

Final Report

San Luis Obispo Tank Farm Phase III Biological Resources Studies



Prepared for:
Unocal Corporation

Prepared by:
Rincon Consultants, Inc.



June 3, 2004

E n v i r o n m e n t a l S c i e n t i s t s P l a n n e r s E n g i n e e r s

**San Luis Obispo Tank Farm
Phase III Biological Resources Studies**

*Morro Shoulderband Snail Survey
Winter Season Bird Surveys*

Final Report

Prepared for:

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San Luis Obispo Tank Farm Phase III Biological Resources Studies

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1.0 INTRODUCTION AND PURPOSE

The Unocal Corporation 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. Southern Pacific (=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 determine if fairy shrimp cysts were present, and if so, to taxonomically identify the cysts, and to initiate the first survey for the Morro shoulderband snail. The methodology and results of these surveys are described in the *Unocal San Luis Obispo Tank Farm Phase II Biological Resources Studies - Vernal Pool Fairy Shrimp Dry Season Survey, Initial Morro Shoulderband Snail Survey* (October 10, 2003). The Phase III studies included the required remaining four wet season surveys for the Morro shoulderband snail and also surveys for winter bird use in the various habitats present onsite. The Phase III study is fully discussed herein.

2.0 METHODS

2.1 Morro Shoulderband Snail

These surveys were conducted in accordance with USFWS Guidelines by EcoAnalysts, Inc. invertebrate ecologist D. Christopher Rogers under Section 10(A) 1(a) permit PRT-796284. EcoAnalysts, Inc. notified Della Snyder of the Ventura Branch of the USFWS that surveys under the USFWS *Protocol Survey Guidelines for the Morro shoulderband snail (Helminthoglypta walkeriana)* (June 2003) would be conducted at the Unocal Tank Farm site on August 4, 2003. The initial site visit was conducted on August 12 and 13, 2003 after summer morning fog events. Mr. Rogers walked the entire site searching for live snails and empty snail shells and recorded existing conditions. Subsequent wet season survey events occurred on January 9 and 30, February 12, and March 5, 2004. The 2004 winter season surveys were conducted during rain or fog events, or immediately following rain events. These surveys included walkovers through appropriate habitat in search of the snail.

2.2 Winter Season Bird Surveys

David Wolff, Principal Ecologist with David Wolff Environmental (DWE), conducted bird surveys throughout the Unocal SLO Tank Farm to provide an inventory of bird species observed from November 2003 to April 2004. The purpose of the survey was to document bird use of the SLO Tank Farm habitats both north and south of Tank Farm Road during the winter season.



Winter bird surveys were conducted on a biweekly basis between the hours of approximately 7:30 AM and 1:00 PM focusing on days without storms or high winds. The intent of the biweekly level of effort was to capture most resident and resident migrant use with observations of transitory migrants being more subject to random opportunities for observation. The winter bird surveys were primarily an inventory with quantitative data taken when aggregations of birds were observed.

Field surveys were conducted during morning hours given that afternoon winds typically blow through the Tank Farm Road area making bird surveys less effective. Specific days for field visits for the winter bird surveys were selected based on the most ideal birding conditions anticipated for the biweekly surveys. For example, surveys were mostly conducted on days with low winds, just before or after storms, and other times when conditions appeared ideal for birding. Surveys were conducted on the following dates:

November 6, 7, 20, 21, 2003

December 4, 5, 16, 17, 2003

January 7, 8, 20, 27, 2004

February 5, 6, 19, 23, 2004

March 2, 3, 16, 17, 2004

April 1, 2, 2004

Winter bird surveys were conducted along transects of opportunity from established loop routes on the north and south sides of the SLO Tank Farm. Two loop routes were established on each side of Tank Farm Road covering all habitat types (i.e. grassland, former tanks and berms, riparian corridor). When birds were heard or otherwise noted off of the general survey line, the biologist searched to obtain positive identification. The loop transects provided visual coverage of the tank farm areas through use of 8x32 power binoculars and 15 to 30 power spotting scope. Trees, shrubs, berms, power poles/lines and the general landscape were scanned with binoculars as a regular part of the walking transects to provide a thorough visual coverage of the site for bird observations.

Birds observed were recorded in a field notebook documenting habitat use, behavior (foraging, roosting, fly-over, etc.), abundance if appropriate, and specific location as deemed appropriate if aggregations of birds were observed in any one area (e.g. ponded areas or specific habitat use). Given that birds are highly mobile, exact locations for all individuals were not collected. All habitats at the site were searched, with the surveyor spending the greatest amount of survey time at locations where birds were most numerous at the time of the survey.

The seasonal use and behavior of birds recorded on the SLO Tank Farm during the survey was based on field observations and the seasonal range maps in the *Peterson Field Guide to Western Birds* and *The Sibley Guide to Birds*. Conclusions on resident versus transitory use was drawn from a single observation versus repeated observations of the same species in subsequent weeks of the survey.



3.0 RESULTS

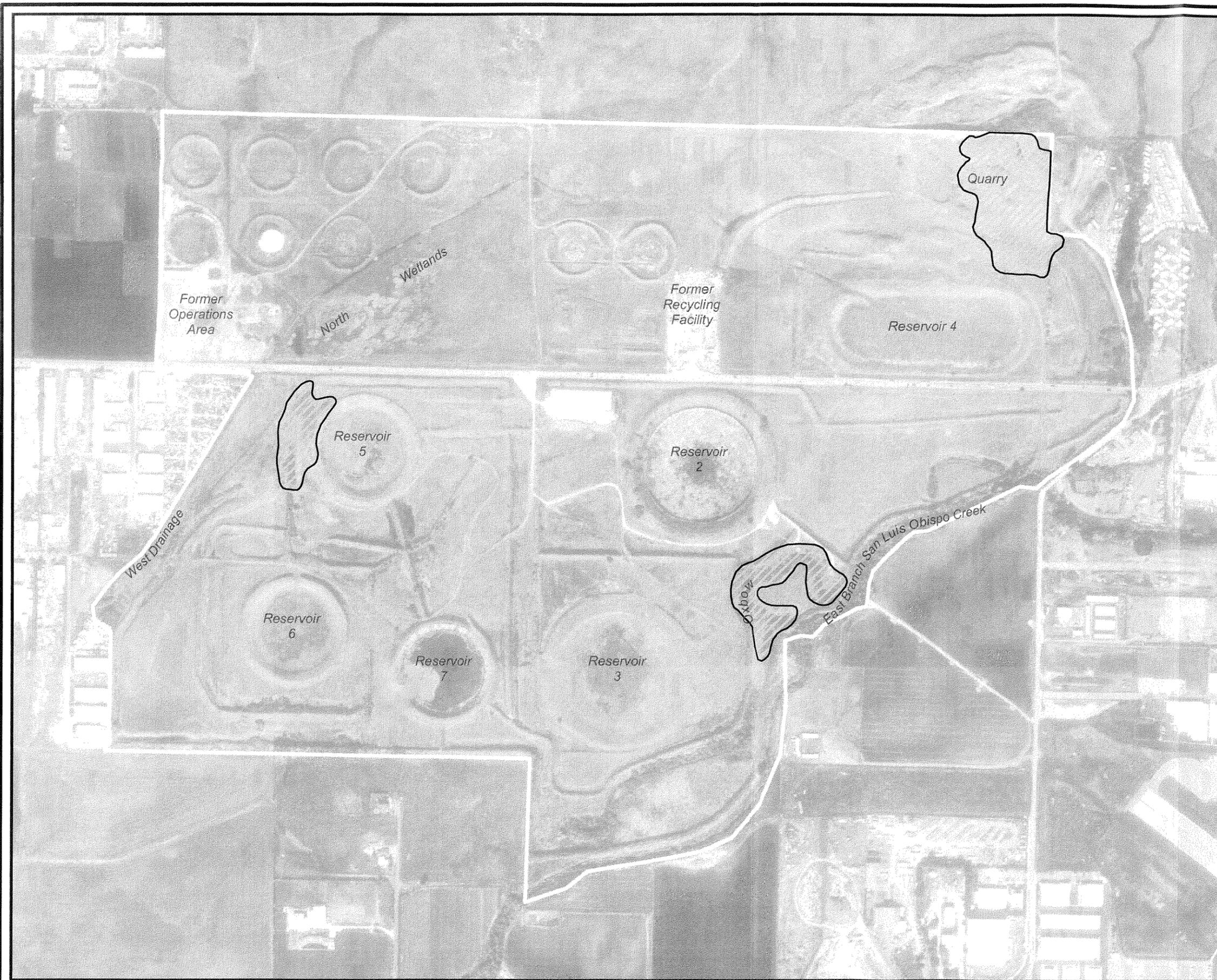
3.1 Morro Shoulderband Snail

Potential habitat for the Morro shoulderband snail was observed in various portions of the northern and southern parts of the site during the initial summer survey conducted under the Phase II work scope, however; neither live Morro shoulderband snails nor empty shells were observed. Four additional winter surveys were conducted per the protocol survey guidelines and the Morro shoulderband snail was observed. The snails were observed in three localities: in the talus of the serpentine rock outcrop and in the adjacent scrub in the northeast portion of the site; in the leaf litter of the coyote brush and California sagebrush along an old oxbow channel in the eastern perimeter of the southern portion of the site (i.e.; south of Tank Farm Road), and; in the leaf litter of the coyote brush and California sagebrush in the northwest corner of the southern portion of the site (Figure 1).

Two non-native invasive species, the brown garden snail (*Helix aspersa*) and a slug (*Deroceras reticulatus*) were also commonly observed around the site. The native Big Sur shoulderband snail was observed in leaf litter along the creek on the eastern side of the site.

The USFWS met with representatives of the City and County of San Luis Obispo in early April 2004 to advise them that the USFWS would no longer regulate the shoulderband snail that occurs on clay soils (the "inland type"; Steve Kirkland, USFWS, personal communication with Rincon Consultants). The USFWS has made their findings on the basis that the listing criterion was for the dune/sand occurring type based on its limited distribution. The USFWS has indicated that the listing criteria only applies to snails on Baywood fine sands and not on clay or other non-sandy soil types. An official policy statement letter is anticipated to be issued in the future that clarifies the status of the "inland type."





Explanation

- Snail Observations
- Approximate Site Boundary

Note: Shoulderband snail surveys performed by EcoAnalysts Permit PRT-796284.

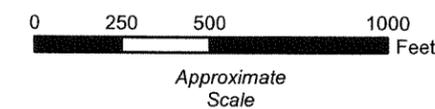


FIGURE 1
**Phase III Biological Resources Study
 Morro Shoulderband Snail Survey Results**

UNOCAL SAN LUIS OBISPO TANK FARM
 SAN LUIS OBISPO, CALIFORNIA

PREPARED FOR

UNOCAL CORPORATION
 SAN LUIS OBISPO, CALIFORNIA



S:\Project\1107_ Unocal02_Bldg Tank Farm02_Storage_SEPRIT\Asp\documenta\SnailSurvey_11x17L.mxd, May 6, 2004

3.2 Winter Season Bird Survey

A total of 78 species of birds were observed on the SLO Tank Farm during surveys conducted from November 2003 to April 2004. Originally, surveys were scheduled to conclude towards the end of April, but they were concluded at the beginning of April given the shift of winter seasonal weather patterns to spring conditions and the arrival of breeding season migrants that signified the conclusion of the winter bird season. Table 1 provides a list of all species observed referenced by the months the species were observed.

Table 1. Monthly Observations of Winter Birds 2003/2004

Species	Months Observed					
	Nov	Dec	Jan	Feb	Mar	Apr
Great blue heron	x		x			
Great egret			x		x	x
Snowy egret				x		
Green heron			x			
Mallard duck	x	x	x	x	x	x
American wigeon			x			x
Green-winged teal			x	x		
Cinnamon teal				x	x	x
Common merganser						x
Turkey vulture	x	x	x	x	x	x
White-tailed kite		x	x		x	
Northern harrier		x	x		x	
Sharp-shinned hawk			x		x	
Cooper's hawk	x	x	x	x		
Red-shouldered hawk			x		x	x
Red-tailed hawk	x	x	x	x	x	x
Ferruginous hawk	x		x			
Merlin				x		
American kestrel	x	x	x	x	x	x
Peregrine falcon						x
American coot			x	x	x	x
Killdeer	x	x	x	x	x	x
Greater yellowlegs			x	x	x	x
Long-billed curlew		x	x	x		
Western sandpiper		x				
Common snipe	x	x	x	x	x	x
Unidentified gull species	x	x				
Ring-billed gull						x
California gull					x	
Mourning dove	x	x	x	x	x	x
Rock dove		x	x	x		
Burrowing owl	x	x	x	x		
White-throated swift			x			
Anna's hummingbird	x	x	x	x	x	x
Belted kingfisher	x	x	x			
Nuttall's woodpecker	x					
Hairy woodpecker	x	x				
Northern flicker	x	x		x	x	
Black phoebe	x	x	x	x	x	x
Say's phoebe	x	x	x	x	x	
Ash-throated flycatcher						x
Loggerhead shrike	x	x	x	x	x	



Table 1. Monthly Observations of Winter Birds 2003/2004

Species	Months Observed					
	Nov	Dec	Jan	Feb	Mar	Apr
Gray vireo		x				
Hutton's vireo	x	x				
Blue-headed vireo			x			
Scrub jay	x	x	x	x	x	x
American crow	x	x	x		x	x
Homed lark			x	x	x	x
Barn swallow						x
Tree swallow			x			x
Chestnut-backed chickadee	x	x		x	x	x
Bushtit	x	x	x	x	x	x
Bewick's wren	x		x	x	x	x
Rock wren	x					
Ruby-crowned kinglet		x	x	x	x	
Western bluebird	x		x			
Northern mockingbird	x	x	x	x	x	x
European starling	x	x	x	x	x	x
American pipit		x	x	x		x
Audubon's warbler	x	x	x	x	x	x
Common yellowthroat			x		x	x
California (brown) towhee	x	x	x	x	x	x
Rufous-crowned sparrow		x				
Chipping sparrow	x					x
Savannah sparrow	x	x	x		x	
Savannah sparrow (Bryant's)		x				
Lark sparrow		x		x	x	x
Golden-crowned sparrow					x	
White-crowned sparrow		x	x	x	x	x
Fox sparrow			x			
Song sparrow	x		x	x	x	x
Western meadowlark	x	x	x	x	x	x
Brown-headed cowbird	x					
Red-winged blackbird	x	x	x	x	x	x
Brewer's blackbird	x	x	x		x	x
House finch		x	x	x	x	x
Lesser goldfinch	x	x	x		x	
American goldfinch		x				

Nomenclature follows Sibley, May 2001; identification per Sibley, May 2001 and Peterson, 1990.

Table 2 provides a list of all species observed referenced by the habitat where observed, behavior, and seasonal use presumed from the observations. Following the table is a description of the habitats and an explanation of the behavior noted in the habitat columns and seasonal use shown in Table 2. The totals of species observed by habitat type are greater than the total species observed because many species were observed in more than one habitat type.

Table 2. Winter Bird Survey Habitat and Use Observations

Species	Habitat								Seasonal Use
	AGS	FLO	MAR	PAS	RIP	ROP	SCR	PND	
Great blue heron	O,F		O					F	1
Great egret	F		F					F	1
Snowy egret								F	1
Green heron					O				1

Table 2. Winter Bird Survey Habitat and Use Observations

Species	Habitat								Seasonal Use
	AGS	FLO	MAR	PAS	RIP	ROP	SCR	PND	
Mallard duck			F		O			F	1,5
American wigeon								F	2
Green-winged teal			F					F	2
Cinnamon teal			F					F	2
Common merganser								O	3
Turkey vulture	P	S			P				1,2,4
White-tailed kite	F,S	O							1,2
Northern harrier	F	O							1,3
Sharp-shinned hawk	F						P		3
Cooper's hawk	F,P				P				1,3
Red-shouldered hawk	F	O			P				1,3
Red-tailed hawk	F,P,S	S			P				1,3
Ferruginous hawk	O	O							3
Merlin	P								4
American kestrel	F,P,S	O					P		1,3
Peregrine falcon	P								1,3
American coot								F	1
Killdeer	F							F	1
Greater yellowlegs								F	2
Long-billed curlew	F	O							3
Western sandpiper								F	3
Common snipe	F	O	O					F	1,3
Unidentified gull species		S							1,3
Ring-billed gull		S							3
California gull		S							3
Mourning dove	F			P	P		P		1
Rock dove	P	O							1
Burrowing owl	O,P								1,3
White-throated swift		O							1,3
Anna's hummingbird	O				O		P		1,3
Belted kingfisher					O				1
Nuttall's woodpecker					F				1,3
Hairy woodpecker					F				1,3
Northern flicker					F		F		1,3
Black phoebe	F							F	1
Say's phoebe	F							F	2
Ash-throated flycatcher					O				5
Loggerhead shrike	F,P						P		1,3
Gray vireo							O		4
Hutton's vireo					F				1
Blue-headed vireo							O		4
Scrub Jay					O				1
American crow		O							1
Horned lark	F								1
Barn swallow		O							5
Tree swallow		O							1,4
Chestnut-backed chickadee					F				1
Bushtit					F		F		1
Bewick's wren					O		O		1
Rock wren						O			3
Ruby-crowned kinglet					F		F		3
Western bluebird	F								1,3
Northern mockingbird	O				O		O		1

Table 2. Winter Bird Survey Habitat and Use Observations

Species	Habitat								Seasonal Use
	AGS	FLO	MAR	PAS	RIP	ROP	SCR	PND	
European starling	F,P	F		F					1,3
American pipit	F								2,3
Audubon's warbler	F				F		F		1,2,3
Common yellowthroat			O		O				1,5
California (brown) towhee					F		O		1
Rufous-crowned sparrow					O				1,3
Chipping sparrow	O				O				1,3
Savannah sparrow	F								2,3
Savannah sparrow (Bryant's)			O						2,3
Lark sparrow	F				O		F		1
Golden-crowned sparrow							O		3
White-crowned sparrow					F		F		1,3
Fox sparrow					O				1
Song sparrow	F		O		F		O		1
Western meadowlark	F								1,5
Brown-headed cowbird	F			F					1
Red-winged blackbird	F		P	F					1,5
Brewer's blackbird	F		P	F					1,3
House finch					P		P		1
Lesser goldfinch	F						F		1
American goldfinch	F						F		1

3.2.1 Habitat Descriptions

Annual Grassland (AGS). This habitat type covers the majority of the SLO Tank Farm on both the north and south sides of Tank Farm Road. The north side was mostly annual grassland habitat. The south side was also dominated by annual grassland, but had a more diverse mix of other habitat types. A total of 39 bird species were observed using the annual grassland habitat.

Fly-Over (FLO). While technically not a habitat type, the fly-over designation was used for observations of birds flying past the site where there appeared to be no intent or interest in a bird using resources available at the SLO Tank Farm site. A total of 18 bird species were observed flying over and not specifically using the on-site habitats at the time of observation.

Marsh (MAR). This habitat type pertains to the areas on both the north and south sides supporting robust emergent vegetation such as bulrush and cattails. As referenced in the Phase I study (and observable in Figure 1), areas of marsh were primarily the north marsh, north marsh ditch, and the southwest marsh. The marsh areas did not support standing water until the storm events in February 2004. Once ponded, red-winged blackbirds and various ducks began using the marsh habitats more regularly. A total of 11 bird species were observed using the marsh habitat.

Pasture (PAS). Two areas were considered pasture where fenced cattle feeding enclosures are located. One area of pasture is on the north boundary in the center of the north Tank Farm site and the other is near the central entrance to the south Tank Farm site. Because of the presumed large quantity of insects from the concentrated cattle use, this habitat type was



noted as it attracted large numbers (50-100) of red-winged blackbirds, Brewer's blackbirds, and European starlings. A total of 5 bird species were observed using the pasture habitat.

Riparian Corridor (RIP). This habitat was associated with the East Branch San Luis Obispo Creek and old oxbows supporting tall riparian trees such as sycamores and willows on the south side of the Tank Farm. No riparian habitat occurs on the north side. A total of 30 species were observed using the riparian habitat.

Rock Outcrop (ROP). One area of rock outcrop habitat was identified as the quarry area at the northeast corner of the north side of the tank farm. This habitat generally did not yield many bird observations because of the lack of food and cover. Only one species, the rock wren, was observed once in the rock outcrop area.

Scrub (SCR). This habitat was associated with areas where shrubs and small trees were growing typically on the berms of the old tanks and along the perimeter berms on the southern boundary of the Tank Farm south side. The passerine species seemed to have an affinity to the scrub habitat as it provides easy access to food and cover. A total of 21 species were observed the scrub habitat.

Ponded Areas (PND). This habitat included all areas on the north and south sides that supported ponded water at any given time during the survey. The ponded area habitat does not include the marsh areas mentioned above or other areas that supported open water with robust emergent vegetation. Ponded areas included some of the former tank bottoms and the various seasonal ponds throughout the site which otherwise supported annual grassland vegetation. Mostly ducks, large wading birds, and shorebirds were observed in the ponded habitat. On the south side, Reservoir 2, Cow Pond, the southwest corner, and the long pond just inside the entrance gate typically yielded observations of water birds (see Figure 1 for place names). On the north side, the pond just east of the road at the east end of the north marsh ditch, a pond at the base of a berm just north of the former recycling facility, and a ponded area at the northwest corner of the "race track" typically yielded observations of water birds. The highest number of ducks observed (mallards and teals) at one time was approximately 20, with groups of less than 10 being more typical. A total of 15 bird species were observed using the ponded areas.

3.2.2 Behavior Description

Observed bird behavior is shown by habitat column in Table 2 and was categorized to document bird use of the SLO Tank Farm habitats as follows:

- **O = Observed in Habitat** - This designation was used when no discernable use could be determined, typically because the observation was brief.
- **F = Foraging/Feeding** - This behavior was documented when birds were observed actively foraging (raptors stooping or "kiting"), seed eating (sparrows, etc.), or insect eating (gleaning or fly catching).
- **P = Perching, Roosting, Loafing** - This designation was recorded when birds were observed on site essentially staying in one place. Examples are hawks and vultures roosting in trees, birds on the power lines and poles, or other sedentary behavior.



Typically the species observed perching were also observed at other times doing other behaviors.

- **S = Soaring High Above** – This designation was assigned to birds observed flying over the site without apparent intent to use SLO Tank Farm resources. Various gulls, American crows, turkey vultures, and hawks were observed flying over the site on many occasions.

3.2.3 Seasonal Use Description

Birds were assigned a presumed seasonal use (last column in Table 2) based on observations throughout the survey and the widely accepted Peterson and Sibley field guides. Bird use ranged from observations on every survey day by year-round resident or winter resident species to only single observations of rare occurrences or wide ranging nomadic or migratory species.

1. **Resident; Nomadic Resident** – This designation applies to birds that generally stay in the area throughout the year or move about locally as nomads. Key examples of resident species include the western meadowlark, horned lark, blackbirds, and sparrows.
2. **Winter Resident** – This designation applies to birds that migrate to this area from breeding habitat outside the region and essentially reside locally for the winter. Key examples include the Say's phoebe, ducks, shorebirds, and some raptors.
3. **Winter Migrant/Nomadic/Wandering** – This designation applies to wide ranging winter migrants that do not necessarily locate to one site for the winter. The ferruginous hawk and other raptors are the best example for this category. Additionally, individuals of many species observed on site that can be considered residents may be migrating individuals from other areas.
4. **Transitory Migrant** – This designation was assigned to species seen only once or are known to just pass through the area briefly during fall and spring migrations. Most notable examples are the merlin, gray vireo, and blue-headed vireo.
5. **Probable Breeding Bird** – This designation was assigned to birds observed exhibiting breeding behaviors, such as singing males or aggregations of males and females during the March and April surveys, that are likely to breed in on-site habitats. Key examples include the western meadowlark in the grassland habitat, the red-winged blackbirds setting up territories in the marsh habitat, and the white-crowned sparrow and the song sparrow in the scrub habitat.

3.2.4 Findings

January yielded the highest diversity of birds observed at 53 different species. The remaining months of the survey were essentially equal in bird species diversity, ranging from 39 to 43 species. Daily high species diversity observed was 38 species on January 27, 2004. Daily low was 14 species for both sides of Tank Farm Road. The low of 14 species on the south side was because the survey was conducted on a day of high winds. Higher diversity was observed on the south side of Tank Farm Road primarily because of the greater diversity of habitats. The riparian and scrub components in particular added significantly to the daily totals and overall bird diversity observed on the south side. Average daily observations on the south side were 31



species as compared to 19 on the north side. Table 3 provides the number of species observed, general field conditions, and average daily observations for each side of the SLO Tank Farm.

Table 3. Daily Totals of Birds Observed and Survey Conditions

Survey Day	North Side	South Side	Wind mph	Weather
November 6	14		5-10	Clear, cool
November 7		29	5-20	Partly cloudy, cool
November 20	18		No wind	Clear, cool
November 21		14	5-10 steady	High clouds, cool
December 4	20		No wind	Clear, cool to warm
December 5		29	0-5	75% clouds, cold to warm
December 16		26	No wind	Clear, frost at start
December 17	17		0-5	50% clouds, cool
January 7	21		0-5	20% clouds, cold to cool
January 8		34	0-5	Mostly clear with high clouds, cold to cool.
January 20	20		0-5	Clear with surrounding fog, cold to cool
January 27		38	No wind	Overcast with occasional drizzle, cold to cool
February 5	15		0-20 gusty	Clear, cool
February 6		29	No wind	High clouds clearing, cold to warm
February 19	22		10-25 steady	50% clouds, cool
February 23		34	0-5	30% clouds and fog, cold to cool
March 2	21		10-30	Mostly cloudy, cold
March 3		34	0-10	Clear with some high clouds, cold to warm
March 16	18		No wind	Clear, warm
March 17		33	No wind	Clear, warm
April 1		37	5-20 gusty	Clear, cool to warm
April 2	21		5-20 gusty	Clear, cool to warm
Average Daily Total	19	31		

Temperature Ranges from start to finish of daily surveys:
 Cold 40-55 F
 Cool 55-65 F
 Warm 65 + F



4.0 CONTRIBUTORS

This report was prepared by Rincon Consultants, Inc. while under contract to the Unocal Corporation. John Ljung, Senior Geologist, was the project manager for Unocal. Persons involved in data gathering, analysis, project management and quality control include the following.

Rincon Consultants, Inc. (Prime Consultant)

Duane Vander Pluym, D. ESE, Principal-in-Charge

David Wolff Environmental

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Appendix A

EcoAnalysts, Inc. Letter of Findings





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5 April 2004

Dr. Duane Vander Pluym
Rincon Consultants, Inc.
790 East Santa Clara Street,
Ventura, CA 93001

SUBJECT: Surveys for the Federally Endangered Morro Shoulderband Snail (*Helminthoglypta walkeriana*) at Unocal's Tank Farm site in San Luis Obispo, San Luis Obispo County, California.

Dear Dr. Vander Pluym,

This letter documents the results of protocol level surveys performed by EcoAnalysts, Inc. invertebrate ecologists at Unocal's Tank Farm site in San Luis Obispo for the federally endangered Morro shoulderband snail (*Helminthoglypta walkeriana*). As required by our section 10(A) 1(a) permit, a copy of this report will be submitted to the Ventura field office of the U.S. Fish and Wildlife Service (USFWS). Morro shoulderband snail was observed during the protocol surveys.

Background

EcoAnalysts, Inc. was contacted by Rincon Consultants on behalf of the Unocal Corporation on 12 July 2003 and requested a site assessment to determine the potential for the presence of Morro shoulderband snails at Unocal's Tank Farm site in San Luis Obispo County, California. The 300-acre parcel is located on both sides of Tank Farm Road. The initial site assessment did not yield any specimens or evidence of Morro shoulderband snails, so Rincon Consultants requested full protocol level surveys.

Morro shoulderband snail was listed as endangered under the ESA on December 15, 1994 (50 CFR 64613-64623). This species was first described by Hemphill (1911), who placed it in the genus *Helix*. Hemphill later described *Helix* vars. *morroensis* as a subspecific population of *H. walkeriana*, which Roth (1985) redescribed as an infrasubspecific form. Pilsbry (1939) moved the Morro shoulderband snail to the genus *Helminthoglypta*. The genus *Helminthoglypta* currently contains three subgenera comprising more than 70 species and more than 100 subspecies. The genus ranges from southern Oregon along the California coast and Great Central Valley to the Mojave Desert and Baja California Norte. The greatest species diversity appears to be along the California coast.

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Five species of shoulderband snails in 2 subgenera occur in the San Luis Obispo vicinity. The subgenus *Helminthoglypta* (sensu stricto) has 3 species: *Helminthoglypta walkeriana*, *H. cuyama*, and *H. umbilicata* (Big Sur shoulderband). *H. cuyama* occurs in rock slides along the Cuyama River. Big Sur shoulderband is common from Atascadero and San Luis Obispo west to the coast, and from Monterey County south to Santa Barbara. It is typically found in the leaf litter of oaks (*Quercus* sp.), gum (*Eucalyptus* sp.), California sycamore (*Platanus racemosa*), poison oak (*Toxicodendron diversilobum*), and coyote bush (*Baccharis* sp.) (Pilsbry, 1939).

The other subgenus, *Charadotes*, has 2 species in the Morro Bay region: *H. carpenteri*, which occurs in limestone deposits and along streambeds from Atascadero north; and *H. fieldi* (surf shoulderband), which occurs from Surf to Lompoc in Santa Barbara County, and has a possible outlying population around Shark Inlet at the south end of Morro Bay. Although not in the same subgenus, Morro shoulderband snail more closely resembles surf shoulderband in general appearance than it does the other San Luis Obispo County species (Pilsbry, 1939). It is, however, more closely related to Big Sur shoulderband.

The Morro shoulderband snail is reported from the Los Osos Valley to the coast, south to Montana de Oro, north along both sides of Morro Bay to Toro Creek. Inland populations have been discovered at Morro Bay State Park east of South Bay Boulevard to Camp San Luis Obispo. Pilsbry (1939) reported the Morro shoulderband from San Luis Obispo and those populations may have been rediscovered (USFWS, pers. comm., January, 2001).

Little is known about the habitat requirements of Morro shoulderband snail (Hill, 1974; Roth, 1985). This species appears to be restricted to relict dune soils that support coastal scrub, particularly in association with mock heather (*Ericameria ericoides*), dune buckwheat (*Eriogonum parvifolium*), California sagebrush (*Artemisia californica*), black sage (*Salvia mellifera*), and dune lupine (*Lupinus chamissonis*) (Roth, 1985); and rock outcroppings.

Typically, Morro shoulderband snail utilizes habitats where these shrubs provide dense cover and there is substantial leaf litter or talus. Morro shoulderband snail may also use ice plant (*Carpobrotus* sp.) as cover; however, ice plant is a nonnative invasive weed that excludes native plants, and can alter desirable habitats. Morro shoulderband snails live in the leaf litter of the coastal scrub, typically where the branches of the shrubs come into contact with the soil. During or after rain or heavy fog events, the snails emerge at night and during the early morning and disperse to new habitats, wandering at random until they encounter new suitable habitat.

Methods

The surveys were conducted in accordance with USFWS Guidelines by EcoAnalysts, Inc. invertebrate ecologist D. Christopher Rogers under Section 10(A) 1(a) permit PRT-796284. EcoAnalysts, Inc. notified the Ventura Branch of the USFWS that surveys would be conducted at the Unocal Tank Farm site on 4 August 2003. The initial site visit was conducted on 12 and 13 August 2003 after summer morning fog events. Mr. Rogers walked the entire site and recorded all vegetation and existing conditions. Subsequent survey events occurred on 9 and 30 January, 12 February, and 5 March 2004. All surveys conducted during the 2004 winter season were conducted during rain or fog events, or immediately following rain events.

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Setting

The Tank Farm site is 300-acres in size, and is currently used for livestock grazing and is nearly devoid of coastal sage scrub vegetation. Coastal scrub vegetation persists in patches in the northeast corner of the property, along the southern and southeastern perimeter, and along the western perimeter and northwestern corner of the portion of the site on the south side of Tank Farm Road. The western side of the southern half of the site is bordered with commercial development, a municipal park borders the northwestern corner, and the remainder of the site is bordered by dry land farming, none of which supports native vegetation. The northeastern corner of the site has a large serpentine rock outcropping.

Results

Morro shoulderband snails were observed during the final four surveys. The snails were observed in three localities: in the talus of the serpentine rock outcrop and in the adjacent scrub in the northeast portion of the site; in the leaf litter of the coyote brush and California sagebrush along an old oxbow channel in the eastern perimeter of the southern portion of the site (i.e.; south of Tank Farm Road), and; in the leaf litter of the coyote brush and California sagebrush in the northwest corner of the southern portion of the site.

Two non-native invasive species, the brown garden snail (*Helix aspersa*) and a slug (*Deroceras reticulatus*) were also commonly observed around the site. The native Big Sur shoulderband snail was observed in leaf litter along the creek on the eastern side of the site.

If you have any questions, please contact me.

Sincerely,



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