

**APPENDIX J**  
**BIOLOGICAL RESOURCES**

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**APPENDIX J-1**  
**REPTILE AND HABITAT SURVEY**

## CPV Sentinel Power Plant Site Reptile and Habitat Survey



**presented to:**

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## Site Description

Soil texture and terrain were important considerations for all three special-status reptile species that were the focus of our survey, especially for the Coachella Valley fringe-toed lizard (*Uma inornata*) that has a nearly obligate association with loose, sandy soils derived from eolian or broad alluvial sources. Surface texture is also relevant to certain sensitive or listed plant species in the area.

The proposed project site is located on the lower middle to lower alluvial fan section that drains the Painted and Whitewater hills. The associated landforms are typical of desert bajada to alluvial plain topography, characterized by undulating terrain of terraced flats, debris flow ridges, and shallow braided drainages. Soils are fairly rocky at the north end of the study area, with subangular pebbles, rocks and cobbles in a sandy loam. These soils are typical in the vicinity of the power plant site, construction laydown area, and northern ends of the gas line route alternatives. The rocky debris flow deposits transition abruptly to sandy surficial terrain in a broad benched terrace feature north of Dillon Road.

Soil characteristics are mostly homogeneously sandy-textured for much of the gas line route alternatives to the south of Dillon Road. At the east edge of the project area, along the northern section of gas line route alternative C, soil texture grades more evenly into a crusty pediment-like terrain. At the south end of the gas line route alternatives A and C, surface soils are distinctly more sandy from downslope and downwind depositions and from peripheral deposits associated with the Garnet Wash drainage. Rounded cobbles and boulders, typical of downstream deposits, occur on the outer terrace terrain of Garnet Wash and are occasional features at the south end of the gas line route alternatives, especially along Karen Ave south of 18th Street. Unusually silty deposits along Garnet Wash in the proposed project vicinity suggest recent flooding without scouring or coarse sand load. Various upstream infrastructures alter some of the channel characteristics. Photographs in Appendix A show some examples of terrain and soils in the study area

Surface parent materials in the study area are mostly composed of felsic to semi-mafic granitics or metagranitics like gneiss. Most rock types were very typical of the stratas in the Little San Bernardino Mountains and Whitewater Hills.

Eolian sand deposits are present in a variety of locations in the study area, but nearly all such features are the result of infrastructure alterations and disturbances, especially at the south end of the power plant site and the east end of the construction laydown area. Some of the blow sand deposits associated with the fringe of Garnet Wash appear to be natural, although no plants species characteristic of sand fields or dunes was observed there or anywhere else in the study area. Some plants associated with coarse sand of washes, such as cheesebush (*Ambrosia salsola*), indigobush (*Psorothamnus spp.*), desert almond (*Prunus fasciculata*) and joint-fir (*Ephedra californica*) are present along various drainages. These species are more prevalent at the south end and lower slope zones of the survey areas, indicating a more sandy-loam deposit at depth in these areas.

## Vegetation

Vegetation throughout the study area is typical low desert creosote bush scrub (*Larrea tridentata*), usually of the *Larrea tridentata*-*Ambrosia dumosa* association. Other associated low shrubs grade into the cover composition with increased terrain features and drainages, particularly brittlebush (*Encelia farinosa*), cheesebush, and rhatany (*Krameria grayi*). Cacti are frequent in some of the rockier areas, especially barrel cactus (*Ferocactus cylindraceus*) and various chollas (*Cylindropuntia* spp.), though most cactus stands have died out or are in poor health. Although the woody crowns of burrobush (*Ambrosia dumosa*) were a common cover form, most appeared to be in a die-out phase or highly dormant, such that the typical living vegetation aspect for most of the study area was only creosote bush in nearly pure stands. Photographs in Appendix A show some examples of vegetation in the study area.

## Seasonal and Local Conditions

The relative conditions for the survey of desert reptiles in the study area were not optimal. The spring of 2007 followed one of the driest winter rainfall seasons in the past decade, and even the most common and weedy annuals, such as splitgrass (*Schismus*), Sahara mustard (*Brassica tournefortii*), or *Cryptantha angustifolia*, were not observed in any of the survey areas as living plants, even along roadsides. The biota of the local area has been greatly reduced by systemic and direct effects of local land use and fragmentation. There has been much energy development in this area in recent years. The road infrastructure, and the Devers substation in particular, limit the regular surface flow patterns of ephemerally intense rainfall events and wind/water alluvial deposition to the study area. Intensive feeding habits of jackrabbits (*Lepus californicus*) and packrats (*Neotoma* sp.) on woody plants normally free of herbivory indicated both seasonally weak and ecologically unbalanced conditions. Creosotebush, the most vigorous plant species of the area, showed signs of die-off or die-back throughout the survey areas, suggesting an increasing depth of water availability at the capillary fringe in the water table. Some die-backs or die-offs, particularly with burrobush, are the product of natural biota reductions following a peak created by the heavy rainfall year of 2005. Much of the general area, however, seems to be part of a more long-term effect of an increasingly perched or interrupted alluvial fan section, particularly evident in the growth patterns of cacti.

## Methods

The target species of our survey effort was desert tortoise (*Gophereus agassizii*), Coachella Valley fringe-toed lizard, and flat-tailed horned lizard (*Phrynosoma mcallii*). Other reptiles of interest included coast horned lizard (*Phrynosoma coronatum*) and red diamond rattlesnake (*Crotalus ruber*), two coastal species that are known to range into the desert in the San Gorgonio Pass region. The seasonal timing of our surveys for diurnal reptiles seemed appropriate for a range of reptile species, based on temperature profiles, the relative activity of common reptile species, the presence of certain migrating birds, and the relative phenology of perennial plant life.

We expected fringe-toed lizard to be the most particular in survey effort and referred to Mayhew's work (1964-65, see Table 1) and the Coachella Valley Multi-Species Habitat Conservation Plan species descriptions for reference data as general guidelines to determine

daily survey periods. Unimodal activity of diurnal reptiles typically ends in late April in the Colorado Desert region and often marks the beginning of activity for nocturnal or crepuscular reptiles. Our survey expected activity patterns to correspond with the beginning season of bimodal daily activity for tortoise and lizards. Our survey times focused primarily on the morning activity period. Appendix B lists the survey times and locations, relative weather data, and faunal observations.

We conducted the survey with two field workers walking side by side transects, 10 meters apart, in a manner similar to Bureau of Land Management (BLM) protocol for desert tortoise in trend population study plots. For the proposed power plant site, we performed 100 percent coverage. For the proposed construction laydown areas, we were limited by windmill infrastructure safety zones and the coverage for this area was approximately 75 percent (nearly 100 percent of the available natural feature terrain). For the proposed gas line routes, alternative A, B and C, we were limited by unsecured property access, fences, other infrastructure, and road traffic. These areas were surveyed as two sets of transects where the easements allowed, and four sets of transects in the higher lizard potential area along 19th AvenWue. here access/safety was limited, the areas were spot-checked or scoped for habitat potential or available biota observations. Most of these routes are on private property or easements, and survey access was limited for much of the proposed gas line route alternatives. Due to the limited survey effort in these areas, further gas line route surveys may be needed if property access is available. During our surveys, we noted the observations of all lizards and horned lizard food ant colonies as associated habitat suitability factors. Further survey methods are discussed with the results under the target species descriptions.

## Results

### Desert Tortoise (*Gopherus agassizii*)

No definitive sign of desert tortoise was observed during our surveys. Two highly modified burrows in the proposed power plant site had remnant features suggesting tortoise use in the past, but were most likely of recent use by jackrabbits and/or backfilled by kangaroo rats (*Dipodomys*). No scats or shell fragments were observed in our survey areas. Packrat middens were abundant in most areas, especially north of Dillon Road. These features were carefully checked for evidence of tortoise and other biota, but yielded no sign of tortoise. Most middens included a variety of objects, suggesting *N. lepida* or perhaps *N. albigula*. These middens regularly included animal bones and scat, suggesting that they were a good additional reference resource for determining tortoise presence.

Desert tortoises are known from the local region from populations in the Whitewater and Painted Hills, at the southeast edge of the San Bernadino Mountain range. The population in the Whitewater hills represent the nearest extant animals to the study area, within 2.5 miles, with historically suitable geomorphic habitat extending downslope into the study area. The history of local development, land uses, and barriers make the presence of reproductively viable tortoises in the study area highly unlikely, although isolated or wandering desert tortoise might still be encountered. Highway 62 seems to represent a significant barrier or obstacle to the nearest active tortoise populations.

The best potential habitat in terms of geomorphic suitability for desert tortoise in the survey areas was located along the east side of the proposed power plant site, the west end of the proposed laydown areas in the Windtec Energy property, the north end of alternative A proposed gas line route in the Horowitz property, the north end of alternative B proposed gas line route along Karen Avenue, and the sections of alternative B and C proposed gas line routes along 16th Avenue. All these areas however, are variably to highly disturbed and have a degraded ecology.

### **Coachella Valley Fringe-toed Lizard (*Uma inornata*)**

No sign of *Uma inornata* was observed during our surveys. If they were present in the survey areas, it is unlikely that one of these lizards would have been detected by our survey effort for several reasons:

- Even in areas of good habitat during seasonally favorable and diurnally optimal activity periods, studies (Muth,1987; Muth and Fisher, 1991 and unpubl. data) suggest that only 20 percent of occurring fringe-toed lizards will be active and observable on the surface at any one time.
- There appears to be a high degree of between-year fluctuations in local populations (17 to 149 per hectare [Muth and Fisher]), with higher mortality rates reducing the population in dry years. We would expect the lizard population in this area to be at the minimal end of the density spectrum after a dry year in 2006 and a very dry year in 2007. The lizards we observed (*Uta* and *Cnemidophorus*) were not in good condition, lacking fat reserves in their tail bases and along the spine, further suggesting a difficult season for lizard populations in general.
- Only a small portion of our survey areas were marginally suitable geomorphic habitat.
- The study area is fragmented by roads, various land uses, and other systemic and direct disturbances.

These ecologically impacting factors appear to have reduced lizard diversity in the area, especially for another “sand-diving” species, the zebra tailed lizard (*Callisaurus draconoides*), which should have been easily observable during our surveys but was also not detected.

Very little of the survey area seemed to have potential for these lizards. The area along 19th Avenue at the south end of the alternative A proposed gas line route, especially at intersection with Karen Avenue, seemed to have the best habitat. This area was surveyed during an optimal activity time in the bimodal part of the activity season (07:15 - 0930 AM) and was fairly active with other fauna (insects, lizards, antelope ground squirrels, and birds) during our survey effort. In this area, the northern fringe channels of Garnet Wash are adjacent and the general slope zone is more sandy from drainage depositions. This area has surficial blow sands that are mostly crusty and primarily restricted to the lee side of shrubs and in depressions. There are no true psammophytic plants though, in even the sandiest parts of this area, and it appeared that blow sands are, at best, weakly surficial veneers throughout the survey areas.

If the area along 19th Avenue was still contiguous with the whitewater drainage system, the possibility of *Uma* to occur at the south end of the alternative A proposed gas line route would be much greater, especially for juvenile-immature or dispersing animals. Garnet Wash seems to be a supporting feature for these lizards, although the portion adjacent to our survey area was often silty, suggesting that sandy alluvial deposition is being partially interrupted. The Interstate 10 corridor, windmill farms, and frontage roads are now major barriers, and it would seem that the proposed project vicinity and proposed routes likely do not support reproductively viable occurrences of *Uma inornata*. It seems likely, though, that some of these lizards are still present in the area of Garnet Wash, and historic records suggest that they ranged in the vicinity of the project area. Additionally, a certain amount of adaptive dispersing onto secondary habitats is expected.

### **Flat-tailed Horned Lizard (*Phrynosoma mcallii*)**

No sign of flat-tailed horned lizard was observed during our surveys. We did not have the expertise to determine scat of this species, and our effort was directed primarily at observing them at harvest ant (*Messor pergandei*) colonies as a strong associated factor (Grant, 2005) and “flushing” them up from blow sands around shrubs. As with the *Uma inornata*, the most suitable habitat for this species in the project area was associated with south ends of alternative A and C, especially along 19th Avenue. Unlike the habitat quality for *Uma*, which was marginal, the 19th Avenue area had highly suitable geomorphic habitat for flat-tailed horned lizard and abundant ant colonies. As with *Uma inornata*, the detection probability for this species is low because of the expected rarity for the area given habitat fragmentation and lack of records, problems with sampling detectability (Grant, 2005), and the cryptic nature of their coloration and movements.

The extent of the study area seems to match the expected transition zone between the desert horned lizard (*Phrynosoma platyrhinos*) and the flat-tailed horned lizard. The area of the proposed power plant site, construction laydown areas, and northern sections of the gas line routes appeared to be highly suitable geomorphic habitat for the desert horned lizard, though lacking in harvester ant colonies (*Pogonomyrmex*). Though we did not detect flat-tailed horned lizard in the study area, there is the expectation that they can occur at the south end of the proposed gas line routes as rare individuals of a declining population.

### **Other sensitive species**

Western burrowing owl (*Athene cunicularia*) is known from previous surveys to occur in the proposed project vicinity, but we did not observe any live owls or active sign. An inactive burrow of high suitability was observed along a wash bank in the western half of the construction laydown area. This burrow was marked by Garmin WAAS GPS (UTM Nad83 11s 0539362 E, 3754515 N, 1020’ elev.).

Some washes in the proposed power plant site and construction laydown area, and especially those that cross 16th Avenue along alternate B appear to have potential to support *Linanthus maculata*.

The south end of alternate A and C have potential to support Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*) or intergrades with variable milk-vetch (*A. lentiginosus* var. *variabilis*).

### **Plant Species Listed under California Native Plant Protect Act**

Cacti are the only plant species present in the study area protected under the California Native Plant Protection Act. Barrel cactus (*Ferocactus cylindraceus*) in the proposed power plant site were the most frequent living cacti. Cacti species presence and numbers are summarized in Table 4. Cacti Counts - Presence/Absence.

Other species under the California Native Plant Protection Act are present in the nearby region, but not within the study area, include:

- California fan palm (*Washingtonia filifera*)
- Desert Agave (*Agave deserti* var. *deserti*)
- Parry cholla hybrids (*Cylindropuntia californica* X *C. echinocarpa*)
- Foxtail cactus (*Escobaria alversonii*)
- Hedgehog cactus (*Echinocereus engelmannii*)
- Fish-hook cactus (*Mammillaria tetrancistra*)
- Ocotillo (*Fouquieria splendens*)
- Mesquite (*Prosopis glandulosa*)
- Palo Verde (*Parkinsonia florida* and *P. aculeata*)
- Cat claw (*Acacia greggii*)
- Desert-holly (*Atriplex hymenelytra*)
- Smoke tree (*Psoralea argophylla*)

### **Comments**

Remnants of reptile pitfall traps were found along the south portion of the proposed gas line route alternative A on the both sides of Karen Avenue. This may be the product of previous biological assessments for the energy developments, research, or poaching (see Appendix B photographs).

There was a distinct lack of reptile diversity in the study area. We expected observations of additional lizard species, including *Phrynosoma platyrhinos*, *Urosaurus graciosus*, *Dipsosaurus dorsalis*, *Gambelia wislizenii*, and especially *Callisaurus draconoides*. None of these were observed, though these species are likely present at least on a rare basis.

The herbivory on cacti, ephedra, and other tough desert plants at the proposed project plant site was among the most extreme I have seen in 25 years of observing desert natural history. These plants do not usually get affected to such a degree, which suggests that *Lepus* and *Neotoma* are successful locally and that a balance of predators is ecologically important to the long-term health of desert vegetation stands. Such impacts in drought conditions are mostly expected though, given the combination of factors that come together in place and time (see Appendix B photographs).

## References

CVFTL activity statement from CV MSHCP web site:

“Coachella Valley fringe-toed lizards are active from March to mid November (and sometimes into December when the weather is accommodating), although adults are primarily active from April to October with a peak in May-June (Mayhew 1965, Muth and Fisher pers. comm.). Springtime activity is triggered when subsurface temperatures exceed the minimum voluntary temperature at –5 cm (-2 inches) where the lizards hibernate, and end when these temperatures drop below minimum voluntary in the fall (Cowles 1941, Brattstrom 1965, Muth and Fisher 1991). Daily activity is also associated with temperature: Mayhew (1964) found them active when their body temperatures ranged from 25.8-44.0° C (78-111 °F); the mean is 38.0° C (100 ° F). They must have access to cool temperatures to survive midday temperatures during the hottest months. Muth and Fisher (1991) found that surface temperatures in the shade and subsurface temperatures at –5cm in the sun exceed the critical thermal maximum for the species (Brattstrom 1965). They must burrow 5cm in the shade or much deeper in the sun to escape these extremes. Not all individuals are active any given day, despite appropriate temperatures. Muth (1987) and Muth and Fisher (1991 and unpubl. data) found that, on average, only 20% of their marked population was active daily, with much individual variation. “

### References for Table 1

from FWIE-Virginia Tech University, from (DRAFT) - Species Id ESIS151001 - Date 14 March 1996:

- 03 Mayhew, W.W. 1965. Reproduction in the sand-dwelling lizard *Uma inornata*. *Herpetologica* 21(1):39-55.
- 04 Mayhew, W.W. 1964. Photoperiodic responses in three species of the lizard genus *Uma*. *Herpetologica* 20(2):95-113.

### Other references

Grant, T.J. 2005. Flat-tailed horned lizards (*Phrynosoma mcallii*): population size estimation, effects of off-highway vehicles, and natural history. Master's thesis, Colorado State University

<b>Table 1. Reference Activity Data for Uma inornata</b>						
FWIE - Virginia Tech University (DRAFT) - Taxonomy Species LIZARD, FRINGE-TOED, COACHELLA VALLEY Species Id ESIS151001 Date 14 MAR 96						
Activity times for Uma inornata collected monthly over a four year period. Data from Mayhew (03,04).						
MONTH	TIME	IMMATURE	YEAR (Adult male/female)			
			59	60	61	62
Jan	1000-1400	1	1/0	-	-	-
Feb	1030-1600	0	1/0	-	1/0	-
Mar	0900-1700	7	1/3	5/6	9/4	3/2
Apr	0700-1830	8	7/6	6/6	9/2	3/2
May	0700-1230, 1430-1830	9	6/6	10/6	9/2	7/2
Jun	0600-1230, 1600-1900	11	3/10	8/2	3/5	10/6
Jul	0500-1100, 1630-1930	6	3/11	3/4	5/7	6/6
Aug	1530-1330, 1630-1900	19	7/9	17/33	6/5	7/11
Sep	0730-1330, 1630-1830	4	5/7	7/17	6/8	5/7
Oct	0730-1400	3	3/3	3/3	4/6	2/3
Nov	1000-1300	1	-	-	-	-
Dec	---	-	-	-	-	-
TOTAL		69	37/55	59/78	52/42	43/38

<b>Table 2. Animal Species List</b>
<b>Invertebrate</b>
Desert harvest ant ( <i>Messor pergandei</i> )
California harvester ant ( <i>Pogonomyrmex californicus</i> )
Tarantula hawk wasp ( <i>Pepsis</i> sp.)
<b>Reptile</b>
Side-blotch lizard ( <i>Uta stansburiana</i> )
Great-Basin whiptail lizard ( <i>Gnemidophorus tigris tigris</i> )
<b>Avian</b>
Gambel’s quail ( <i>Callipepla gambelii</i> )
Greater roadrunner ( <i>Geococcyx californicus</i> )
Ash-throated flycatcher ( <i>Myiarchus cinerascens</i> )
Say’s phoebe ( <i>Sayornis saya</i> )
Common raven ( <i>Corvus corax</i> )
Barn swallow ( <i>Hirundo rustica</i> )
European starling ( <i>Sturnus vulgaris</i> )
Yellow warbler ( <i>Dendroica petechia</i> )
Yellow-rumped warbler, Audubon’s variety ( <i>Dendroica coronata</i> )
Hermit warbler ( <i>Dendroica occidentalis</i> )
Black-throated sparrow ( <i>Amphispiza bilineata</i> )
sparrow ( <i>Spizella</i> ) sp., clay-colored ( <i>S. pallida</i> ) or Brewer’s ( <i>S. breweri</i> )
House finch ( <i>Carpodacus mexicanus</i> )
<b>Mammal</b>
Coyote (scat) ( <i>Canis latrans</i> )
Kit fox (scat) ( <i>Vulpes macrotis</i> )
Antelope ground squirrel (observed) ( <i>Ammospermophilus leucurus</i> )
Desert woodrat (middens-scat) ( <i>Neotoma</i> sp., middens typical of <i>N. lepida</i> , <i>N. albigula</i> uncommon in the area)
Blacktail jackrabbit (observed) ( <i>Lepus californicus</i> )
Cottontail rabbit (observed) ( <i>Sylvilagus auduboni</i> )

**Table 3. Plant Species List**

Scientific Name	Common Name	Family	Native?	Life Form	A	B	C	D	E
<i>Ephedra californica</i>	California ephedra	Ephedraceae	native	shrub	X			X	X
<i>Ambrosia dumosa</i>	White bursage	Asteraceae	native	subshrub	X	X	X	X	X
<i>Ambrosia salsola var. salsola</i>	Cheesebush	Asteraceae	native	subshrub	X	X	X	X	X
<i>Bebbia juncea var. aspera</i>	Sweetbush	Asteraceae	native	shrub	X	X		X	X
<i>Chaenactis fremontii*</i>	Fremont Pincushion	Asteraceae	native	annual	X				
<i>Chrysothamnus paniculatus</i>	Blackband Rabbitbrush	Asteraceae	native	shrub	X				
<i>Encelia farinosa var. farinosa</i>	Brittlebush	Asteraceae	native	shrub	X	X	X	X	X
<i>Stephanomeria pauciflora var. pauciflora</i>	Wire Lettuce	Asteraceae	native	perennial	X			X	X
<i>Amsinckia tessellata*</i>	Devil's Lettuce	Boraginaceae	native	annual				X	
<i>Cryptantha angustifolia*</i>	Narrow-leaved forget me not	Boraginaceae	native	annual	X		X	X	
<i>Cryptantha nevadensis*</i>	Forget-me-not	Boraginaceae	native	annual				X	
<i>Brassica tournefortii</i>	Mustard	Brassicaceae	exotic	annual	X	X	X	X	
<i>Cylindropuntia bigelovii</i>	Teddy Bear cholla	Cactaceae	native	stem succulent				X	
<i>Cylindropuntia echinocarpa</i>	Golden cholla	Cactaceae	native	stem succulent		X	X	X	X
<i>Cylindropuntia ramosissima</i>	Diamond Cholla	Cactaceae	native	stem succulent				X	X
<i>Ferocactus cylindraceus</i>	Barrel cactus	Cactaceae	native	stem succulent		X		X	X
<i>Opuntia basilaris var. basilaris</i>	Beavertail Cactus	Cactaceae	native	stem succulent				X	
<i>Isomeris arborea</i>	Bladderpod	Capparaceae	native	shrub	X	X			
<i>Atriplex canescens</i>	Fourwing Saltbush	Capparaceae	native	shrub					
<i>Ditaxis neomexicana</i>	Ditaxis	Euphorbiaceae	native	perennial	X		X	X	
<i>Stillingia linearifolia</i>	Stillingia	Euphorbiaceae	native	semi-shrub				X	
<i>Psoralea argophylla</i>	Indigo Bush	Fabaceae	native	shrub	X		X		
<i>Psoralea schottii</i>	Smoke Tree	Fabaceae	native	shrub	X	X	X	X	X
<i>Erodium cicutarium*</i>	Filaree, Storks Bill	Geraniaceae	exotic	annual				X	
<i>Pholistoma membranaceum*</i>	Fiesta flower	Hydrophyllaceae	native	annual				X	
<i>Phacelia distans*</i>	Blue Phacelia	Hydrophyllaceae	native	annual				X	
<i>Krameria grayi</i>	White Rhatany	Krameriaceae	native	subshrub	X		X	X	X
<i>Camissonia californica*</i>		Onagraceae	native	annual	X			X	
<i>Plantago ovata *</i>	Wooly plantain	Plantaginaceae	native?	annual	X				
<i>Eriogonum fasciculatum var. polifolium</i>	California buckwheat	Polygonaceae	native	subshrub				X	
<i>Thamnosma montana</i>	Desert Thamnosma	Rutaceae	native	subshrub					X
<i>Prunus fasciculata</i>	Desert Almond	Rosaceae	native	shrub	X		X		
<i>Larrea tridentata</i>	Creosote Bush	Zygophyllaceae	native	shrub	X	X	X	X	X
<i>Schismus sp.*</i>	Split grass	Poaceae	exotic	annual	X	X	X	X	X

A = Gas Line Route Alternative A

B = Gas Line Route Alternative B

C = Gas Line Route Alternative C

D = Ocotillo Power plant Site

E = Lay Down Areas

\* - dead plants, annual skeletons from previous years

**Table 4. Cacti Counts - Presence/Absence**

<i>Scientific Name</i>	<b>Common Name</b>	A1	A1	A2	A2	B	B	C1	C1	C2	C2	D1	D2	D3	Dx	E1	E2	E3	Ex
		present - alive	present - dead	plants under 12"	plants 12" - 24"	plants over 24"	plants - dead	plants pls under 12"	plants pls 12" - 24"	plants under 12"	plants - dead								
<i>Ferocactus cylindraceus</i>	Barrel cactus	5	X		X	3	X	1	X			160	69	26	X	6	6		X
<i>Opuntia basilaris</i>	Beavertail Cactus						X					6			X				X
<i>Cylindropuntia bigelovii</i>	Teddy Bear cholla	1	X										2		X				X
<i>Cylindropuntia echinocarpa</i>	Golden cholla		X		X		X	3	X	1	X	3	6	17	X				X
<i>Cylindropuntia ramosissima</i>	Diamond Cholla		X				X	1	X			1	3	5	X				X

A1 = Gas Line Route Alternative A - north of Dillon Rd  
 A2 = Gas Line Route Alternative A - south of Dillon Rd  
 B = Gas Line Route Alternative B  
 C1 = Gas Line Route Alternative C - north of Dillon Rd  
 C2 = Gas Line Route - south of Dillon Rd  
 D = Ocotillo Power plant Site  
 E = Lay Down Areas

## Appendix A- Photos

Cover Photo: Area of the proposed power plant east of the Devers Sstation, looking southwest, from the northeast corner of the site.  
(PP\_NEcorner\_P5080011.jpg)



Area of the proposed project east of the Devers substation, looking from the northwest corner of the site. Cover photo is a view from the northeast corner of the site. Both show *Larrea*-dominated vegetation and terrain typical of much of the study area. (PP\_NWcorner\_P5080002-003.jpg,



View of proposed project site, looking north at the southeast end of the parcel where vegetation is more open and systemically disturbed. The surficial conditions, including denudation of small shrubs, the dead cacti, and lack of chlorophyllous seasonal plant growth were typical throughout the study area. Most dead litter on the surface is the previous year's growth of splitgrass (*Schismus*). (PP\_SEside\_P5080020.jpg)

## Appendix B - Survey times, locations, relative weather data, and associated faunal observations

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### 07 May 2007

#### 07 May 2007 - Weather at 0924 hrs

T<sub>air</sub> @ 1.5 m = 83.5° F, T<sub>air</sub> @ 5 cm = 86.2° F  
wind = 8.0 mph avg, max gust = 11.5 mph from bearing 30° (True North)  
clear skies, mostly breezy, few gusts

#### 07 May 2007 - Weather at 1300 hrs

T<sub>air</sub> @ 1.5 m = 86.0° F, T<sub>air</sub> @ 5 cm = 88.0° F  
wind = 6.6 mph avg, max gust = 9.8 mph from bearing 35° (True North)  
clear skies, mostly breezy, few gusts

#### 07 May 2007 - Ocotillo Power Plant Proposed Site

Survey begin: 0930 hrs

Survey end: 1415 hrs

Fauna: desert woodrat (*Neotoma lepida*), black-tailed jackrabbit (scat) (*Lepus californicus*), Antelope ground squirrel (*Ammospermophilus leucurus*), black-throated sparrow (*Amphispiza bilineata*), ash-throated flycatcher (*Myiarchus cinerascens*), coyote (scat) (*Canis latrans*), kit fox (scat) (*Vulpes macrotis*), common raven (*Corvus corax*), European starling (*Sturnus vulgaris*), *Spizella* sparrow (clay-colored sparrow [*S. pallida*] or Brewer's (*S. breweri*)), barn swallow (*Hirundo rustica*).

Great-Basin whiptail lizard (*Cnemidophorus tigris*): 3 observations

Side-blotch lizard (*Uta stansburiana*): 3 observations

Harvest ant (*Messor pergandei*) active colonies: 2 observations

California harvester ant (*Pogonomyrmex californicus*) active colonies: 2 observations

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### 08 May 2007

#### 08 May 2007 -Weather at 0750 hrs

T<sub>air</sub> @ 1.5 m = 82.4° F, T<sub>air</sub> @ 5 cm = 85.3° F, T<sub>soil</sub> @ 2 cm = 84.0° F  
wind = 1.0 mph avg from bearing 352° (True North)  
clear skies, no breezes

**08 May 2007 -Weather at 1215 hrs**

T<sub>air</sub> @ 1.5 m = 94.0° F, T<sub>air</sub> @ 5 cm =100.5° F, T<sub>soil</sub> @ 2 cm = 111.5° F  
wind = 6.6 mph avg, max gust = 7.6 mph from bearing 32° (True North)  
clear skies, mostly breezy, few gusts

**08 May 2007 - Ocotillo Power Plant Proposed Site**

Survey begin: 0730 hrs

Survey end: 1200 hrs

Fauna: desert woodrat, ash-throated flycatcher, hermit warbler (*Dendroica occidentalis*), black-tailed jackrabbit, house finch (*Carpodacus mexicanus*), Say's phoebe (*Sayornis saya*), black-throated sparrow, common raven

Great-Basin whiptail lizard (*Cnemidophorus tigris*): 20 observations

Side-blotch lizard (*Uta stansburiana*): 6 observations

Harvest ant (*Messor pergandei*) active colonies: 3 observations

California harvester ant (*Pogonomyrmex californicus*) active colonies: 1 observation

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**09 May 2007**

**09 May 2007 - Weather at 0715 hrs**

T<sub>air</sub> @ 1.5 m = 78.0° F, T<sub>air</sub> @ 5 cm = 78.3° F  
wind = 3.3 mph avg, max gust = 4.5 mph from bearing 247° (True North)  
mostly clear skies, except smoke haze to west from fire in LA basin (Griffith Park)

**09 May 2007 - Weather at 0915 hrs**

T<sub>air</sub> @ 1.5 m = 93.4° F, T<sub>air</sub> @ 5 cm = 96.4° F, T<sub>soil</sub> @ 2 cm = 89.8° F  
wind = 12.8 mph avg, max gust = 19.9 mph from bearing 247° (True North)  
mostly clear skies, except smoke haze to west from fire in LA basin (Griffith Park)

**09 May 2007 - Weather at 1150 hrs**

T<sub>air</sub> @ 1.5 m = 96.1° F, T<sub>air</sub> @ 5 cm = 102.0° F, T<sub>soil</sub> @ 2 cm = 110.0° F  
wind = 10.0 mph avg, max gust = 14.3 mph from bearing 244° (True North)  
clear skies, mostly breezy, few gusts

**09 May 2007 - Weather at 1910 hrs**

T<sub>air</sub> @ 1.5 m = 90.5° F, T<sub>air</sub> @ 5 cm = 90.7° F, T<sub>soil</sub> @ 2 cm = 97.5° F  
wind = 17.5 mph avg, max gust = 22.5 mph from bearing 244° (True North)

slightly hazy skies, constant wind

**09 May 2007 - Alternative A, between Indigo Power Plant and Karen Ave**

Survey begin: 0645 hrs

Survey end: 0900 hrs

Fauna: desert woodrat, black-tailed jackrabbit, yellow warbler (*Dendroica petechia*), tarantula hawk wasp (*Pepsis* sp), yellow-rumped warbler-Audubon's variety (*Dendroica coronata*)

Great-Basin whiptail lizard (*Cnemidophorus tigris*): 5 observations

Side-blotch lizard (*Uta stansburiana*): 18 observations

Harvest ant (*Messor pergandei*) active colonies: 2 observations

California harvester ant (*Pogonomyrmex californicus*) active colonies: 2 observations

**09 May 2007 - Alternative A, N-S between 18th and 19th Ave**

Survey begin: 0915 hrs

Survey end: 1045 hrs

Fauna: desert woodrat, black-tailed jackrabbit

Great-Basin whiptail lizard (*Cnemidophorus tigris*): 5 observations

Side-blotch lizard (*Uta stansburiana*): 1 observations

Harvest ant (*Messor pergandei*) active colonies: 1 observation

California harvester ant (*Pogonomyrmex californicus*) active colonies: 1 observations

**09 May 2007 - Construction Lay Down and Well Site areas**

Survey begin: 1100 hrs

Survey end: 1200 hrs

Fauna: desert woodrat, black-tailed jackrabbit, Gambel's quail (*Callipepla gambelii*), Greater roadrunner (*Geococcyx californicus*), Brewer's sparrow, Western burrowing owl (*Athene cunicularia*)

Great-Basin whiptail lizard (*Cnemidophorus tigris*): 4 observations

Side-blotch lizard (*Uta stansburiana*): 1 observation

Harvest ant (*Messor pergandei*) active colonies: 6 observations

California harvester ant (*Pogonomyrmex californicus*) active colonies: 0 observations

**09 May 2007 - Alternative A, N-S between Dillon Rd and 18th Ave**

Survey begin: 1900 hrs

Survey end: 1945 hrs

Fauna: desert woodrat, black-tailed jackrabbit, cottontail rabbit (*Sylvilagus auduboni*)

Great-Basin whiptail lizard (*Cnemidophorus tigris*): 4 observations

Side-blotch lizard (*Uta stansburiana*): 1 observation

Harvest ant (*Messor pergandei*) active colonies: 0 observations

California harvester ant (*Pogonomyrmex californicus*) active colonies: 0 observations

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### **10 May 2007**

#### **Weather at 0600 hrs**

T<sub>air</sub> @ 1.5 m = 75.7° F, T<sub>air</sub> @ 5 cm = 75.0° F, T<sub>soil</sub> @ 2 cm = 76.6° F

wind = 8.0 mph avg, max gust = 10.8 mph from bearing 244° (True North)

clear skies, mostly breezy, few gusts

#### **10 May 2007 - Alternative C (unpaved N-S road between Dillon Rd and Indigo Power Plant)**

Survey begin: 0600 hrs

Survey end: 0745 hrs

Fauna: desert woodrat, tarantula hawk wasp, common raven, black-tailed jackrabbit

Great-Basin whiptail lizard (*Cnemidophorus tigris*): 1 observations

Side-blotch lizard (*Uta stansburiana*): 5 observations

Harvest ant (*Messor pergandei*) active colonies: 15 observations

California harvester ant (*Pogonomyrmex californicus*) active colonies: 0 observations

#### **10 May 2007 - Alternative A (N-S alignment in Horowitz parcel, between Dillon and 16th )**

Survey begin: 0800 hrs

Survey end: 0930 hrs

Fauna: desert woodrat, black-tailed jackrabbit, antelope ground squirrel

Great-Basin whiptail lizard (*Cnemidophorus tigris*): 8 observations

Side-blotch lizard (*Uta stansburiana*): 3 observations

Harvest ant (*Messor pergandei*) active colonies: 8 observations

California harvester ant (*Pogonomyrmex californicus*) active colonies: 1 observation

#### **10 May 2007 - Alternative B and C (16th Ave, along powerline roads)**

Survey begin: 0945 hrs

Survey end: 1030 hrs

Fauna: desert woodrat, black-tailed jackrabbit

Great-Basin whiptail lizard (*Cnemidophorus tigris*): 2 observations

Side-blotch lizard (*Uta stansburiana*): 3 observations

Harvest ant (*Messor pergandei*) active colonies: 2 observations

California harvester ant (*Pogonomyrmex californicus*) active colonies: 0 observations

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**APPENDIX J-2**  
**BIOLOGISTS RESUMES**



## David A. Kisner

*Project Biologist*

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### Areas of Expertise

- Birds of the Western United States
- Site Assessment and Monitoring of Endangered Birds of California
- Habitat Assessment
- Wildlife Survey
- Wetland Delineation
- Botanical Assessment
- Permit Compliance
- Construction Monitoring

### Years of Experience

With URS: 3 Years

With Other Firms: 12 Years

### Education

MS/Ecology/2004/San Diego State University

BA/Biology, Evolution, & Ecology/1994/University of California, Santa Barbara

### Permits

U.S. Fish and Wildlife Recovery Permit (TE-095868-0) for Southwestern Willow Flycatcher and Least Bell's Vireo

### Overview

Mr. Kisner is a wildlife biologist with extensive experience working with threatened and endangered birds within southern California coastal and riparian areas. David completed his Master's in Ecology through San Diego State University looking at the impact of the non-native Giant Reed (*Arundo donax*) on the riparian bird community. While in San Diego, David worked with the U.S. Geologic Survey for four years conducting presence/absence and nest monitoring surveys for Least Bell's Vireos and Southwestern Willow Flycatchers. David has a broad background in biology and has also worked for Santa Barbara County Planning and Development as a Biologist and Planner.

### Project Specific Experience

#### Project Management

- Wildlife Task Manager for the Chevron Guadalupe Restoration Project – Organize, coordinate, and oversee wildlife monitoring and permit compliance of 2,700 acre soil remediation site. Communicate with On-site Environmental Coordinator regarding restoration, monitoring, coordinate operations with wildlife monitors, and reporting of sensitive species found on site. Oversee monitoring efforts for Western Snowy Plovers, California Red-legged Frogs, and numerous sensitive species. February 2006 to present.
- West Figuroa Bird Usage Study for the City of Santa Barbara – Conduct winter, spring, and breeding bird surveys to determine species usage and habitat values prior to proposed creek enhancement and native plant restoration efforts. January 2006 to July 2006.
- Designated Biologist for SCE Mountainview Power Project – Organized and oversaw biological monitoring of 18 mile gas line and power plant construction site. Ensured construction was conducted according to permit conditions and worked with client and regulatory agencies to address biological concerns. April 2004 to April 2006.
- Alternate Designated Biologist for SCE Mountainview Power Project – Assist, as needed, to address any biological issues that may arise with the operations and maintenance of the Mountainview Power Project. May 2006 to present.
- Project Manager and Lead Biologist for CalTrans SR 118/23 Widening Project – surveyed 5 miles of riparian habitat for Least Bell's Vireo and Willow Flycatchers. Managed project, contract biologist, and report production. 2004.



### **Sensitive Species Survey Experience**

#### **Least Bell's Vireo (*Vireo bellii pusillus*)**

Over 350 positive contact hours

- Santa Clara and Ventura Rivers, Ventura County – Conducted presence/absence surveys for vireos and mapped territories. 2004 and 2005.
- San Timeteo River, Riverside County - Conducted presence/absence surveys for vireos and mapped territories. 2005.
- San Luis Rey River, San Diego County – Conducted area searches for Least Bell's Vireos. Monitored nest for fledging success, predation, and parasitism by Brown-headed Cowbirds. Banded nestlings with color bands. 2000 to 2003.
- Santa Barbara, Ventura, and Los Angeles Counties - Conducted focused surveys for Least Bell's Vireos. 1998 and 1999.

#### **Southwestern Willow Flycatcher (*Empidonax traillii extimus*)**

Over 175 positive contact hours

- San Timeteo River – Riverside County - Conducted presence/absence surveys for vireos and mapped territories. 2005.
- Camp Pendleton, San Diego County – conducted area censuses for Willow Flycatchers and followed individuals and pairs through the breeding season. 2000 and 2001.
- Santa Barbara, Ventura, and Los Angeles Counties - conducted focused surveys for Willow Flycatchers. 1999.
- Vandenberg Air Force Base, Santa Barbara County – conducted surveys for Willow Flycatchers and monitored nest for success, predation, and parasitism by Brown-headed Cowbirds. 1998.

#### **Western Snowy Plover (*Charadrius alexandrinus nivosus*)**

Over 130 positive contact hours

- Guadalupe Dunes, San Luis Obispo County – Assisted with nest searching and monitoring. July 2006.
- Coal Oil Point, Santa Barbara County –monitored Snowy Plovers, educated the public, and enforced beach use regulations. Recorded human, dogs, and other wildlife's affects on the plovers. November 2005 to February 2006.
- Guadalupe UNOCAL Oil Field Response Monitoring, Santa Barbara and San Luis Obispo Counties – searched for and monitored Snowy Plover nests. 1994 and 1995.
- McGrath Beach Natural Resource Damage Assessment, Ventura County – searched for and monitored Snowy Plover nests. Recorded the number, behavior, and localities of wintering Snowy Plovers. 1994.



**Belding's Savannah Sparrow (*Passerculus sandwichensis beldingi*)**

Over 50 positive contact hours

- Tijuana River Estuary, San Diego – conducted passive surveys in the Tijuana River Valley in conjunction with sound study. 2002.
- Goleta Slough, Santa Barbara – conducted passive surveys in and around Goleta Slough to determine habitat usage. 1998 and 1999.
- Goleta Slough, Santa Barbara – assessed population dynamics and habitat selection of the Belding's Savannah Sparrows. 1993 and 1994.

**California Least Tern (*Sterna antillarum browni*)**

Over 30 positive contact hours

- Mission Bay Bird Usage Study, San Diego County – passive observation of Least Terns foraging and breeding within the study area. 2000 to 2002.
- McGrath Beach Natural Resource Damage Assessment, Ventura County – searched for and monitored Least Tern nests. Surveyed the beach, river mouth, and coastal dune pond for birds and signs of habitat damage. 1994.

**California Gnatcatcher (*Poliophtila californica*)**

Over 25 positive contact hours

- Ventura, Los Angeles, and San Diego Counties – opportunistic passive surveys.

**Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)**

10 positive contact hours

- Camp Pendleton, San Diego County – opportunistic passive surveys along the Santa Margarita River. 2000.
- Ventura and Los Angeles Counties – conducted presence/absence surveys for Yellow-billed Cuckoos. 1998 and 1999.
- Kern County – conducted focused work under the direction of M. Halterman. 1996.

**California Red-legged Frog (*Rana aurora draytonii*)**

- Guadalupe Restoration Project, San Luis Obispo County – assisted with quarterly eye-shine surveys, egg mass surveys, tadpole sampling, and day-time work zone clearances; adults, yearlings, tadpoles, and egg masses seen. 2006.
- Ventura River, Ventura County – assisted with USFWS protocol CRLF Surveys along the Ventura River. Captured numerous Bullfrogs located with the main Ventura River channel. 2004.
- Gaviota State Beach, Santa Barbara County – day time habitat assessment; adults and egg mass seen. 2004.

**General Bird Surveys, Wildlife Surveys, and Habitat Assessment**



- Santa Barbara Airport Bird Usage Studies – Conducted regimented observations of bird usage of control and experimental tidal basins to determine potential strike hazards, assessed breeding bird habitat and directed vegetation removal to minimize nesting within certain areas, located and monitored nests within study areas in order to ensure there were no “take” under the Migratory Bird Treaty Act, and conducted Belding’s Savannah Sparrow and general bird observations in and around construction to ensure there were no impacts. 2004 to present.
- Lake Casitas Waterfowl and Bird Usage Study – conducted year round surveys of Lake Casitas for ducks, grebes, and other “aquatic” bird species. Surveys required determining the number, species, and location of all individuals. Fall 2004 to Winter 2005.
- Oxnard Plain Groundwater Recharge Project EIS/EIR – conducted surveys for Least Bell’s Vireo and general wildlife within the project site. Compiled historic data, recent survey results, and third party observations and assessed potential impacts to the biologic resources by proposed project activities. Made suggestions for avoidance and mitigation measure to negate and/or minimize impacts. 2005
- National Forest Avian Point Count Assessment, Santa Barbara, Ventura, Los Angeles, and San Diego Counties – conducted point counts within four Southern California National Forests; coordinated field crew and access logistics. 2003
- Camp Pendleton MAPS sites, San Diego County – captured, measured, and banded riparian birds to determine productivity and survivorship. Supervised field crew in 2003. 2000 to 2003.
- Point Loma Breeding Bird Assessment, San Diego County – conducted point counts to determine habitat usage and breeding bird composition. 2000 to 2003
- Upper Tijuana Estuary Bird Usage Study, San Diego County – conducted seasonal surveys of U.S. Navy lands within the Tijuana River Valley to determine species composition and abundance. 2002.
- Mission Bay Bird Usage Study, San Diego County – conducted monthly surveys of the basins and wetlands to determine bird species composition and abundance. 2000 to 2002.
- Santa Barbara Municipal Airport Wetland Mitigation Feasibility Study, Santa Barbara – conducted surveys of bird usage of wetland basins within Goleta Slough to predict possible outcome of restoration efforts on bird-plane interactions. 1998 to 1999.



- Summerland Greenwell Park, Santa Barbara County – developed restoration plan using native plants to restore and enhance riparian and coastal scrub communities for new wildlife preserve. 1998.
- Golden Gate National Recreation Area Brown-headed Cowbird Census, Marin County - censused 5 locations using point count survey method for birds and searched riparian areas for nests. Monitored nests for parasitism (by Brown-head Cowbirds), predation, and fledging success. Trained volunteers in nest search methodology and directed their search efforts, and resolved logistical problems. 1996.
- Northeastern Washington Timber Management Project, Western Washington State – censused riparian and upland transects for birds and mammals. Determined herbaceous and woody vegetation composition of transects. Gathered morphological measurements and prepared study skins of small mammals. Assisted with artificial nest predation experiments, nest searching, nest success assessment, and small mammal trapping. 1995.

### **Botanical Experience**

#### **Course work:**

- Flora of California - UC Santa Barbara, 1993 Quarter long course with laboratory and field trips covering the plant families of California taught by Dr. Bob Haller. Focus of course involved keying plants to species using A Flora of California by Philip Munz (1974).
- Flora of California - Santa Barbara City College, 1998. Quarter long course with laboratory covering the plant families of California taught by Mr. Al Flinck. Focus of course was to key plants to species using The Jepson Manual, Higher Plants of California (1993).

#### **Field Experience:**

- Guadalupe Restoration Project – Conduct active and passive restoration assessments and assist with population censuses for three listed species. Over see construction activity to ensure minimization of impact and avoidance of sensitive species.
- Mountainview Power Project – Conducted regular surveys within and near work zones to ensure no sensitive plants were present. Restored project area after disturbance; collected quantitative data on restoration success. April 2004 to April 2006.
- Santa Barbara Airport / Goleta Slough quantitative restoration monitoring –Assisted with quantitative data collection on restoration transects through out the salt marsh and transition habitats. Spring 2004 and 2005.



- L.A. Metropolitan Water District HCP site assessment. March 2004 and 2005. Surveyed large parcels within the northern Mojave Desert for rare and sensitive plant species.
- USGS – 2000 to 2004 – conducted habitat assessments of sensitive species breeding areas /territory. Conducted “stacked cube” qualitative vegetation assessment of restoration site.
- Santa Barbara County Planning and Development – Conducted baseline surveys of proposed project sites to determine habitat function and value. November 1996 to August 1999.
- Northeastern Washington Timber Management Project – Conducted line transects through pine woodlands and mountain riparian zones in conjunction to avian survey routes. 1995.

#### **Environmental Permitting and Regulations**

- Contract Biologist/Planner, Santa Barbara County Planning and Development – processed development projects in Santa Barbara County under applicable local, state, and federal environmental and planning regulations and laws. Assessed impacts to Biologic Resources and reviewed environmental documents. March 1998 to August 1999.
- Permit Compliance, Santa Barbara County Planning and Development – ensured compliance with Conditions of Approval connected to discretionary projects. Assessed success of mitigation measures, environmental protection plans, and restoration efforts. Responded to public inquiries, complaints, and concerns. August 1997 to January 1998.
- Biologist/Planner, Santa Barbara County Planning and Development – processed development projects in Santa Barbara County under applicable local, state, and federal environmental and planning regulations and laws. Assessed impacts to Biologic Resources and reviewed environmental documents. November 1996 to August 1997.

#### **Specialized Training**

- OSHA 40-Hour HAZWOPER  
December 2004  
HAZWOPER refresher: October 2006
- OSHA 8-Hour Supervisor HAZWOPER Training  
April 2005
- Loss Prevention System  
March 2006



- CNPS Vegetation Mapping and Classification Workshop  
August 2005
- Red Cross First Aide, CPR, & AED  
July 2006

**Contact Information**

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Santa Barbara, CA 93117  
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david\_kisner@urscorp.com



## J. Wayne Vogler

Ecologist

### Areas of Expertise

Wetland Delineations  
Coastal Dune Ecosystems  
Flora/Fauna Surveys  
Mapping Services  
HAZWOPER Trained

### Years of Experience

With URS: 1 Year  
With Other Firms: 11 Years

### Education

BS/Biological Sciences/1994/  
University of California, Irvine

### Registration/Certification

1997/U.S. Army Corp of Engineers  
Wetland Delineation Certification  
Program  
1997/Lead Related Construction  
Supervisor (#S2112) and Project  
Monitor (#M2112), California  
Department of Health Services  
1995/Asbestos Certified Site  
Surveillance Technician, #95-1831,  
California Department of  
Occupational Safety and Health

### Overview

Mr. Vogler is an ecologist with extensive experience working with natural dune habitats along the Central California coast. Wayne's diverse experience ranges from site investigations of industrial sites to restoring native habitats at a large soil and groundwater remediation site. Wayne's project experience has included working with federal, state, and local agencies to find consensus among several parties, often with conflicting interests, toward the successful completion of the project. Wayne developed and instituted monitoring protocols, developed restoration plans, and monitored one of the largest hydrocarbon remediation projects along the U.S. Western Coast. Wayne has maintained compliance with Health and Safety training requirements, including some specialized training, since 1996; he is fully-versed and indoctrinated in the health and safety culture.

### Project Specific Experience

#### Project Management

- Ecological Field Coordinator/Monitoring Task Leader for the Chevron Guadalupe Restoration Project – Develop, coordinate, and conduct biological monitoring and permit compliance of 2,800 acre remediation site. Participate and direct field crews in performance of botanical and wildlife monitoring efforts. Interact with construction personnel and coordinate efforts to avoid disturbance to sensitive species and habitats. Develop and provide senior review of ecological reporting documents. Initiate protocols to ensure compliance with 1,200+ permit conditions. Delineate federal and state jurisdictional wetlands. September 1997 to June 2006.
- Phase I ESAs, Asbestos and Lead Surveys – Managed and trained staff in site assessment and asbestos/lead investigations. Conducted 100+ site assessments in California, Colorado, Hawaii, Illinois, Indiana, Nevada, and New Mexico. Subject properties ranged from multi-acre vacant, natural lands to large industrial facilities to a pharmaceutical manufacturing plant.

#### Sensitive Species Survey Experience

##### **California Red-legged Frog (*Rana aurora draytonii*)**

- San Luis Obispo and Santa Barbara County – Conducted presence/absence surveys for California red-legged frogs and mapped habitats. 1999 through present.
- Chevron Guadalupe Restoration Project - Permitted to survey, capture, handle, and relocate California red-legged frogs. Includes pit-tagging and radio-tracking of individuals to monitor relocation efforts. Survey efforts for tadpoles, including dip-netting and use of minnow traps. 1999 through present.



#### **Desert Tortoise (*Gopherus agassizii*)**

- Mojave Desert – Completion of the Desert Tortoise Council Annual Surveying, Monitoring, and Handling Techniques Workshop. Training included survey techniques for individuals and their sign, assessment of habitat, handling techniques, and burrow construction. 2003.

#### **Tidewater Goby (*Eucyclogobius newberryi*)**

- Santa Barbara Airport, Los Carneros and Tecolotito Creek Realignments – Captured and relocated individuals from the former creek channels. Field work included seining creek channels, dip net capture, identification of listed and common species encountered, and transportation/release. 2006.
- City of Santa Barbara Laguna Channel Tide Gate Repair – Conduct survey for tidewater goby prior to work activities. Captured and relocated individuals prior to cofferdam placement and de-watering activities; monitored construction activities to avoid impacts to species. Field work included seining tidal lagoon channels, installation of blocking nets, capture and identification of listed and common species encountered, and transportation/release. 2006.

#### **Wetland Delineations and Restorations**

- Performed the initial survey and subsequent update surveys to identify and delineate wetlands according to federal definitions at the 2,800-acre Guadalupe Restoration Project. Employed both routine and comprehensive survey methods with findings reviewed by ACOE and NRCS. 1997 and 2004.
- A contributing author and editor to an encompassing wetland restoration and mitigation plan at the Guadalupe Restoration Project. Plan elements included the satisfaction of both federal and state resource agencies. Designed wetland habitat elements for the enhancement of both California red-legged frogs and La Graciosa thistle. Plan was approved by several federal and state resource agencies with accommodation by the U.S. Army Corp of Engineers describing the Plan as an example for future plans to ascribe toward. 2004 through 2006.
- Guadalupe-Nipomo Dunes – Conduct an identification survey of wetland habitats throughout the entire dunes complex. Developed identification and screening criteria, classification and descriptive identifiers, and survey methodology. Employed aerial photography interpretation for initial target identification. Mapped wetland habitats with sub-meter GPS unit for data to be incorporated into an existing GIS project. 2004 to present.
- Administrative Hearing with the Army Corp of Engineers for the Santa Maria Airport District. Presented to Hearing Officer in support of District's opinion that wetlands unfairly identified by ACOE personnel. Hearing resulted in no action taken by ACOE against District.

#### **General Vegetation Surveys, Wildlife Surveys, and Habitat Assessment**

- Conducted regimented surveys and mapping efforts for La Graciosa thistle (*Cirsium loncholepsis*), surf thistle (*Cirsium rhotopilum*), and beach



spectacle-pod (*Ditthyrea maritima*). Initial survey and mapping of presence. Annual censusing of populations. Monitoring of construction activities to ensure avoidance of disturbance to individuals and habitat. Summer 1998 to present.

- Presence survey. Population mapping, and habitat assessment for Gaviota tarplant (*Deinandra increscens* ssp. *villosa*) for a naturally vegetated 16-acres site at Vandenberg Air Force Base, California. June 2006.
- Habitat Inventory and Ecological Database (HIED) development for the 2,800-acre Guadalupe Restoration Project. Scope included the initial mapping of sensitive flora, sensitive fauna, weed infestation, habitat quality, and several other parameters. Data developed from aerial photograph interpretation, qualitative and quantitative surveys, and specific presence/absence surveys per species. Updated annually. 2002 to present.
- Pre-disturbance assessment and restoration monitoring surveys to determine habitat composition and quality. Developed protocols for photograph documentation efforts. Spring 1998 to present.
- Construction monitoring to ensure compliance with over 1,200 permit conditions. Work with contractors and construction personnel to minimize native habitat disturbance and avoid sensitive and listed flora and fauna. Spring 1998 to present.

#### **Other Reports and Projects**

- Worker identification guide to sensitive plants and animals in SLO County to Tosco pipeline workers. 1999.
- Collection of tadpoles and soil in support of an ecological risk analysis at a former gas plant along Santa Barbara coast.

#### **Specialized Training**

- Annually/8-Hour HAZWOPER Annual Refresher
- 2006/Loss Prevention System Training, a Behavior Based Safety Program
- 2006/Smith System Advanced Driving Traffic Safety
- 2003/PADI Certified Open Water Diver
- 2001/Stormwater Pollution Prevention on Construction Sites, California State Water Resources Control Board
- 1999/Certified Beer Master, Anheuser-Busch, Inc.
- 1996/40-Hour Hazardous Waste Workers' and 24-Hour First Responder Health and Safety Training

#### **Chronology**

- 06/06-present: URS Corporation, Santa Maria, CA
- 10/02-06/06: (sd)<sup>2</sup> ecology, Grover Beach, CA



- 06/95-09/02: LFR, Inc., Santa Maria, CA

**Contact Information**

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***Xeric Specialties Consulting* Dave Silverman - Plant Ecologist**  
437 Calle De Collie, Ridgecrest, CA 93555, (760) 384-8535 or (760) 608-3105, xeric@mchsi.com or xsl@iwvisp.com

Qualifications:

Services in botanical and biological assessments, mapping, research and reporting. Experienced in field identification, keying-out and determining plant taxa of the southwest region and southern California; able to on-site field ID 10,000+ regional plant taxa. Experienced at working under permits, biological opinions, MOUs, etc. Consultant and contributor on rare plant taxa to CNPS rare plant program since 1996. Worked on desert tortoise population trend studies and mitigation projects in AZ, CA, NV and UT, between 1990 and 2000 mostly, including permits, and 500+ tortoises processed for field data, 800+ field days dedicated to tortoise survey during this time. Active attendance of scientific symposiums and workshops, wildlife conservation meetings and numerous Jepson Herbarium-sponsored workshops concerning plant family. Familiar with southwest geography, geology and mineral types, experienced at visually identifying common and characteristic crystal-mineral-rock components in soils and strata. Experienced at interpreting maps, writing physiognomic and vegetation descriptions. Accurate and reliable in collecting detailed data from transects, grids and other sampling methods. Skilled computer user and data handler (ten years of professional experience), with additional experience in biology-related applications. Proficient at collecting field data with maps and differentially corrected GPS or using aerial photos, rendering to graphics in CAD and GIS, and conversion to other file formats. Equipped with all necessary software and hardware for front-end GIS work. Avid hiker, traveler and photographer of the desert since 1978. All equipment necessary to conduct extended field work, under adverse conditions and cross-country travel, including 4WD vehicles. Excellent field skills. EMT qualified field member of the China Lake Mountain Rescue Group from 1985-1992. Liability Insurance through Hartford Casualty Insurance Co.

Recent Experience:

April, 1998 to Present. Botanical/ Consultant. Various projects, primarily botanical and TnE fauna field surveys, writing/reporting, vegetation mapping, and GPS data collection/GIS development. Recent clients include :

Southwest Botanical Research, Cino Valley, AZ (Marc Baker, 928-636-0252)  
Kleinfelder and Associates (Chris Enyedy, 559-486-0750)  
Tetra Tech EM Inc. San Francisco (Cindi Rose, 415-222-8286)  
Aspen Environmental Group, Agoura Hills and San Francisco, CA (Chris Huntley, 818-597-3407)  
URS Corp. Oakland, Fresno, San Diego, Santa Ana, and Las Vegas offices (Amanda Matthews-Neiswenter (702) 951-3318)  
Las Vegas Valley Water District (Seth Shanahan, 702-822-3314)  
Resource Design Technology, Eldorado Hills, CA (Dave Brown, 916-983-9193)  
Wildland International, Las Vegas, NV (Dan Maleug, 702-657-9711)  
ESR Corp., Oakhurst, CA (Scott Larson, 559-683-5335)  
Phoenix Biological Consulting, Wrightwood, CA (Ryan Young 661-261 3390)  
Naval Air Weapons Station (NAWS) China Lake (Tom Campbell, 760-927-1515)

Highlights of Recent Experience:

present; Southwest Botanical Research, conducting rare *Sclerocactus* and *Coryphantha* cactus surveys in the Tucson area

present; Tom Volk and Associates, research and writing of biological opinions for sensitive biota in the Tehachapi area of south-central CA, for EIR process for WZI Materials sand and gravel mine.

4/06 to present; URS Corp. Las Vegas Office, NV. Botanical/rare plant surveys for Toquap Wash Energy and Coyote Springs project

4/06 to 5/06; Tetra Tech EM Inc. Biological surveys for hazardous site assessment at China Lake Naval Air Warfare Station.

3/06. Kleinfelder and Associates. Desert tortoise and general biota survey for Terminal Project, Boron, Kern Co. CA.

9/05 to 3/06; Aspen Environmental Group. Mapped GIS inventory tree survey in Griffith Park for mitigation measures required for DWP proposed water line, Los Angeles, CA.

10/05 to 12/05; Resource Design Technology. Botanical Surveys and consulting services for revegetation/reclamation plan for F.W. Aggregates mine, southeast of Lone Pine, CA.

12/04 to 5/05; Southern Nevada Water Authority - Las Vegas Wash Coordination Committee. Field ground-truth vegetation mapping project utilizing national NRCS vegetation mapping protocol methods.

5/04 to 10/05; Aspen Environmental Group. Botanical and wildlife surveys for Angeles National Forest, for various management release sites, plantations, fuel stands, etc. Sensitive plant species surveyed for included *Swertia neglecta*, *Calochortus plummerae*, *C. palmeri*, *Castilleja gleasonii*, *Linanthus concinnus*, *Perideridia pringlei*, *Galium jepsonii*, *Lupinus excubitus johnstonii*, *Nemacladus gracilis*, and *Arenaria macradenia* var. *kuschei*.

4/04 to 4/05; URS Corp – San Diego. Botanical and habitat surveys for initial phase of HCP planning for MWD Colorado River Aqueduct and associated properties in Riverside and SE San Bernadino Co. Sensitive plant species surveyed for included *Ditaxis californica*, *D. clariana*, *Teucrium glandulosum*, *Cryptantha costata*, *C. holoptera*, and *Linanthus maculata*.

05/03 to 3/06; Aspen Environmental. Botanical surveys for various project sites along DWR California Aqueduct in Los Angeles, San Bernadino and Kern Co.s. Sensitive plant species surveyed for included *Erodium macrophyllum*, *Scutellaria bolanderi austromontana*, and *Calochortus clavatus*.

6/02 to present; Southern Nevada Water Authority - Las Vegas Wash Coordination Committee. Vegetation and floral assessment, quantitative sampling design, collections and voucher preparation, restoration consulting, revegetation monitoring and worker education for Las Vegas Wash riparian habitats in flood control and water quality project areas.

04/01 to present; Ongoing herbarium study (RSA, SBBG, CAS, and UC Jeps) and research of annual cryptantha taxonomy.

1996 to present; China Lake Naval Weapons Center and Edwards Air Force Base. Ongoing volunteer or funded studies on floristic diversity, plant communities, springs, western Mojave seasonal pool and playa biota. Sensitive plant species surveyed for included *Astragalus jaegerianus*, *Astragalus mojavenensis hemigyris*, *A. atratus mensanus*, *A. lentiginosus micans*, *A. oophorus*, *Calochortus panamintensis*, *C. striatus*, *Cryptantha clokeyi*, *Goodmania luteola*, *Loeflingia squarrosa artemisiarum*, *Eriastrum pluriflorum*, *Astragalus lentiginosus var. albifolius*, *A. preussii laxiflorus*, *Cymopterus deserticola*, *Psorothamnus arborescens var. arborescens*, *Chorizanthe spinosa*, *Eriophyllum mohavense*, *Mentzelia tridentata*, *Linanthus arenicola*, *Sclerocactus polyancistrus*, *Phacelia nashiana*, *P. monoensis*, *P. mustelina*, *Eriogonum mensicola*, and *Arabis dispar*.

3/05 to 11/05; URS Corp.-Las Vegas. Botanical/cactus surveys for FAA proposed Mesquite Airport on 2600 acre BLM takedown parcel in eastern Clark Co., NV. Sensitive plant species surveyed for included *Astragalus geyeri triquetrus*, *A. preussii laxiflorus*, *A. lentiginosus stramineus*, *Cirsium virginense*, *Eriogonum viscidulum* and *Pediomelum castoreum*.

5/05 to 10/05; URS Corp.- San Diego. Botanical surveys for proposed Southern California Edison Oak Valley transmission line project in Western Riverside Co (Beaumont-Banning area), California. Sensitive plant species surveyed for included *Berberis nevinnii*, *Dodecahema leptoceras*, *Eriastrum densifolium var. sanctorum*, *Centromadia pungens* and *Calochortus plummerae*.

04/03 to 7/05; Twining/ESR Corp.s Botanical/rare plant surveys for Granite/Desert Aggregate Five Bridges mining expansion project EIR, Bishop. Sensitive plant species surveyed for included *Calochortus excavatus*, *Spartina gracilis*, *Chrysothamnus albidus*, *Oryctes nevadensis* and *Mentzelia torreyi*.

5/05; SNWA-Jones and Stokes Association – Botanical survey for proposed water pipeline in Las Vegas, Hidden and Coyote Springs Valleys (I-93 corridor) survey. Sensitive plant species surveyed for included *Astragalus geyeri triquetrus*, *A. preussii laxiflorus*, *Penstemon bicolor*, *Enceliopsis argophylla*, *Arctomecon californica*, *Gilia nyensis*, *Phacelia filiae*, *Arenaria stenomeris*, *Anulocaulis leiosolenus*, and *Eriogonum corymbosum nilesii*.

05/05; Phoenix Biological Consulting. Botanical/rare plant survey for proposed Service Rock sand and gravel mine near Garlock, E. Kern Co., CA. Sensitive plant species included *Mentzelia eremophila*, *Eschsholzia twissellmannii* and *Sclerocactus polyancistrus*.

04/05; Attended Nevada Native Plant Society rare plant workshop in Las Vegas , NV.

04/05; Wildland International. Botanical/desert tortoise survey for proposed SNWA surface water pipeline, NE of Las Vegas.

6/04 to 7/04; URS Corp. Botanical surveys for Mammoth/Bishop Airport expansion, Inyo/Mono Co.s.

5/04; Assistant instructor for Kern Co. Flora workshop sponsored by The Jepson Herbarium.

02/04; Attended two Jepson Herbarium workshops at UC Cal Berkeley; on molecular phylogeny (J. McMurray), and on new species description and publication (B. Ertter).

06/03 to 11/03; Kern Co. Planning Dept. Biota survey of two parcels in Boron, Ca., and one site in Frazier Park, CA.

06/03 to 8/03; Caltrans-Robert Frank Construction, Inc.. Pre-construction survey, monitoring and report for desert tortoise and Mojave ground squirrel per biological opinion.

04/03 to 5/03; URS Corp. Botanical surveys for two sites in western Riverside Co., and one in Escondido, San Diego Co.

04/03; Attended two Jepson Herbarium workshops; on ferns (A. Smith), and on desert lichens/soil crusts (St. Clair).

01/03 to 4/03; Sanford Stone mine. Desert tortoise fence construction monitoring, clearance surveys and worker education in the BLM Rand ACEC, Red Mountain, CA. Sensitive plant species included *Mentzelia eremophila*, *Eschsholzia twissellmannii* and *Cryptantha clokeyi*.

3/02 to 9/03; URS Corp. Rare plant and blunt-nosed leopard lizard surveys for Caltrans SR119 highway widening project between Bakersfield and Taft, including Elk Hills. Sensitive plant species included *Atriplex coronata*, *A. vallicola*, *A. tularensis*, *Eriastrum hooveri*, *Caulanthus californicus*, *Delphinium gypsophilum* and *Stylocline citroleum*.

03/03 to 06/03; Jones and Stokes Associates. General vegetation sampling for species richness, cover, density and rare plant surveys for Edwards AFB.

12/02 to 02/03; Ecology & Environment, Inc. Desert tortoise pre-construction clearance surveys and construction monitoring for Kern River Gas Transmission pipeline project along Highway 58, Barstow to Mojave, CA.

10/14 to 10/03; BioResource Consultants. Desert tortoise surveys (USFWS protocol) on 29 Palms Marine Core Base, CA.

9/01 to 2003; Cal St. Dominguez Hills Foundation (Dr. David Morafka). Ongoing pitfall trapping project for Panamint Alligator Lizard (*Elgaria panamintina*) in the northern Mojave Desert. Duties include installing and monitoring traps on NAWs CL (Coso and Argus Mountains) and processing faunal collections for data. Project suspended, but trap maintenance and construction continuing for my trapping sites at NAWs.

6/02 to 9/02; Eve Laeger Consulting. assist with floristic survey of Manter Burn, sampling of various sites, in east Canell Meadow District, USFS S. Sierra NV, CA.

7/02 to 8/02; Baseline vegetation sampling of riparian monitoring transects for Garcia & Assoc./LA DWP project located in the lower Owens River region, CA..

6/02; URS corp. Desert tortoise surveys in Area 62 of Nevada Test Range, for Nellis AFB.

5/02; Impact Sciences Corp. Rare plant survey, GPS site mapping on Tejon Ranch, E. Tehachapi Mtns. Species of concern include *Erodium macrophyllum*, *Delphinium parryi* ssp. *purpureum*, *Thermopsis macrophylla*, *Navarettia setiloba* and *Eriophyllum lanatum howellii*.

3/02 to 4/02; Enviro-Plus Consulting/URS corp. Various pre-construction surveys (plants, tortoise, burrowing owl) and monitoring for Williams High Desert Power Plant Project along highway 395 and Victorville.

2/23/02; attended mosses (Norris) and lichens (Bratt) Jepson Herbarium workshop. Also attended perennial Lupine workshop (Scholars) in July of 2002.

6/01 to 11/01; U.S Navy (Naval Air Weapons Station China Lake (NAWS CL)) Environmental Project Office task to inventory, map and report on three alkaline spring areas in the Coso Mountains

4/20/01 to 11/15/01; Jones and Stokes Associates. BLM GSA contract for rare plant surveys for Clokey's cryptantha (*Cryptantha clokeyi*), and other rare plants including Lane mountain milk-vetch (*Astragalus jaegerianus*), Desert cymopterus (*Cymopterus deserticola*), and Alkali mariposa lily (*Calochortus striatus*), associated with the Ft. Irwin expansion area and BLM West Mojave Plan, BLM Contract task order under Jones and Stokes.

7/01 to 11/4/01; attended Carex (Norris) and Polygonaceae (Reveal) Jepson Herbarium workshops and SERCAL conference.

7/15/01; Rare plant surveys for proposed gold mine (American Reward Mill) in Mazourka Canyon of Inyo county. Sensitive plant species include *Astragalus inyoensis*, *Arabis dispar*, *Allium atrorubens* and potentially new taxa of *Eriogonum umbellatum*.

5/25/01; McCormick Biological Rare plant survey for National Cement plant (McCormick Biological), in S. Kern county. Species of concern include Yellow false lupine (*Thermopsis macrophylla*) and Mt. Pinos larkspur (*Delphinium parry ssp. purpureum*).

4/18/01; rare plant surveys for Three-corner milk-vetch (*Astragalus geyeri var. triquetous*), Bicolored penstemon and other potential rare plants on PG&E powerline project in Meadow Valley area, NV., for URS Corp.

3/01 to 7/6/01; rare and narrow endemic plant search, including Quino Checkerspot habitat assessment, on approx. 3,000 acres of Otay Ranch lands, San Diego Co., for URS Corp.

5/12/01; rare plant survey for proposed powerline near Victorville, San Bernadino Co., for Varanus Biological Services. Target species included Alkali mariposa lily, *Pediomelum castoreum*, *Cymopterus deserticola*, *Camissonia boothii ssp. boothii* and other TnE pls.

4/00 to present; botanical assessment of the Lost Valley area of northeast San Diego County, property of Orange Co. council of BSA, ca. 800 acres, for Varanus Biological Services, Inc. San Diego, CA. Project associated with EIR requested by San Diego County. ca. 40 hours of work. TnE spp incl *Astragalus oocarpus*, *Lessingia glandulosa var. tomentosa*, *Chaenactis parishii*, *Linanthus orcuttii*, *Gilia caruifolia*, *Rupertia rigida*, *Lilium humboldtii* and *Horkelia clevelandii*.

10/00 to 12/00; biological monitor under USFWS permit for fiber line project (Williams), from Yuma, AZ to Riverside, CA. Duties included pre-construction surveys, monitoring construction and reclamation per protocol and BO. Target species included Flat-tailed Horned Lizard (*Phrynosoma M'callii*), Coachella Valley Fringe-toed Lizard (*Uma inornata*), Desert Tortoise, Various endangered milk-vetches (*Astragalus magdalenae var. peirsonii*, *A. tricarinatus*, *A. crotalariae* and *A. lentiginosus var. coacellae*) and other sensitive plant and animal spp.

6/00 to 12/00; rare plant surveys and meetings with USFWS concerning federally endangered Otay tarplant (*Hemizonia conjugens*) for URS Corp., on the U.S. Generating Company proposed Otay Mesa generating plant project.

10/99 to 12/00; worked on botanical assessment, vegetation performance standard and revegetation plan (SMARA) for proposed aggregate mine in Frazier Park, Kern Co., for Ojai Concrete, Inc. ca. 200 hours of work. Sensitive plant species were *Castilleja plagiotoma* and *Quercus lobata*.

5/99 to 6/01; botanical assessment of parcel in Lockwood Valley, Ventura Co., for Kiva Biological Consulting/French and Associates. TnE species include Mt. Pinos onion (*Allium howellii var. clokeyi*) and *Gila leptantha ssp. pinetorum*.

7/00; habitat assessment related to FE Quino Checkerspot Butterfly, for URS Woodward-Clyde - San Diego, project related to permit for generating plant on Otay Mesa in San Diego County.

7/00; habitat assessment related to FE Willow Flycatcher, for Varanus Biological Services and USFWS contract, project related study area along San Luis Rey River in San Diego County.

7/00; plant communities assessment for FE California Gnatcatcher study on U.S. Navy Ordnance facility in Fallbrook, in San Diego County, for Varanus Biological Services (Navy contract).

4/00 to 6/00; rare and endangered plant surveys, for Impact Sciences, Inc., in Kern and L.A counties, CA., on areas proposed for development or mitigation by Tejon Ranch Company and Newhall Ranch Land Company. Project incl. searches especially for *Chorizanthe parryi ssp. fernandina* (formerly presumed extinct), *Navarettia setiloba*, *Opuntia basilaris trealeasi*, *O. b. brachyclada*, *Escholtzii lemmonii var. kernensis*, and other TnE spp., combined areas of 35,000 acres. ca. 160 hours of work.

4/00; rare and endangered plant surveys with San Diego Natural History Museum (Jon P. Rebman - curator), San Diego, CA., with U.S Marine Corps contract for rare and endangered plant surveys project on 7300 acres at Miramar MCAS. ca. 30 hours work. Target spp. incl. *Dudleya variegata*, *Arctostaphylos glandulosa ssp. crassifolia*, *Baccharis vanessae*, *Acanthomintha ilicifolia*, *Ambrosia pumila*, *Fremontodendron mexicanum*, *Chorizanthe orcuttiana*, *Monardella linoides var. viminea*, and *Ferocactus viridescens*.

2/00; rare plant habitat and soils assessment, and produced report for URS Woodward Clyde, San Diego, CA., concerning federally endangered Otay tarplant (*Hemizonia conjugens*) for U.S. Generating Company proposed Otay Mesa generating plant. ca. 100 hours work.

12/99 to 01/00; Assist Southwest Botanical Research, Chino Valley, AZ with Bureau of Reclamation contract for plant community mapping project on 1.4 million acres in central AZ. ca. 120 hrs.

11/99; botanical assessment of San Diego County Sweetwater River mitigation and revegetation area, 26 acres, for Varanus Biological Services, Inc. San Diego, CA. ca. 20 hrs.

11/99; plant cover sampling (pin frame) on Saltgrass plots at Owens Dry Lake, Inyo Co., CA. For Agrarian Research Inc. ca. 20 hours.

11/99: surveys (monitoring, video scoping of burrows, transects for USFWS protocol) for desert tortoise for Jones & Stokes Associates at various localities in the Mojave Desert. ca. 50 hours of work.

10/99: Participated in botanical collecting trip to Sierra De Guadalupe region of Baja Sur Mex., in association with Botany Dept. of San Diego Natural History Museum.

4/99 to 10/99: rare plant and general vegetation surveys, provided reports, maps, text data for URS Corp./Varanus Biological Services on Otay Mesa Generating Project and Sloane Canyon Sand and Gravel Projects. ca. 120 hours of work. Target Spp. incl *Quercus dumosa*, *Cupressus forbesii*, *Rosa*, *Ambrosia pumila*, *A. chenopodifolia*, *Hemizonia conjugens*, *Dudleya variegata*, *Acanthomintha*, *Pogogyne nudiscula*, *Eryngium aristulatum* ssp. *parishii*, *Achnatherum diegensis*, *Lepechina ganderi*, *Opuntia parryi* var. *serpentina*, *Bergerocactus emoryi*, *Brodiaea* spp., *Muilla clevelandii*, *Artemisia palmeri*, *Juglans californica*, *Astragalus deanei*, and other TnE plant spp.

7/97 to 9/99: Contributed vegetation section of NAWS China Lake Integrated Natural Resources Plan (INRMP) and most data for vegetation section of NAWS EIS. Last contributions as of September 1999, include GIS mapped data for all sensitive and potentially sensitive plants coverages of sites, populations and potential habitats based on known data, habitat types, and surficial geologic units. GIS data covers 1,000,000+ acres in the region. Combination of volunteer services (through research agreement with NAWS) Tetra Tech. and DSI contracts. ca. 200 hours of work.

5/99 to 9/99: Participated as rare plant expert in four CNPS rare plant advisory committee meetings for Eastern Sierra Rare Plant Working Group, Peninsular Range-East Mojave-Colorado Desert Group, LA Co.-San Bernadino Co.-Ventura Co. Group and San Diego Co.-Riverside Co. Group. Regular contributor to rare plant E-Mail queries from CNDDB/CNPS (D. Tibor, R. Bittman).

4/99 to 9/99: rare plant and general vegetation surveys, provided reports, for Varanus Biological Services on San Diego Co. dept. of Public Works Monte Vista Borrow Pit project, and for MCAS Miramar herpetological trapping arrays site vegetation and physiognomic descriptions. Projects total ca. 80 hours of work. Sensitive spp incl. California Gnatcatcher, Red Diamond Rattlesnake, Orange-throated Whiptail, and Quino Checkerspot host plants (*Plantago*, *Castilleja*, *Lasthenia*).

3/97 to 7/99: field surveys (ca. 100 total hours) for NAWS China Lake for federally-listed Lane Mtn Milk-vetch (*Astragalus jaegerianus*), surveys conducted over three spring seasons, incl. 1999, for contracts with Digital Systems International, Tetra Tech and Applied Technology Associates.

5/99: Assisted BLM (West Mojave plan) and USFWS (C. Rutherford-Ventura office) with data, GIS templates, field surveys concerning federally listed and rare plants (*Astragalus jaegerianus* and *Cryptantha clokeyi*) affecting the proposed Ft. Irwin expansion. Volunteer-cooperative land planning project.

2/99: Reviewed and studied specimens of all plant taxa known to occur in San Diego County from San Diego Natural History Museum's synoptic collection in preparation for consulting work in the San Diego area.

6/98 to 8/98: Mojave Ground Squirrel habitat characterization surveys for West Mojave Plan (2 days of vegetation/habitat surveys). Also performed ca. 225 hours of tortoise density transect surveys for West Mojave Plan.

6/98: vegetation surveys, provided report for sites near Needles (City of Needles proposed prison site) for Kiva Biological Consulting. ca. 20 hours work. Target spp. incl. *Echinocereus engelmanni* var. *howei*, *Coryphantha vivipara* var.s and *Machaeranthera spinulosa* ssp. *goodingii*.

5/98: vegetation and rare plant survey for Western Botanical Services, for High Desert Pipeline project, Kramer Jct to Victorville/Adelanto. TnE target spp. incl. *Chorizanthe spinosa*, *Eriophyllum mohavense*, *Cymopterus deserticola*, *Pediemelum castoreum*, *Psorothamnus arborescens* var. *arborescens*, ca. 70 hours work

#### **Other Experience:**

October, 1997 to April, 1998. Biological Technician. Tetra Tech. Inc., 348 W. Hospitality Lane, San Bernadino, CA, (Dovey Dee, 909-381-1674). Working for Naval Air Weapons Station (NAWS) Land Use Planning Office, China Lake, CA. Continuation of projects and surveys associated with previous two employers (ATA and Boeing). Work includes botanical surveys, data processing, and GIS rendering of NAWS vegetation, maintaining and updating flora database, writing vegetation descriptions for NAWS EIS, NRMP and minor EIRs, and delineating of plant communities and sensitive plant populations. Duties also include maintaining and integrating GPS equipment and survey technology and producing various natural resource layers for GIS system. During this time, completed and delivered on 1.5 year GPS measured-GIS mapping project (as primary mapper, editor and project manager) of all anthropogenic areas of disturbances, roads, test areas and facilities for 1,000,000+ acres of NAWS ranges to 1m accuracy; the only such project of this scale in the U.S. during 1997/98.

October, 1996 to October, 1997. Senior Systems Engineer. Applied Technology Associates, 6710 Bonanza rd, Las Vegas, NV., (Larry Nolen, 702-438-4427). Working for Naval Air Weapons Station (NAWS) Land Use Planning Office (John O'Gara, 760-927-1524), China Lake, CA. Employed under one year GSA contract. Project to provide development and integration of natural resource data into base-wide ARCInfo GIS database. Duties included acting as liaison to Mojave Ecosystem Project meetings, field surveys of various resource features located on NAWS lands, mapping and GPS field data collection, input, editing, attribution of 2D image data, reduction to GIS import formats, minor GIS analysis and layouts, metadata creation and resource documentation. Accomplishments include ongoing coordination of field effort to survey all major anthropogenic features of the NAWS ranges using differentially corrected GPS, for GIS land use analysis/NAWS EIS and botanical assessments to create documentation of past and present vegetation resources (plant list for the region, plant taxa database, management plan vegetation descriptions, sensitive plant maps and database data).

April to October, 1996. Botanist. Boeing Corp. (Terry Morrison), NAWS Land Use Planning Office (J. O'Gara), China Lake, CA. Providing vegetation mapping and sensitive plant surveys for integration into GIS database. Included mapping plant communities of NAWS lands to 1:100,000 scale topographic template from aerial photos and ground-truthing, floristic surveys using relevés and collections, and assistance with other projects including hyper-spectral vegetation imagery demonstration, endangered Mohave tui chub resource surveys, and review of existing related documents.

May to August, 1996. Botanist. Subcontracts to Southwestern Botanical Research, Kiva Biological Consulting, Inyokern, CA. 93527 (Pete Woodman, 619-377-3466), Perennial cover transects (100m line intercept transects and Daubenmire grids) for Arizona BLM Study Plot in

the Hualapi Mountains, Mohave Co. AZ. Vegetation surveys of parcels in Antelope Valley, Frazier Park. Also performed one week (15-23 May) of desert tortoise surveys at DTNRA, Kern Co., for Eremico consulting (D. LaBerteaux, 619-378-3021).

February to May, 1996. Botanist. California Native Plant Society, Sacramento (Dave Tibor, 916-324-3816). Volunteer work doing herbarium research at San Diego Natural History Museum for the California rare and endangered plant inventory. Also submitted CNDDDB reports (ongoing) for taxon under review or with previous listings.

September, 1995. Botanist. Mark Bagley-Consulting Biologist (619-873-5326), Bishop, CA. Assisted with alkaline riparian vegetation sampling at Owens Lake, CA. Contract to establish baseline measurements with control sites and future monitoring of sites to determine vegetation impacts from ground water pumping associated with soda ash mining.

April to June, 1995. Botanist. Kiva Biological Consulting. Worked 30 field days on California Bureau of Land Management fire and alien grass study in the western Mojave desert. Contract associated with U.C. Riverside research being conducted by Matt Brooks. Duties involved identifying and sampling annual and herbaceous perennial plant composition along transects with evenly distributed grid samples in open and shrub-shaded sites. Diversity, biomass, and frequency data were collected. Worked at 32 sites in the Ord-Rodman, Superior-Cronese, and Fremont-Kramer resource areas.

August to October, 1994. Field Researcher. Kiva Biological Consulting. Three weeks as field investigator for Arizona BLM Desert Tortoise Permanent Study Plot in the Harquahala Mountains, Maricopa Co. AZ. Performing standard AZ BLM 60-day survey method; including searches for, capture, and processing of tortoises (weights, measurements, health assessment, etc...), photographs and daily field notes. Lab duties included preparation of carcasses and photographs, data transfer to computer formats, analysis and report writing and assistance with associated botanical work. Lab duties included preparation of carcasses and photographs, data transfer to computer formats, analysis and report writing.

February to May, 1994. Field Researcher. Enviro-Plus Consulting, Ridgecrest, CA., (Gilbert Goodlett, 619-371-3592). Principal field researcher and team leader in Nevada Department of Wildlife desert tortoise studies at three sites (Piute Valley, Christmas Tree Pass and Eldorado Valley) in Clark County. Three different survey types were performed at these sites including standard 60-day methods, one square kilometer and random hectare sampling. Duties include assisting proposal writing and personnel recruitment, searches for, capture, and processing of tortoises, field notes, coordination/quality control of three four-person crews.

January to February, 1994. Biological Consultant. Kiva Biological Consulting. Performed preconstruction surveys and environmental monitoring for Southern California Gas pipeline in the Chuckawalla Bench/Chocolate Mountains region (Riverside Co.). Duties included searches for desert tortoise, vegetation sampling plots, desert tree surveys, tree trimming and construction monitoring for compliance.

August to November, 1993. Field Researcher. Kiva Biological Consulting. Principal field researcher for Arizona BLM desert tortoise 60-day population study in the Black Mtns., Mohave Co., AZ. Duties included assisting land survey of site grid, typical tortoise plot data collection and assistance with associated botanical work. Also assisted Jones and Stokes Associates (Stephanie Myers (916) 737-3000), Sacramento, CA., with tortoise surveys (including plant list) in early August at George AFB, ca.

June to July, 1993. Field Research Assistant. Donna J. Howell, Tucson, AZ. Assisted with study of long-nosed bats (*Leptonycteris curasoae*) in association with Luke Air Force Base near Organ Pipe Cactus Monument, Arizona. Duties included hiking to foraging locations and then tracking bats using radio telemetry and chemo-luminescent marking.

March, 1991 to May, 1993. Field Researcher/ Biological Consultant. Primarily for Kiva Biological Consulting and Enviro-Plus Consulting and including Great Basin Exploration and Mining Co., Inc., Reno, NV and The Planning Center, Bakersfield, CA. Desert tortoise field and lab work (similar to most recent tortoise work descriptions), mostly as a primary field investigator on 60-day study plots (Six sites in CA, NV and AZ). Also included presence or absence surveys (five sites), environmental monitoring (areas in CA and NV), assistance with plant surveys and sheep grazing study. Contributed five report sections (written presentations for individual plot sites) to NV and AZ BLM/Game and Fish. Also conducted endangered species preconstruction surveys in the San Joaquin Valley for pipeline construction (target species were San Joaquin kit fox and blunt-nosed leopard lizard), and performed environmental monitoring during exploratory drilling in East Imperial County, CA (impact analysis/written report to the BLM).

April, 1990 to November, 1990. Biological Aide/Forestry Technician. USDA Forest Service (Theresa Ritter-Cannell Meadow District), Sequoia National Forest, CA. Conducted spotted owl (*Strix occidentalis*) surveys per USFS protocol for two timber sale areas. Also worked as Forestry Technician for two months. Duties included use of chainsaw for thinning as part of post-harvest treatment. Also worked as a mapper and driver for US Department of Commerce 1990 census.

February, 1985 to May, 1989. Computer Specialist (334-GS-9). US Navy, NAWS, China Lake, CA. Systems Manager for central computer facility. Specialized in VAX/VMS system software and third-party products. Also worked with Univac, MS-Dos, Mac and Unix systems (Cray +Alliant front-end) which were integrated at main site. Duties included keeping systems operational, maintaining integrity of software and data, consulting and managing a large (500+) user group, creating data transfer routines and programs to bridge vendor/site gaps, customizing and installing new software, managing environmental requirements, site security, hardware configuration, creating hardware and software communication links, and documenting local software procedures. Completed software training to VAX/VMS system programmer level.

September, 1980 to January, 1985. Computer Operator/Data Reduction Technician. Computer Sciences Corporation, NOSC, San Diego and NAWS, China Lake, CA. Operated large-scale computer systems in support of submarine and flight simulators as a contractor to US Navy at various sites. Systems included Univac mainframes, Digital (VAX, etc.) minicomputers and UYK RISC systems.

November, 1979 to August, 1983. Curatorial Aide. San Diego Natural History Museum. Assisted herpetology department with inventory and validation of existing collection, including specimen (*Crotalus*) preservation and maintenance, analysis of specimen data to confirm validity, preparation of non-valid specimens to skin and bone samples, and assistance with field projects including trap transects and new specimen collection. Volunteer Position.

#### Education:

24 units, biology major, Mesa College, San Diego.

10 units, computer science major, City College, San Diego

References:

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Marc Baker – Southwest Botanical Research, Chino Valley, AZ (928) 636-0252