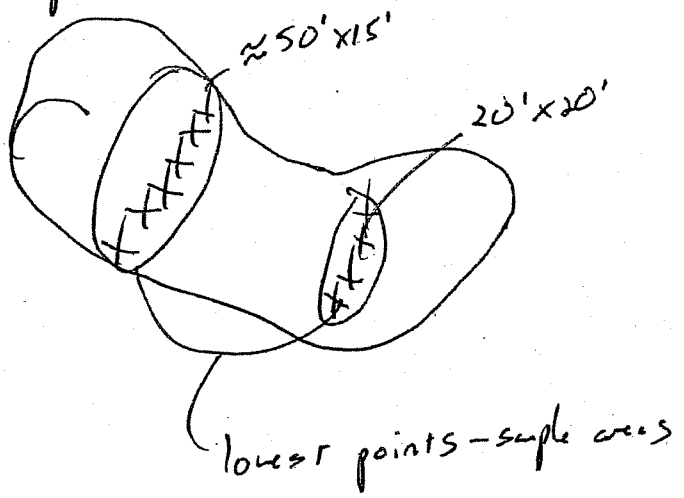
Pool Bottom Surface: (circle where appropriate)

hardpan (claypan) cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations

See map for overall pool dimensions.



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	100	BRLY / LIOC	100+/100+	100+

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 34 E

Date: August / 13 /2003 **Time:** 11:20 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** F530

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: tire tracks — garbage — discing/plowing
- ungrazed — grazed: (cattle) — horses — sheep — other_____
  light — (moderate) — heavy

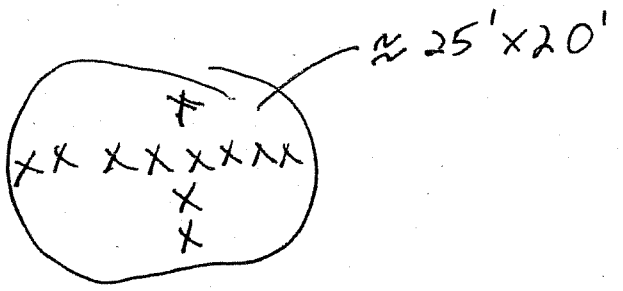
- *Land Use of Habitat*: Former oil tank farm; tanks removed — grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan — (claypan) — cobbly/rocky — lava flow — other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	100	BRV/LIOC	100+/100+	100+

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 35F

Date: August / 13 /2003 **Time:** 11:30 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS31

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

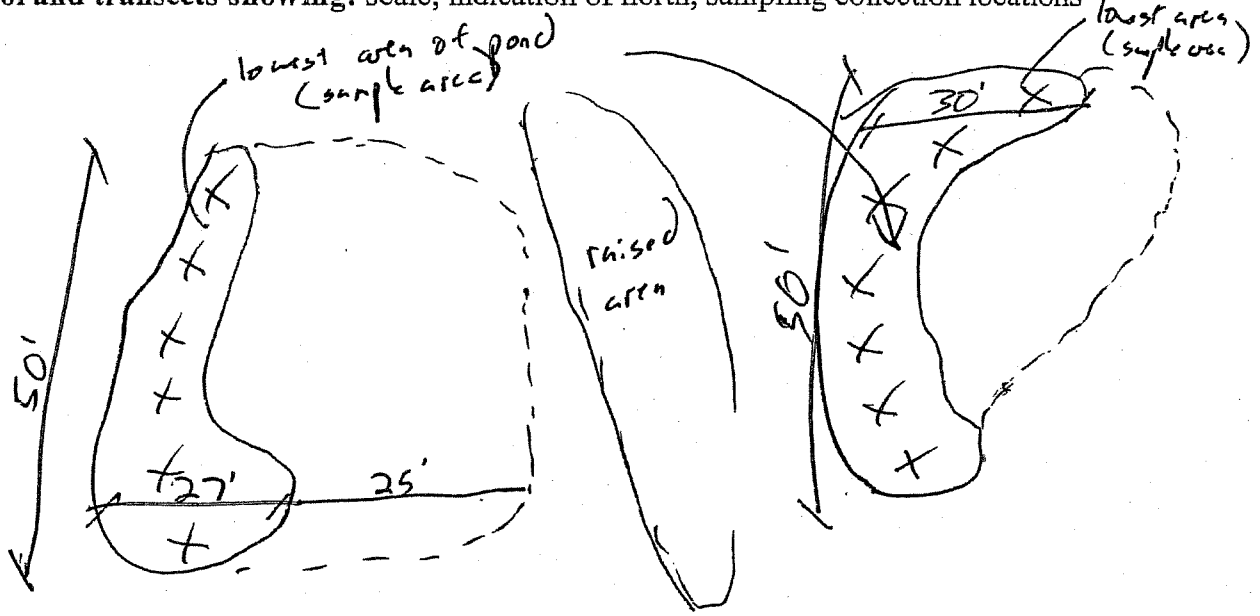
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan (claypan) cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations



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	100	BRL4	100+	"

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 36 E

Date: August / 13 /2003 **Time:** 11:40 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS32

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

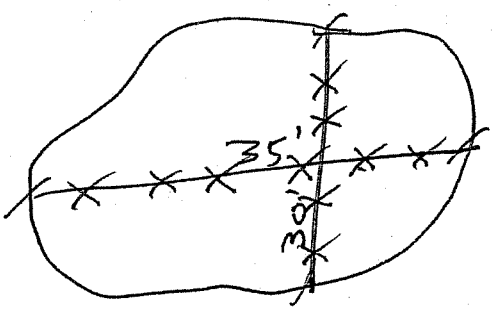
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan (claypan) cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	100	BRLY	106+	11

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 40E

Date: August / 13 /2003 **Time:** 11:30 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS33

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan (claypan) cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations

See map

80m x 15m

L western section

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	10		0	
2				
3				
4				
5				
6				
7				
8				
9				
10				

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

37 35 E

Date: August / ~~15~~ 13 /2003 **Time:** 11:45 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS34

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan (claypan) cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations

78m x 10m — see map

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 Dens (#/100
1	100	BRLY	100+	"

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 38E

Date: August / 13 /2003 **Time:** 12:05 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS35

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

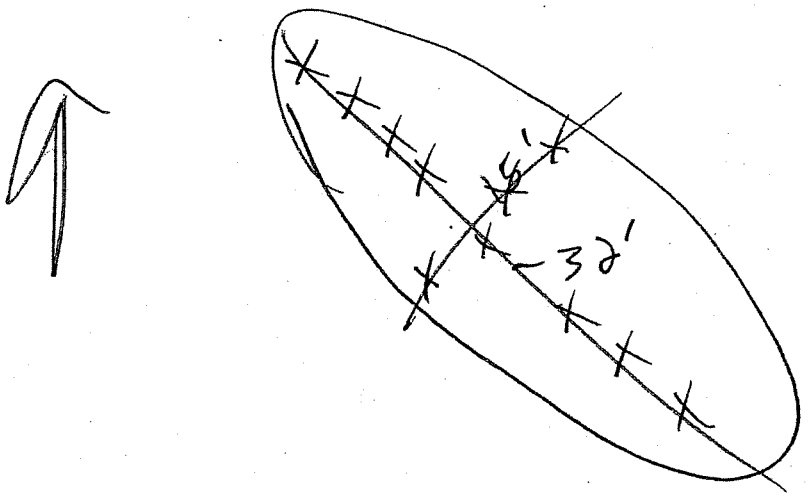
- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection 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 Densit (#/100ml)
1	100	BRLY/LEOC	100+/100+	100+

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 39 E

Date: August / ~~12~~ 13 /2003 **Time:** 12:00 **County:** San Luis Obispo **Quad:** Pismo Beach

Collector(s): Christopher Rogers (EcoAnalysts, lead), David Wolff, Jason Kirschenstein (Rincon)

Permit #: TE-796284-3

Site/Project Name: Unocal, San Luis Obispo Former Tank Farm **Pool #:** FS36

Township: 31S **Range:** 12E **Section:** 11 **Lat.** _____ **Long.** _____

Habitat Condition: (circle where appropriate)

- undisturbed	disturbed:	tire tracks	garbage	discing/plowing	
- ungrazed	grazed:	(cattle)	horses	sheep	other_____
			light	(moderate)	heavy

- *Land Use of Habitat*: Former oil tank farm; tanks removed grazing, open space

Pool Bottom Surface: (circle where appropriate)

hardpan claypan cobbly/rocky lava flow other_____

Pool Depth: _____cm (est. maximum) **Surface Area:** _____m2 (est. maximum)

Sketch of pool and transects showing: scale, indication of north, sampling collection locations

Crude Oil

Sample Cancelled

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.

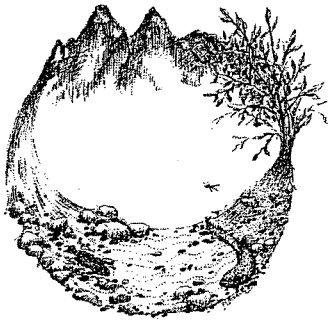
Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml)
1	10		0	
2				
3				
4				
5				
6				
7				
8				
9				
10				

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 #

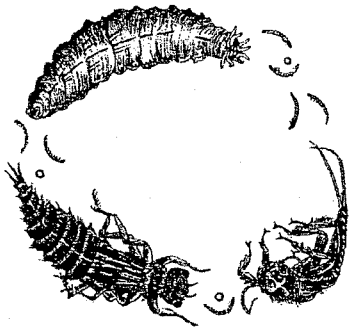
Appendix D

Eco-Analysts, Inc.
Letters of Findings



ECOANALYSTS, INC.

166 Buckeye Street
Woodland, California 95695 USA
Phone/Fax: 530-406-1178
eco@ecoanalysts.com • www.ecoanalysts.com



29 September 2003

Mr. Duane Vander Pluym
Rincon Consultants, Inc.
1530 Monterey Street, Suite D
San Luis Obispo, CA 93401

Dear Mr. Vander Pluym,

EcoAnalysts, Inc. conducted collection oversight and analysis of soil samples collected from potential special-status shrimp habitats at the former Unocal Tank Farm in San Luis Obispo, San Luis Obispo County, California, for Rincon Consultants, Inc. (Rincon).

It is EcoAnalysts, Inc. understanding that Rincon will submit this report and all other pertinent materials and information to the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (DFG), as required by the USFWS guidelines for a protocol-level survey. EcoAnalysts, Inc. will deposit all cultured special status shrimp and recovered cysts at a USFWS approved museum, such as the Bohart Museum of Entomology at the University of California, Davis, or the California Academy of Sciences in San Francisco.

For the purpose of this report, special status shrimp are defined to include shrimp species listed as threatened or endangered under the federal Endangered Species Act (ESA) (50 CFR 17.11 for listed animals and various Federal Register notices for proposed species).

Species Accounts

Two special-status fairy shrimp species (*Branchinecta lynchi* Eng et al., 1990, and *B. longiantenna* Eng et al., 1990) have the potential to occur at the proposed project site. In addition, two non-listed fairy shrimp species (*B. lindahli* Packard, 1883 and *Linderiella occidentalis* (Dodds, 1924)) are known from the proposed project vicinity.

Branchinecta longiantenna Eng, Belk, & Eriksen, 1990

Branchinecta longiantenna is federally listed as an endangered species. This species is reported from small, shallow rock outcrop vernal pools, and grassy-bottomed vernal pools. This species of fairy shrimp has an extremely disjunct distribution, and is known only from three locations; *B. longiantenna* is known from sandstone outcrop vernal pools along the Contra Costa/Alameda County line, a couple of grassy bottomed vernal pools at the Pixley National Wildlife Refuge in Merced County in the San Joaquin Valley, and from a

couple of grassy bottomed vernal pools and roadside scrapes on the Carrizo Plain in San Luis Obispo County (Eriksen & Belk, 1999; Rogers, in prep).

Branchinecta lynchi Eng, Belk & Eriksen, 1990

Branchinecta lynchi is federally listed as a threatened species. This shrimp species is found in vernal pools throughout the Central Valley and western Riverside County in California, and near Medford, Oregon (Eriksen & Belk, 1999). This fairy shrimp species occurs in neutral to slightly alkaline vernal pools throughou the California Central Valley, and in rock outcrop and vernal pools along the Interior Coast Ranges, south of the Sacramento River Delta. This species is known to occur in grassland areas of San Luis Obispo County.

Methods

Rincon prepared a 10-day notification letter, requesting permission to collect soil samples from the potential special-status shrimp habitats at the former Unocal Tank Farm site from the Ventura Branch of the USFWS. Permission was granted on 9 August 2003.

Field Methods

Soil samples were collected by Rincon field biologists under the EcoAnalysts, Inc. 10(A) 1(a) permit (#TE-796284-3) on 12 and 13 August 2003 from potential special-status shrimp habitats at the proposed proje site according to USFWS (1996) Interim Survey Guidelines to Permittees. A hand trowel was used to take approximately one liter of soil from the potential habitats, unless taking such a large quantity would have beer injurious to the habitat. Each soil sample was placed in a plastic zip-lock bag, labeled with the locality numbe and taken to EcoAnalysts, Inc. California laboratory for analysis. All sampled potential habitats were identified according to the numbers assigned to them by Rincon.

Some areas had been previously identified as potential habitat, and were not sampled during this study. These sites were not sampled due to the presence of large amounts of apparent hydrocarbon in the habitats (i.e all soil was black and tarry, or pools of black liquid substances were present). Some habitats that contained small amounts (i.e. blackened soil patches) of apparent hydrocarbon were sampled (potential habitats 18, 21, 33 and 37) however if the majority of the pool bottom contained apparent hydrocarbon, then it was not sampled due to the inability of most Crustacea to live with hydrocarbon pollutants (for example: Leifer et al., in press; Gerhardt et al., 2002; Burger & Gochfeld, 1992; Krebs & Burns, 1977; Teal et al., 1992).

Other habitats were not sampled because they were permanently inundated, or contained plants that required permanently wet soil. The cysts of special-status shrimp species must dry out before they can hatch. If the cysts do not dry out they will fungus and decay. Other sites were not sampled because the size and depth a well as vegetation was indicative of either too short a ponding duration to support special-status shrimp specie or only the soil would be saturated and no standing water would be present during the wet-season.

Laboratory Analysis

Soil samples were prepared for examination in the laboratory by dissolving the clumps of soil in water and sieving the material through 300- and 150- µm pore size screens. The small size of these screens ensures that the cysts from the shrimp species will be retained. The portion of each sample retained in the screens was dissolved in a brine solution to separate the organic material from the inorganic material. The organic fraction was then examined under a microscope.

Scanning electron micrographs and reference specimens were used to identify shrimp cysts to the lowest justifiable taxon. Cysts from the genus *Branchinecta* were identifiable only to genus level, due to cyst character overlap among species, and the potential for three species, *B. longiantenna*, *B. lindahli,* and *B. lynchi* to occur in this region. Cysts from the genus *Linderiella* are readily separated from *Branchinecta* cysts by their dense covering of spines.

Culture Analysis

Adult shrimp were reared from the recovered cysts using methods following U.S. Environmental Protection Agency (1985), Belk, et al. (1990), Maeda-Martinez, et al., (1995a and 1995b), and Jawahar and Dumont (1995). All dry cysts were removed from the filtered debris left over from the soil sieving. These undamaged cysts were placed in a hatching chamber. A combination of de-chlorinated tap water and de-ionized water with an ultimate conductivity of 30 µS (microsiemens) was added to the chamber, which was then incubated at 9-12 °C, 14-17°C, 9-22°C and 23-27°C.

Nauplii (newly hatched shrimp) were transferred to 2.5-liter culture chambers. Nauplii were fed a standard *Daphnia* food that includes; fish food, fish oil, baker's yeast, and the alga *Selenastrum capricornutum.* The nauplii were then reared to maturity. Adult shrimp reared from culture were killed in 90% ethyl alcohol, and examined under a stereo dissection microscope. Identifications were made based upon comparisons with specimens in our collections, the original species descriptions and professional experience.

Results

The specific results and localities of special-status shrimp habitats are in Table 1. Shrimp cysts belonging to the genus *Branchinecta* were identified from 27 of the 36 potential habitats surveyed on the proposed project site (potential habitat numbers:1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 17, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, and 35). Cysts of the non-listed fairy shrimp species *Linderiella occidentalis* were found in eleven of the potential habitats. No shrimp cysts, indeed no crustacean cysts, ephippia or eggs, or flatworm cysts, were found in any of the sampled sampling locations that contained apparent hydrocarbon deposits.

The *Branchinecta* cysts were cultured and determined to be the federally threatened *B. lynchi.* Cultured material and remaining cysts were deposited at the Bohart Museum of Entomology, at University of California, Davis. The *B. lynchi* and the *L. occidentalis* cysts occurred in extremely high densities. This means that the species is well established in the habitats where the cysts were found. The cysts of *L. occidentalis* were found in lower quantities, but were still abundant. This is typical as the cysts of *L. occidentalis* are densely covered in long spines, which tend to attach to debris camouflaging the cyst. *Branchinecta* cysts are smooth, and do not adhere to debris.

All associated wetland habitats within an occupied habitat's complex are also considered as 'occupied habitat', as water moves between sampling locations within complexes, particularly during years with heavy rain fall. The sampling locations included in complexes with the identified occupied habitat in this study are listed in Table 1. It should be stressed however, that wetland habitat complex determinations were made when the sampling locations were dry, and hydrological connectivity should be verified when the sampling locations are inundated, preferably during an El Niño event, with higher than normal rainfall, to accurately assess the connectivity of the habitats.

All habitats sampled are artificial or are natural habitats that were altered during modifications to the landscape for the maintenance of the Tank Farm when it was a functioning facility years ago. Regardless of the origins of the habitats, they are currently functioning as special-status shrimp habitat (i.e. as seasonal wetlands)

without outside artificial management. It is difficult to estimate how long the populations have been present, however the density of the cysts bank suggests that these shrimp have been present for many years time.

If you have any questions please call me.

Sincerely,

D. Christopher Rogers
Senior Invertebrate Ecologist and Taxonomist
EcoAnalysts, Inc.
166 Buckeye Street
Woodland, CA 95695, USA

Table 1. Sampling locations containing vernal pool crustacean cysts.

Habitat Number	*Branchinecta lynchi* (# of cysts)	*Linderiella occidentalis* (# of cysts)	In a shared wetland complex with habitats
1	100+	0	--
4	100+	100+	--
5	100+	100+	--
6	100+	100+	2, 3
7	100+	0	--
8	100+	0	--
9	100+	0	--
10	100+	0	11
11	100+	0	10
12	100+	100+	--
13	100+	0	--
17	100+	0	19
19	100+	100+	17
20	100+	0	--
22	100+	100+	--
23	100+	100+	24
24	100+	100+	23
25	100+	0	26, 27
26	100+	0	25, 27
27	100+	0	25, 26
28	100+	0	--
29	100+	100+	30, 31, 32
30	100+	100+	29, 31, 32
31	100+	0	29, 30, 32
32	100+	0	29, 30, 31
34	100+	0	--
35	100+	100+	--

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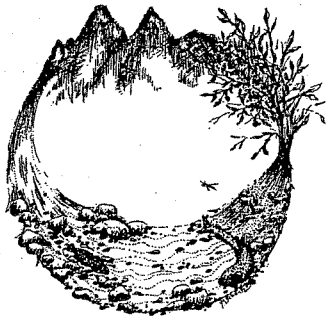

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29 September 2003

Mr. David K. Wolff
Manager, Biological Resources Group
Rincon Consultants, Inc.
1530 Monterey Street, Suite D
San Luis Obispo, CA 93401

Dear Mr. Wolff,

EcoAnalysts, Inc. conducted a preliminary survey of potential Morro shoulderband snail habitats at the former Unocal Tank Farm in San Luis Obispo, San Luis Obispo County, California, for Rincon Consultants, Inc. (Rincon).

EcoAnalysts, Inc. will submit this report to the U.S. Fish and Wildlife Service (USFWS) as required by the USFWS guidelines for a protocol-level survey.

Methods

EcoAnalysts, Inc. requested permission to conduct surveys for the federally endangered Morro shoulderband snail (*Helminthoglypta walkeriana*) at the former Unocal Tank Farm site from the Ventura Branch of the USFWS. Permission was granted on 4 August 2003.

Fieldwork commenced 12 August, and was completed by 3:00 PM on 13 August 2003. The entire site was surveyed for suitable habitat.

Results

Potential habitat for the Morro shoulderband snail was observed in various portions of the northern and southern parts of the site, however; neither Morro shoulderband snails nor empty shells were observed. This survey by itself is insufficient to determine that the species does or does not occur, and four additional surveys during rains or heavy fog events must be conducted during the 2003/2004-winter season to establish whether or not the site supports this species.

If you have any questions please call me.

Sincerely,

D. Christopher Rogers
Senior Invertebrate Ecologist and Taxonomist
EcoAnalysts, Inc.
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