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Chris Otahal
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Barstow Field Office
2601 Barstow Road
Barstow, CA 92311

Subject: Late Season 2010 Botanical Survey of the Calico Solar Project Site
URS Project No. 27658189.70013

Dear Mr. Otahal:

INTRODUCTION

This letter report presents the results of the late season floristic surveys for the Calico Solar Project (Project), a proposed renewable solar energy facility located approximately 37 miles east of Barstow, California. The purpose of this study was to identify late season plant species that only respond to late summer/early fall monsoonal rains and to satisfy the California Energy Commission (CEC) Supplemental Staff Assessment BIO-12 Special-status Plant Impact Avoidance and Minimization, requirements B and C (CEC 2010). Botanical surveys were conducted for the Project site in 2007 and 2008. In response to above average rainfall events that have occurred during 2010, including a late season rainfall event on August 17, 2010 totaling 0.49 inch[1], additional botanical surveys were conducted by URS Corporation (URS) for the Project site. These surveys incorporated survey protocols published by the Bureau of Land Management (BLM) (BLM 1996a, BLM 1996b, BLM 2001, and BLM 2009). BLM and CEC staff were given the opportunity to comment on the survey protocol prior to the commencement of botanical surveys on the site. The 2010 late season survey was conducted from September 20 through September 24, 2010. The surveys encompassed the 1,876-acre Phase 1 portion of the Project site; select areas in the main, western area of Phase 2; a 250-foot buffer area outside the site perimeter; and a proposed transmission line, which begins at the Pisgah substation, heads northeast following the aerial transmission line, follows the Burlington Northern Santa Fe (BNSF) railroad on the north side, and ends in survey cell 24 (ID#24, Figure 1). The remaining areas of Phase 2 will be surveyed at a later date, prior to Phase 2 construction. Table 1 provides a summary of the dates on which the surveys were performed and the URS staff who participated in the surveys. This letter report documents the results of these surveys and supplements the data collected during the previous spring botanical surveys conducted in 2007, 2008, April 2010 (URS 2010a) and May 2010 (URS 2010b).

[1] Data from Weather Underground
http://www.wunderground.com/history/airport/KDAG/2010/8/1/MonthlyHistory.html?req_city=NA&req_state=NA&req_statename=NA

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PRE-SURVEY RECONNAISSANCE AND VICINITY DATA

Focal special-status plant species for the Project botanical late season survey are identified in Table 2. The list of special-status plants includes all species from the BLM and CEC Calico Solar Project Staff Assessment (Biological Resource Table 1 in the Staff Assessment/Draft Environmental Impact Statement [SA/DEIS]), recommendations made by Mr. James Andre (J. Andre, pers. comm.) of the Sweeney Desert Mountain Research Center and additional selections for late season blooming annual species. Flowering and fruiting diagnostic characters are often needed to properly identify many plant species. The late season botanical survey was appropriately timed to capture special-status focal species that may not have germinated during previous, spring season survey efforts. Survey timing was determined through reconnaissance-level site visits that were conducted prior to the survey to assess the phenology (progression of the blooming period) of the flora and to assess the phenology of special-status plant reference populations offsite.

Two offsite reference populations, Abrams' spurge (*Chamaesyce abramsiana*, CNPS 2.2) and Parry's spurge (*Chamaescyce parryi*, CNPS 2.3), both with a moderate potential to occur onsite, were visited prior to the initiation of the late season surveys. Both of these populations were observed to be in flower and fruiting at the reference sites at the time of the surveys. The fruit and seeds for these two species are diagnostic features required for identification.

Another sensitive annual plant species with a high likelihood to occur within the Project area based on known environmental requirements and onsite environmental conditions is Jack-ass clover (*Wislizenia refracta ssp. refracta*). Reference populations for this species were not visited based on the results from the previous spring surveys that did not yield an occurrence of this species in the Project area. The blooming period for Jack-ass clover is from April to November. Because this species is a showy annual, it would have been easily observed during the extensive spring surveys. Based on the survey results this species is assumed to not be present within the Project area.

In addition to floral observations, precipitation and temperature data can provide an indication of the probability that ephemeral species will complete their life cycles within that given year. For example, in an above average rainfall year, it can be assumed that appropriately timed surveys will more accurately reflect the ephemeral flora of a site than during a below average rainfall year. The population sizes of ephemeral species annually fluctuate due to climatic conditions, with higher population numbers occurring in relatively high rainfall years. The current rainfall conditions exceeded the 0.4 inch threshold CEC staff assigned to this Project area (CEC 2010).

Table 3 provides 2009-2010 precipitation and temperature data from the meteorological station at the Daggett-Barstow Airport (ASOS HFM Daggett, CA) located approximately 20 miles west of the Project. Although rainfall can be variable within the region, it is assumed the data generally are reflective of the meteorological conditions experienced onsite. Leading up to the 2009-2010 winter, the region was experiencing very low rainfall totals and lacked an autumn triggering event (i.e., precipitation 0.4 inch or greater) indicative of most substantial spring blooms. Nevertheless, the region did receive significant rainfall by early winter, and subsequent rainfall events occurred at regular intervals through early spring and again in mid-August resulting in favorable conditions for spring and late season blooms.

SURVEY METHODS

The surveys encompassed the 1,876-acre Phase 1 portion of the Project site; select areas in the main, western area of Phase 2; a 250-foot buffer area outside the site perimeter; and a proposed transmission line beginning at the Pisgah substation, heading northeast following the aerial transmission line, following the BNSF railroad on the north side, and then ending in survey cell 24 (ID#24, Figure 1). The remaining areas of Phase 2 will be surveyed at a later date, prior to Phase 2 construction. The survey area was divided into 33 cells, each of which consisted of approximately 95 acres (Figure 1). The 250-foot buffer area also included areas within the Not-a-Part (NAP) parcels where the Applicant had right-of-entry. These areas are shown on Figures 1 and 2.

The distance between transects for the first two days of surveys was 20 meters (Figure 2). These intensive surveys were intended to provide one hundred percent coverage of upland and lowland areas that may have received more precipitation as runoff from Cady Mts. and to familiarize the botany crew with the search images of senesced plant species and the phenology of plants in special habitat areas. After two days of intensive survey effort, it was evident that in the lowland areas (south of the BNSF railway) that any annual vegetation would be limited to desert wash habitat areas despite adequate summer rainfall. Per BLM (2009) guidelines, surveys on day three were changed to an intuitive-controlled study methodology that focused on habitat areas with the greatest potential to harbor sensitive plant species, namely: desert washes, dune swales, and other lowlands within the Project site that would have experienced water flows during a moderate to large storm event. These focal habitat areas were surveyed at one hundred percent coverage. Upland areas such as bajadas and desert pavement were surveyed up to 25 percent coverage. These upland areas do not have the topography required to focus precipitation into runoff that will provide the soil moisture required for germination of late season annual species.

The level of survey effort was floristic, which requires that all plant species encountered by each botanist be identified to the lowest taxonomic level possible given the state of the specimen encountered. Daily floristic lists were generated by each botanist and were recorded in their field notebooks. Field notebooks from all botanists were collected at the end of the survey and were used to create the comprehensive list of flora shown in Table 4.

Appropriate timing of the late season survey was determined by the August 17th rain event of 0.49 inch (12.45mm), Project site reconnaissance surveys on August 31st and reference population surveys on August 31 and September 1, 2010. The August 31st Project reconnaissance surveys showed that annual species such as whitemargin sandmat (*Chamaesyce albomarginata*) had germinated in larger desert wash areas and these larger desert wash areas showed signs of heavy runoff since the August 17th rain event. Whitemargin sandmat has similar germination and habitat requirements as the focal species, Abram's spurge and Parry's spurge. Perennial shrub species such as Sandpaperplant (*Petalonyx thurberi*) also exhibited a growth response to the monsoonal rains. These phenological signs were used to assess habitat areas with the greatest likelihood of containing the focal plant species.

RESULTS

Cells 3, 22 and part of 26 in Figure 2 show only partial data as one or more of the botanists had not switched their GPS units to “log tracks” mode or had run out of battery power during the survey. These areas do not represent deletions in the survey effort.

No new special-status plant species, taxa were detected during the late season 2010 surveys. No plant specimens were collected that may have been ambiguous in comparison to the focal species. Based on meteorological data, field observations of recent flows in larger desert wash areas, and evidence of late season blooming annual species (i.e., whitemargined sandmat), the region had sufficient precipitation in the form of rain and runoff from the Cady Mountains for the germination of late season annual plant species, including the special status focal species. Based on this data and the late season survey effort that yielded no special status species, the potential for the late season focal species to occur within the late season botanical survey areas (Cells 1 through 33) is low to none. A late season floristic survey is still required before construction activities may commence within the unsurveyed areas of Phase 2. Phase 2 late season floristic surveys will be conducted in 2011.

Sincerely,

URS CORPORATION

Patrick Mock, Ph.D.
Principal Scientist

PM:kl

cc: Chris Huntley, Aspen/CEC
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Attachments:

Table 1:	Calico Solar Project Late Season Survey Effort By Grid Cell
Table 2:	Calico Solar Project 2010 Potential and Occurring Sensitive Plant Species
Table 3:	Calico Solar Project, 2009-2010 Precipitation and Temperature for Project Vicinity
Table 4:	Calico Solar Project, Vascular Plant Inventory –Late Season Survey Only
Figure 1:	Botany Survey Area
Figure 2:	Botany Survey Area with GPS Track Logs
Appendix A:	Surveyor Resumes

REFERENCES:

Andre, J. 2010. Personal communication with James Andre. April 2010.

BLM 1996a. Bureau of Land Management. Special Status Plant Management. BLM Manual Handbook 6840-1.

BLM 1996b. Bureau of Land Management. Special Status Plant Management. BLM Manual Supplement 6840-06.

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California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants (online edition, v7-10c). California Native Plant Society. Sacramento, CA. Accessed on Tues, Sept. 07, 2010 from http://www.cnps.org/inventory

URS Corporation. 2010a. First Round Spring 2010 Botanical Survey of the Calico Solar Project Site Letter Report. May 17.

URS Corporation. 2010b. Late Spring 2010 Botanical Survey of the Calico Solar Project Site Letter Report June 14.

Table 1
Calico Solar Project
Late Season Survey Effort By Grid Cell

Calico (Phase I) Grid Cell #	Surveyors*	Date Surveyed
1	CS, NK	9/23
2	DR, KB	9/20
3	DR, KB	9/22
4	CS, NK	9/24
5	DR, KB	9/20
6	KB, NK	9/20
7	CS, NK	9/21
8	KS, MB	9/21
9	GR, JB	9/25
10	GR, JB	9/23
11	CS, NK	9/23
12	CS, NK	9/21
13	CS, NK	9/22
14	GR, JB	9/23
15	GR, JB	9/23
16	KS, MB	9/23
17	CS, DR, GR, JB, KB, NK, MB	9/24
18	CS, DR, GR, JB, KB, NK, MB	9/24
19	DR, KB	9/23
20	DR, KB	9/23
21	KS, MB	9/23
22	DR, KB	9/22
23	KS, MB	9/21-22
24	CS, NK	9/21
25	GR, JB	9/22
26	DR, JB	9/21
27	JB, KS, MB	9/20
28	JB, KS, MB	9/20
29	KS, MB	9/21-22
30	JB, GR	9/21
31	GR, JB, KS, MB	9/21
32	JB, KS, MB	9/20
33	DR, KB	9/22
Transmission Line	GR, JB, KS, MB	9/24
Abrams' Spurge Reference Population Checks	KS, SA, CS	8/31 - 9/1, 9/12

*Surveyor Acronyms: CS = Cecile Shohet; DR – Dina Robertson, GR - Glenn Rink, JB = Jessica Birnbaum; KB – Karen Brimacombe, KS = Kristiaan Stuart; SA = Sundeep Amin, MB – Marc Baker, NK - Neal Kramer

Table 2
Calico Solar Project
2010 Potential and Occurring Special-Status Plant Species

Species		Special Status[1]			Habitat Association	Blooming Period	Potential to Occur*
Scientific Name	Common Name	Federal	State	CNPS			
Amaranthus watsonii	Watson's amaranth	None	CNDDB G4G5/S3.3	4.3	Mojave desert scrub, and Sonoran desert scrub habitats ranging in elevation from 20 to 1700 meters.	April - September	Low Potential. Suitable habitat and known to occur within San Bernardino County. Nearest known occurrence approximately 90 miles west along Hwy 58.
Androstephium breviflorum	small-flowered androstephium	None	None G5/S1.2	2.2	Desert dunes and Mojavean desert scrub in elevations ranging from 220 -640 meters.	March - April	Present
Astragalus jaegerianus	Lane Mountain milk-vetch	FE	None G1/S1.1	1B.1	Granitic, sandy or gravelly substrates in Joshua tree "woodland" and Mojavean desert scrub habitats. Ranges in elevation from 900 – 1200 meters.	April - June	Low. Nearest known population is located 35 mile northwest of Project.
Astragalus lentiginosus var. borreganus	Borrego milk-vetch	None	None G5T4T5/S3.3	4.3	Sandy substrates in Mojavean desert scrub, Sonoran desert scrub habitats, ranging in elevation from 30 – 270 meters.	February - May	Moderate. Nearest known population is located 19 miles north of Project in creosote scrub habitat.

Table 2
Calico Solar Project
2010 Potential and Occurring Special-Status Plants
(Continued)

Species		Special Status[1]			Habitat Association	Blooming Period	Potential to Occur*
Scientific Name	Common Name	Federal	State	CNPS			
Blephariidachne kinii	King's eyelash grass	None	None G4/S1.3	2.3	Great Basin scrub habitats in elevations ranging from 1065 - 2135 meters.	May	Low. Species elevation range far exceeds Project elevation range.
Camissonia boothii ssp. boothii	Booth's evening primrose	None	CNDDB G5T4/S2	2.3	Joshua tree woodlands, pinyon and juniper woodland habitats ranging in elevation from 900 - 2400 meters.	April - September	Low potential. Marginally suitable habitat onsite. Nearest known occurrences 60 miles west along the Mojave River, and 60 miles east in Mid Hills.
Castela emoryi	crucifixion thorn	None	CNDDB G3/S2.2	2.3	Gravelly soils in Mojavean desert scrub, Playas and Sonoran desert scrub habitats. Elevation range from 90 - 670 meters.	June-July	High potential. Located within previous project boundary.
Chamaesyce abramsiana	Abrams' spurge	None	CNDDB G4/S1.2	2.2	Mojave desert scrub, and Sonoran desert scrub habitats ranging in elevation from -5 to 915 meters.	August - November	Moderate potential. Suitable habitat within the Project area. Closest known occurrence is from Bighorn Basin quadrangle, along Kelbaker Rd, 45 miles east of site.

Table 2
Calico Solar Project
2010 Potential and Occurring Special-Status Plants
(Continued)

Species		Special Status[1]			Habitat Association	Blooming Period	Potential to Occur*
Scientific Name	Common Name	Federal	State	CNPS			
Chamaesyce parryi	Parry's spurge	None	CNDDB G5/S1.3	2.3	Sandy soils in Desert dunes, and Mojave desert scrub habitat ranging in elevation from 395 to 730 meters.	May - November	Moderate potential. Suitable habitat onsite; however, only known occurrence is from Kelso Dunes.
Chamaesyce revoluta	revolute spurge	None	CNDDB G5/S3.3	4.3	Rocky substrate in Mojave desert scrub habitat. Known elevation range is 1095 to 3100 meters.	August – October (April)	Moderate potential. Suitable habitat and known to occur 40 miles to the east within San Bernardino County.
Cleomella brevipes	Short-pedicelled cleomella	None	None G3G4/S3.2	4.2	Alkaline soils in meadows, seeps, marshes, swamps and playas habitats. Elevation ranges from 395 – 2195 meters.	May - October	Low. Project area lacks habitat requirements.
Coryphantha alversonii *(Escobaria vivipara var. alversonii)*	Foxtail cactus	None	CNDDB G3/S3.2	4.3	Sandy or rocky (granitic) soils in Mojavean desert scrub and Sonoran desert scrub habitats ranging in elevation from 75 - 1525 meters.	April-June	High potential. Suitable habitat onsite. Nearest known occurrence approximately 17 miles northeast and southeast of Project area.

Table 2
Calico Solar Project
2010 Potential and Occurring Special-Status Plants
(Continued)

Species		Special Status[1]			Habitat Association	Blooming Period	Potential to Occur*
Scientific Name	Common Name	Federal	State	CNPS			
Coryphantha chlorantha [*Escobaria vivpara var deserti*]	Desert pincushion	None	None G2G3/S1	2.1	Carbonate, gravelly, rocky substrates in Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland habitats. Elevation ranges from 45 - 1525 meters.	April - September	Low. No detections during 2006, 2007 or 2010 botanical surveys.
Cryptantha holoptera	Winged cryptantha	None	None G3G4/S3?	4.3	Mojavean desert scrub and Sonoran desert scrub habitats ranging in elevation from 100 – 1690 meters.	March - April	Present (unconfirmed in 2010 spring surveys)
Cymopterus deserticola	desert cymopterus	BLM sensitive	None G3/S3	1B.2	Sandy substrates in Joshua tree "woodland" and Mojavean desert scrub habitats. Elevation ranges from 630 – 1500 meters.	March - May	Low to moderate potential. Suitable habitat on site; however, project site is 60 miles east of known range of species.
Cymopterus multinervatus	purple-nerve cymopterus	None	None G5/S2	2.2	Mojave desert scrub, and Pinyon and juniper woodlands. Elevation range from 790 to 1800 meters.	March - April	Moderate to high potential. Suitable habitat on site, and recorded occurrence within 15 miles of the project site.

Table 2
Calico Solar Project
2010 Potential and Occurring Special-Status Plants
(Continued)

Species		Special Status[1]			Habitat Association	Blooming Period	Potential to Occur*
Scientific Name	Common Name	Federal	State	CNPS			
Cynanchum utahense	Utah vine milkweed	None	None G4/S3.2	4.2	Mojave desert scrub, Sonoran desert scrub habitats ranging in elevation from 150m to 1435 meters.	April - June	Present.
Deinandra mojavensis	Mojave tarplant	None	SE / G3/S3	1B.3 CA Endemic	Chaparral, coastal scrub, Riparian scrub (volcanic tuff/mesic) habitats, ranging in elevation from 640 to 1600 meters.	June – October; uncommon in January	Low potential. Marginally suitable habitat onsite.
Eriophyllum mohavense	Barstow wooly-sunflower	BLM sensitive	None G2/S2	1B.2	Chenopod scrub, Mojavean desert scrub and playa habitats ranging in elevation from 500 – 960 meters.	April - March (May)	Moderate. Closest known population is 37 miles west of Project.
Galium proliferum	desert bedstraw	None	CNDDB G5/S2	2.2	Joshua tree woodland, pinyon and juniper woodland (carbonate/limestone), and Mojave desert scrub habitats. Elevation ranges from 1190 to 1570 meters.	March – June, September-November	Moderate potential. Suitable habitat onsite; however, nearest known occurrence is from Ivanpah Mountains, 50 miles northeast of Project area.

Table 2
Calico Solar Project
2010 Potential and Occurring Special-Status Plants
(Continued)

Species		Special Status[1]			Habitat Association	Blooming Period	Potential to Occur*
Scientific Name	Common Name	Federal	State	CNPS			
Linanthus maculatus	Little San Bernardino Mountains linanthus	BLM sensitive	None G2/S2	1B.2	Sandy substrates in desert dune, Joshua tree "woodland", Mojavean desert scrub, and Sonoran desert scrub habitats. Elevation range 195 – 2075 meters.	March - May	Low. Nearest known population is 43 miles south of Project.
Loeflingia squarrosa var. artemisiarum	Sagebrush loeflingia	None	None G5T2T3/S2.2	2.2	Sandy substrates in desert dunes, Great Basin scrub and Sonoran desert scrub habitats. Elevation ranges from 700 – 1615 meters.	April - May	Low. Closest recorded population is 250 miles southwest of Project.
Maurandya antirrhiniflora ssp. antirrhiniflora	violet twining snapdragon	None	CNDDB G4G5T3?/S1.3	2.3	Joshua tree woodland and Mojave desert scrub (carbonate) habitats ranging in elevation from 760 to 1525 meters.	April – June, September - November	Low potential. Nearest known location is from Providence Mountains 50 miles east of Project area.
Mentzelia eremophila	Solitary blazing star	None	None G3/S3.2	4.2	Mojavean desert scrub habitat in elevations ranging from 700 – 1220 meters.	March - May	Moderate. Closest known population is 37 miles northwest of Project.

Table 2
Calico Solar Project
2010 Potential and Occurring Special-Status Plants
(Continued)

Species		Special Status[1]			Habitat Association	Blooming Period	Potential to Occur*
Scientific Name	Common Name	Federal	State	CNPS			
Mentzelia puberula	argus blazing star	None	None G4/S2	2.2	Mojave desert scrub and Sonoran desert scrub habitats. Elevation ranges from 200 to 1200 meters.	March – May	Low potential. Nearest known occurrence approximately 30 miles to north in Avawatz Mountains and at Fort Irwin, and southeast in Sheephole Mountains.
Mentzelia tridentata	creamy blazing star	None	None G2/S2.3	1B.3 CA Endemic	Mojave desert scrub and Sonoran desert scrub habitats, elevation ranging from 700 to 1160 meters.	March - May	Moderate potential. Suitable habitat within project area; however, highly restricted to Yermo and Newberry Mountains, approximately 30 miles west.
Mimulus mohavensis	Mojave monkeyflower	BLM Sensitive	None G2/S2	1B.2 CA Endemic	Mojave desert scrub habitat in elevations ranging from 700 to 1000 meters.	April - June	Moderate potential. Suitable habitat and nearest known occurrences within 25 miles of site along Camp Rock Road southeast of Barstow.

Table 2
Calico Solar Project
2010 Potential and Occurring Special-Status Plants
(Continued)

Species		Special Status[1]			Habitat Association	Blooming Period	Potential to Occur*
Scientific Name	Common Name	Federal	State	CNPS			
Monardella boydii	Boyd's pennyroyal	None	CNDDB None	Proposed List 1B.2	Rocky slopes in Mojave desert scrub habitat, ranging in elevation from 1100 to 1400 meters.	May-June (October)	Low potential, but nearest occurrence near Rodman Mountain, approximately 20 miles west southwest.
Muilla coronata	Crowned muilla	None	None G3/S3.2?	4.2	Chenopod scrub, Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland habitats. Ranges in elevation from 765 to 1960 meters.	March - April	Present (unconfirmed)
Munroa squarrosa	False-buffalo grass	None	CNDDB G5/S1S2	2.2	Gravelly or rocky substrates in Pinyon and juniper woodland habitats, ranging in elevation from 1500 to 1800 meters.	October	Low to no potential. Nearest known occurrence is 70 miles northeast.
Nemacaulis denudata var. gracilis	Slender woolly-threads	None	None	2.2	Coastal dunes, desert dunes, and Sonoran desert scrub. 0 to 700 meters.	April - May	Moderate potential. Suitable sandy habitat within the study area. Nearest known occurrences in Kelso Dunes.
Opuntia wigginsii (Opuntia ramosissima)	Wiggins' cholla	None	CNDDB G3/S1.?	3.3	Sandy soils in Sonoran desert scrub habitat, ranging in elevation from 30 - 885 meters.	March	High potential.

Table 2
Calico Solar Project
2010 Potential and Occurring Special-Status Plants
(Continued)

Species		Special Status[1]			Habitat Association	Blooming Period	Potential to Occur*
Scientific Name	Common Name	Federal	State	CNPS			
Pediomelum castoreum	beaver dam breadroot	None	None G3/S3.3	4.3	Sandy washes and roadcuts in Joshua tree "woodland" and Mojavean desert scrub habitats. Elevation ranges from 610 – 1524 meters.	April - May	Moderate. Habitat present in Project area.
Penstemon albomarginatus	white-margined beardtongue	BLM Sensitive	None	1B.1	Desert Dunes (stabilized) and Mojave desert scrub habitats ranging in elevation from 640 to 1065 meters.	March - May	Present.
Phacelia coerulea	Sky-blue phacelia	None	None G5/S1.3	1B.1	Mojavean desert scrub, Pinyon and juniper woodland habitats. Elevation ranges from 1400 – 2000 meters.	April - May	Low. Elevation in excess of Project range.
Physalis lobata	lobed ground cherry	None	CNDDB G5/S1.3?	2.3	Mojave desert scrub and playa habitats, ranging in elevation from 500 to 800 meters.	April-May, August-October	Low potential. Suitable habitat onsite; however, nearest occurrence is East of Dale Lake quadrangle, approximately 90 miles southeast of the proposed Project area.

Table 2
Calico Solar Project
2010 Potential and Occurring Special-Status Plants
(Continued)

Species		Special Status[1]			Habitat Association	Blooming Period	Potential to Occur*
Scientific Name	Common Name	Federal	State	CNPS			
Polygala acanthoclada	desert polygala	None	CNDDB G4/21	2.3	Chenopod scrub, pinyon and juniper woodlands; and Joshua tree woodland habitat areas. Elevation ranges from 760 to 2285 meters.	May – October	Low potential. Suitable habitat onsite; however, nearest known occurrence from New York Mountains, approximately 70 miles east of Project area.
Portulaca halimoides	desert portulaca	None	CNDDB G5/S3	4.2	Joshua tree woodland habitat, ranging in elevation from 1000 to 1800 meters.	July - November	Low to moderate potential. Nearest known occurrences 30 miles east above 1200m in elevation.
Salvia funerea	Death Valley Sage	None	CNDDB G3/S3.3	4.3	Found in washes and along limestone canyon walls in Mojavean desert scrub (carbonate) habitat, elevation ranges from 0 - 1865 meters.	Mar-May	Low to moderate. Nearest known occurrences 50 miles east.
Senna covesii	Coves' cassia	None	None	2.2	Sonoran desert scrub habitat in elevations ranging from 305 to 1070 meters.	March - June	Present (unconfirmed)

Table 2
Calico Solar Project
2010 Potential and Occurring Special-Status Plants
(Continued)

Species		Special Status[1]			Habitat Association	Blooming Period	Potential to Occur*
Scientific Name	Common Name	Federal	State	CNPS			
Sphaeralcea rusbyi var. eremicola	Rusby's desert mallow	BLM sensitive	None G4T2/S2	1B.2	Joshua tree "woodland" and Mojavean desert scrub habitats ranging in elevation from 975 – 1500 meters.	March - June	Low. Elevation range is outside Project range.
Tripterocalyx micranthus	Small-flowered sand-verbena	None	None G5/S1.3	2.3	Desert dunes and Mojavean desert scrub habitats ranging in elevation from 550 – 885 meters.	April - May	Present (unconfirmed)
Wislizenia refracta ssp. refracta	Jackass-clover	None	CNDDB G5T5/S1.2	2.2	Desert dunes, Mojavean desert scrub, Playas, and Sonoran desert scrub habitats, ranging in elevations from 600 - 800 meters.	April-November	High potential.

* Qualitative potential to occur based on species known distributions, elevation range, and habitat preference compared to onsite conditions.

[1]/Special Status:

Federal Status
FD: Delisted. Status to be monitored for 5 years
FE: Listed as endangered under the federal Endangered Species Act
FT: Listed as threatened under the federal Endangered Species Act

State Status
SE: Listed as endangered under the California Endangered Species Act
ST: Listed as threatened under the California Endangered Species Act

CNPS
1B: Rare, threatened, or endangered in California and elsewhere
2: Rare, threatened, or endangered in California, but more common elsewhere
3: More information is needed
4: Limited distribution or infrequent throughout California
0.1: Seriously endangered in California
0.2: Fairly endangered in California
0.3: Not very endangered in California

Table 3
Calico Solar Project
2009-2010 Precipitation and Temperatures for Project Vicinity[1]

Month	May 2009	June 2009	July 2009	August 2009	September 2009	October 2009	November 2009	December 2009	January 2010	February 2010	March 2010	April 2010	May 2010	June 2010	July 2010	August 2010	September 2010
Precipitation (inches)	0.01	0	0.05	0	0	0 (0.13)*	0.26 (0.26)	0.45 (0.53)	1.61 (0.81)	1.58 (0.87)	0.23 (0.62)	0.10 (0.2)	0 (0.18)	0 (0.13)	0.02 (0.12)	0.49 (0.58)	0 (0.23)
Average Temperature (°F)																	
Maximum	96	92	109	103	99	80	70	56	59	62	70	90	97	109	111	109	107
Mean	81	78	94	87	83	65	56	45	48	52	56	61	68	83	90	86	81
Minimum	66	64	81	72	68	52	42	34	36	42	44	36	32	47	39	40	43

[1]Data courtesy of www.wunderground.com. Closest weather gage used: Daggett-Barstow, * Parenthetical data represents monthly averages from 1971 to 2000 at Barstow station 040519, data courtesy Western Regional Climate Center, http://www.wrcc.dri.edu/

Table 4
Calico Solar Project, Vascular Plant Inventory – Late Season Survey Only

Scientific Name	Common Name
MONOCOTS	
Poaceae	Grass Family
Achnatherum hymenoides	Indian rice grass
*Bromus madritensis ssp. rubens**	red fox-tail brome
*Bromus tectorum**	Cheat grass
Erioneuron pulchellum	fluffgrass
*Hordeum leporinum**	barley
*Phalaris canariensis**	canary grass
Pleuraphis rigida	galletta grass
*Schismus barbatus**	Mediterranean grass
Liliaceae	Lily Family
Androstephium breviflorum	small-flowered androstephium
Hesperocallis undulata	desert lily
EUDICOTS	
Aizoaceae	Carpet-weed Family
Mesembryanthemum nodiflorum	slenderleaf iceplant
Trianthema portulacastrum	desert horsepurslane
Amaranthaceae	Amaranth Family
Tidestromia oblongifolia	Arizona honeysweet
Asteraceae	Sunflower Family
Ambrosia dumosa	white bur-sage
Bebbia juncea	sweetbush
Calycoseris parryi	yellow tackstem
Chaenactis carphoclinia	pebble pincushion
Chaenactis fremontii	desert pincushion
Chaenactis stevioides	desert pincushion
Dicoria canescens	desert twinbugs
Encelia frutescens	button brittlebush

Table 4
Calico Solar Project, Vascular Plant Inventory – Late Season Survey Only
(Continued)

Scientific Name	Common Name
Geraea canescens	desert sunflower
Hymenoclea salsola	white burrobush
Malacothrix glabrata	desert dandelion
Palafoxia arida	Spanish needle
Pectis papposa	manybristle cinchweed
Rafinesquia neomexicana	desert chicory
Stephanomeria pauciflora var. pauciflora	wire lettuce
Boraginaceae	Borage Family
Amsinckia tesselata	devil's lettuce
Cryptantha angustifolia	Panamint cryptantha
Cryptantha circumscissa	cushion cryptantha
Cryptantha micrantha	red root cryptantha
Cryptantha nevadensis	Nevada cryptantha
Tiquilia plicata	plicate colenia
Brassicaceae	Mustard Family
*Brassica tournefortii**	African mustard
Descurainia pinnata	western tansy mustard
Dithyrea californica	California shieldpod
Guillinia lasiophylla	California mustard
Lepidium lasiocarpum var. lasiocarpum	sand peppergrass
Streptanthella longirostris	long beaked twist flower
Cactaceae	Cactus Family
Cylindropuntia echinocarpa	silver cholla
Cylindropuntia ramosissima	diamond cholla
Opuntia basilaris var. basilaris	beavertail cactus
Capparaceae	Caper Family
Cleomella obtusifolia	mojave stinkweed
Chenopodiaceae	Chenopod Family
Atriplex canescens	four-wing saltbush

Table 4
Calico Solar Project, Vascular Plant Inventory – Late Season Survey Only
(Continued)

Scientific Name	Common Name
Atriplex elegans var. fasciculata	wheelscale
Atriplex hymenelytra	desert holly
Atriplex polycarpa	desert saltbush
*Kochia scoparia**	Mexican fireweed
*Salsola tragus**	Russian thistle
Cucurbitaceae	Gourd Family
Cucurbita palmata	coyote melon
Euphorbiaceae	Spurge Family
Chamaesyce polycarpa	small seeded spurge
Croton californicus	California croton
Stillingia spinulosa	annual toothleaf
Fabaceae	Legume Family
Astragalus layneae	Layne's milkvetch
Astragalus lentiginosus	lens-pod milkvetch
Dalea mollis	hairy prairie clover
Lupinus shockleyi	desert lupine
Psorothamnus spinosus	smoke tree
Senna armata	desert senna
Geraniaceae	Geranium Family
*Erodium cicutarium**	red stem filaree
Erodium texanum	Texas filaree
Hydrophyllaceae	Waterleaf Family
Phacelia pachyphylla	black tack phacelia
Krameriaceae	Krameria Family
Krameria erecta	little leaved ratany
Krameria grayi	white ratany
Lamiaceae	Mint Family
Salvia columbariae	chia
Loasaceae	Loasa Family

Table 4
Calico Solar Project, Vascular Plant Inventory – Late Season Survey Only
(Continued)

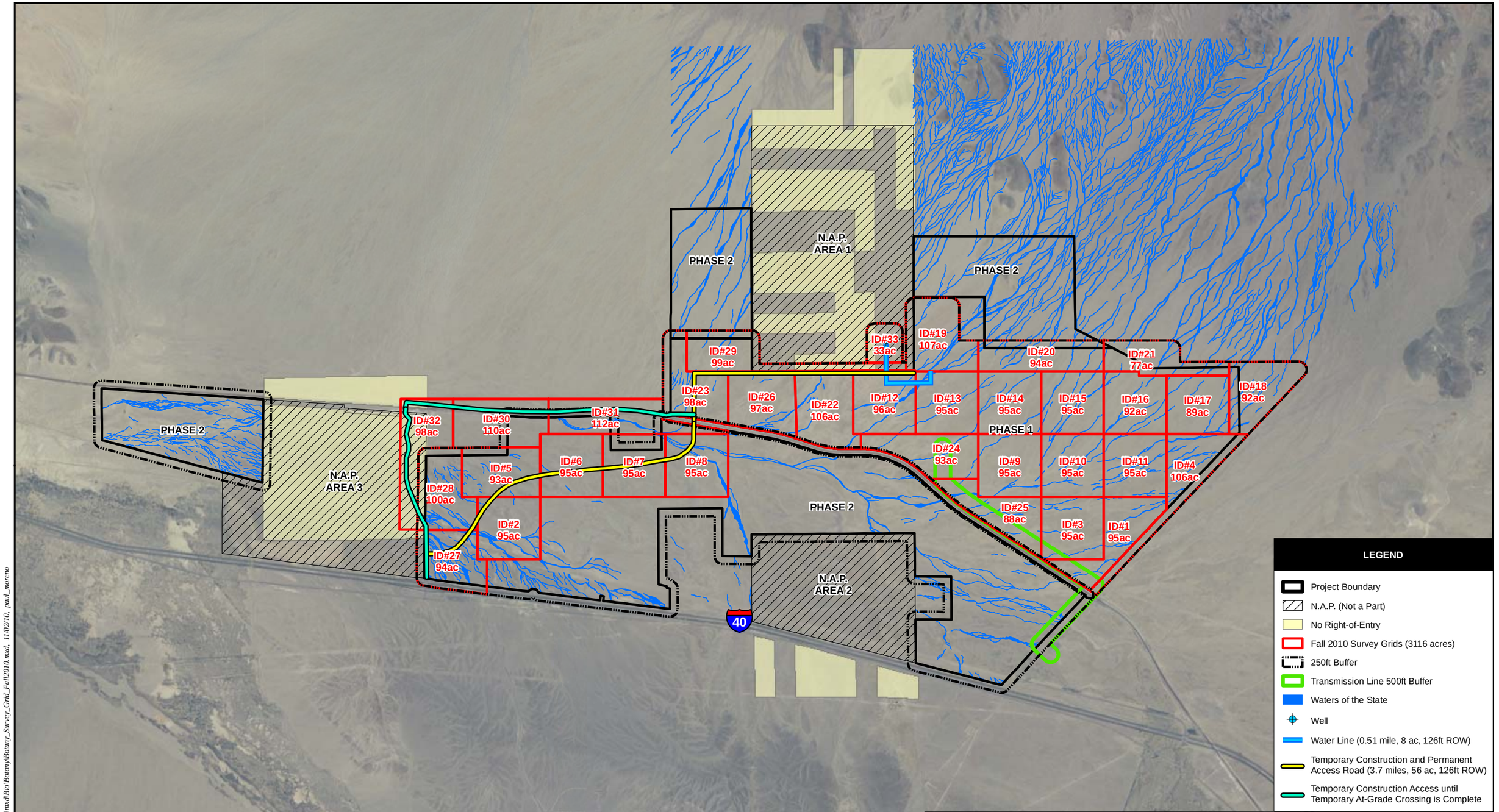
Scientific Name	Common Name
Mentzelia albicaulis	blazing star
Mentzelia obscura	pacific blazing star
Petalonyx thurberi	sandpaper plant
Malvaceae	Mallow Family
Eremalche rotundiflora	desert five spot
Onagraceae	Evening Primrose Family
Camissonia brevipes	yellow cups
Camissonia boothii ssp. condenseta	Booth's evening primrose
Camissonia claviformis	brown-eyed primrose
Camissonia refracta	narrow leaf suncup
Oenothera deltoides	dune primrose
Papaveraceae	Poppy Family
Argemone corymbosa	Mojave prickly poppy
Argemone munita	chicalote
Plantaginaceae	Plantain Family
Plantago ovata	wooly plantain
Polemoniaceae	Phlox Family
Langlosia setosissima ssp. punctata	Great Basin langlosia
Loeseliastrum schottii	Schott's calico
Polygonaceae	Buckwheat Family
Chorizanthe brevicornu	brittle spineflower
Chorizanthe rigida	spiny-herb
Eriogonum deflexum	skeleton weed
Eriogonum nidularium	whisk broom
Eriogonum thomasii	Thomas' buckwheat
Eriogonum trichopes	little trumpet
Resedaceae	Mignonette Family
Oligomeris linifolia	leaved cambess

Table 4
Calico Solar Project, Vascular Plant Inventory – Late Season Survey Only
(Continued)

Scientific Name	Common Name
Tamaricaceae	Tamarix Family
*Tamarix aphylla**	athel tamarisk
*Tamarix ramosissima**	salt-cedar
Zygophyllaceae	Caltrop Family
Larrea tridentata	creosote bush
*Tribulus terrestris**	puncture vine

* Denotes non-native species.

FIGURES



LEGEND

- Project Boundary
- N.A.P. (Not a Part)
- No Right-of-Entry
- Fall 2010 Survey Grids (3116 acres)
- 250ft Buffer
- Transmission Line 500ft Buffer
- Waters of the State
- Well
- Water Line (0.51 mile, 8 ac, 126ft ROW)
- Temporary Construction and Permanent Access Road (3.7 miles, 56 ac, 126ft ROW)
- Temporary Construction Access until Temporary At-Grade Crossing is Complete

SOURCES: ESRI (roads);
Mortenson (project boundary June 2010);
NAIP (USDA aerial 2005).

BOTANY SURVEY GRIDS
FALL 2010
CALICO SOLAR

URS

1500 0 1500 3000 Feet

SCALE: 1" = 3000' (1:36,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CL	DATE: 11-2-10	FIG. NO: 1
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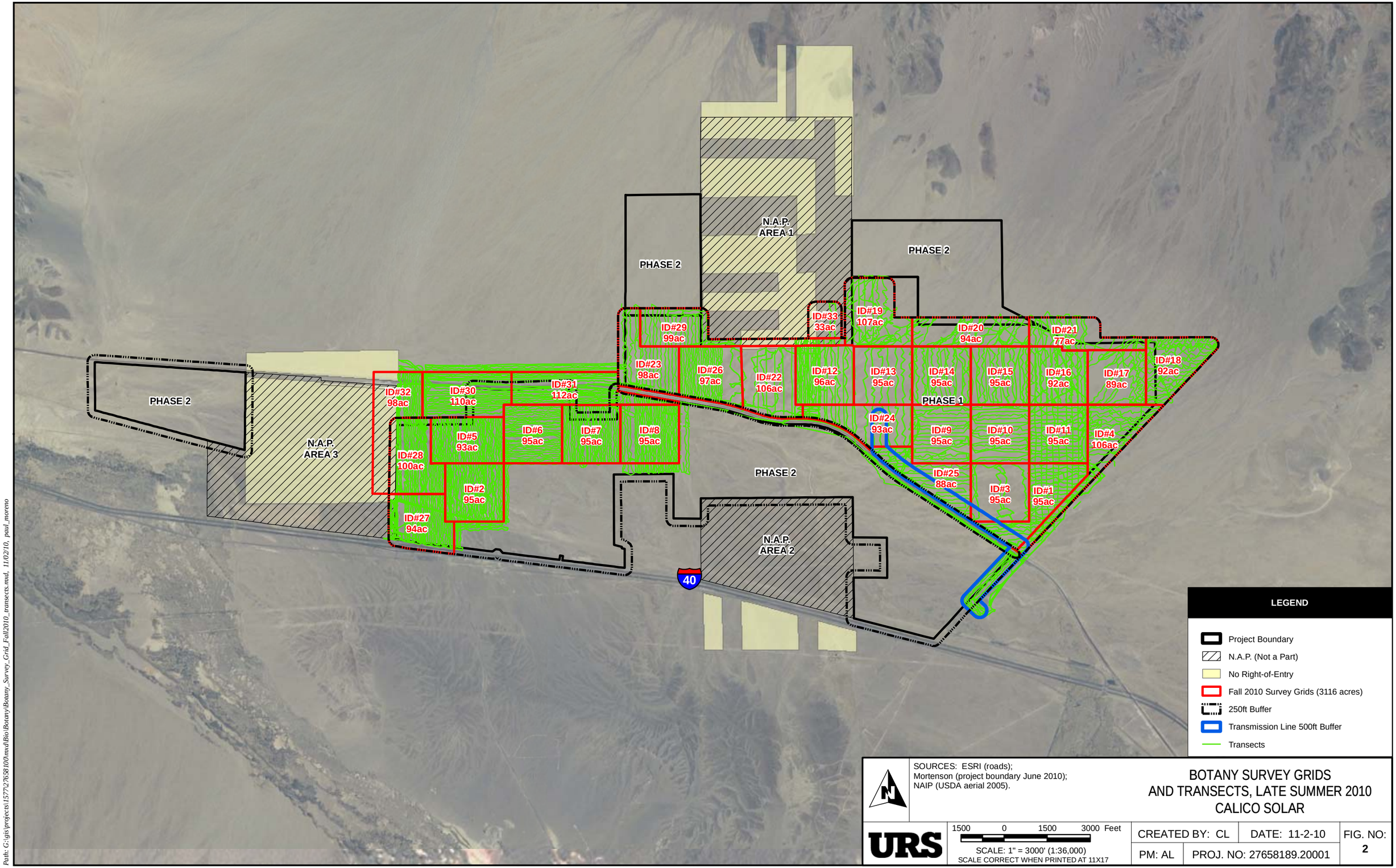

SOURCES: ESRI (roads);
Mortenson (project boundary June 2010);
NAIP (USDA aerial 2005).

BOTANY SURVEY GRIDS AND TRANSECTS, LATE SUMMER 2010 CALICO SOLAR

URS

1500 0 1500 3000 Feet

SCALE: 1" = 3000' (1:36,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CL	DATE: 11-2-10	FIG. NO: 2
PM: AL	PROJ. NO: 27658189.20001	

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APPENDIX A

Resumes of Botanists Participating in the 2010 Late Season Floristic Survey

Jessica Birnbaum

Biologist/Environmental Planner

Areas of Expertise

Biological Assessments
Protocol Surveys for Special-Status Plant and Wildlife Species
Habitat Restoration
Environmental Planning/Permitting
Vegetation/Rare Plant Surveys
Environmental Compliance
Water Quality Sampling
Endangered Species Surveys and Habitat Assessment
Environmental Impact/Technical Reports
Level II Blunt-Nosed Leopard Lizard Surveyor
Wetland Delineation
Construction Compliance and Monitoring
GPS and GIS mapping

Years of Experience

With URS: 2.5 Years
With Other Firms: 3 Years

Education

MS/Natural Resources: Planning and Interpretation/2007/ Humboldt State University
BS/Biology/2002/Trinity College
California Department of Fish and Game Scientific Collecting Permit SC-801043-02
Level II Surveyor: Blunt-nosed leopard lizard survey protocol.

Overview

Mrs. Birnbaum is a Biologist and Environmental Planner at URS' Santa Barbara Office. She provides environmental assessment of planning projects (CEQA, NEPA and environmental regulations, permitting, and compliance) and fieldwork. She has supported document preparation, including editing for clarity and accuracy and writing portions of documents. Mrs. Birnbaum's position at URS also involves botanical and wildlife surveys, endangered species habitat assessment, wetland delineations, vegetation and stream monitoring, and habitat restoration.

Project Specific Experience

Biological Resource Reports/Environmental Planning

Marine Life Protection Act (MLPA) South Coast Study Region (SCSR) EIR, Point Conception to Mexico Boarder, CA, California Department of Fish and Game, 1 year, $1 Million: Wrote sections of an EIR analyzing impacts of the Fish and Game Commission's Marine Protection Areas (MPAs) located in 2,351 square miles of coastal waters and includes waters and seafloor from the shoreline (mean high tide) to three miles offshore. The project includes analysis of the following effected issues areas; air quality, consumptive uses (commercial and recreational fisheries), cultural resources, ecosystems, habitats and species of concern, population and housing, Public services and utilities, recreation and research, vessel traffic, and water quality.

Western Goleta Slough Wetland Restoration Project, Santa Barbara County, CA, The Land Trust for Santa Barbara County, November 2008 – Present: Supported preparation of environmental documents, including the Project Description and Restoration Plan. Mrs. Birnbaum also assisted in obtaining environmental permits, including Streambed Alteration Agreement (SAA) with CCC, ACOE Section 404 Permit, and Santa Barbara County Coastal Development Permit.

Nextlight's Antelope Valley Solar Ranch One Project EIR, Los Angeles County, CA, November 2008-Present: Drafted Biological Resources section of an EIR for a proposed PV solar generating facility in Antelope Valley, California. Key issues of concern included loss of wildflower field habitat, loss of foraging habitat for sensitive grassland birds, and the potential impact upon horned lizards, an endangered species. URS submitted the biota report, which contained botanical survey results, to County SEATAC. Assisted with responding to comments (RTC) from SEATAC and LA County on Biota Report and EIR.

Newhall Ranch EIS/EIR, June 2008-March 2010: URS was retained by a land development firm to prepare a joint EIS/EIR and supporting documentation evaluating the issuance of a long-term 404 permit and master 1600 agreement. Mrs. Birnbaum is a supporting biologist and planner on the project, aiding in the drafting of environmental review documents.

Ekwill Street and Fowler Road Extensions Project, California Department of Transportation and the City of Goleta, October 2008-September 2009: The City of Goleta's (City's) Community Services Department is proposing infrastructure improvements in a portion of the City called "Old Town." Wrote Biological Environment section of EIR/EA.

Assistant Planner, Lassen Wind Project, Lassen County, CA, Sacramento Municipal Utility District, Time and Materials, March – May 2008: URS prepared the Bureau of Land Management (BLM) Right-of-Way Application and Plan of Development (POD) for a 150- to 300-MW wind power project on BLM land. The POD included the optimal initial project layout for wind turbine generators WTGs, temporary land uses for the construction phase, permanent land uses for operations and maintenance (O&M), the power collection system, substations, transmission lines, and an O&M facility. The POD also included federal agency cost recovery, potential issues and conflict areas, environmental and cultural resource studies, public interests and concerns, potential alternative site locations, and financial obligations to be assumed. The project is sited in a newly recognized wind resource area and is the focus of a new 50-kV electric power transmission line in northern California.

Solar PV Site Feasibility Analysis, California, NextLight Renewable Power, LLC, February –April 2008: URS prepared a report summarizing the results of identifying and prioritizing potential development sites, identifying county contacts, and preliminary consultations with agency representatives. Mrs. Birnbaum consulted with county planners to identify local opportunities or constraints for solar photovoltaic development and conducted field investigations of potential sites. The site facility would generate 50 to 100 MW and cover 80 to 240 acres.

Phase 3 EIR, Solano Wind Project, Collinsville-Montezuma Hills Wind Resource Area, Near Rio Vista, CA, for SMUD, 2007 – June 2008: The district proposes to permit and construct up to 84 wind turbine generators (WTGs) on 4,655 acres. Mrs. Birnbaum assisted URS planners in regard to CEQA requirements, preparing and distributing the Final EIR, and developing siting plans for the WTGs. She also monitored on-site construction activities to ensure compliance with environmental standards and surveyed the area for burrowing owls.

John Garcia Environmental Studies Center Project, Environmental Checklist, Rio Linda, CA, for Grant Joint Union High School District, January – February 2008: This regional environmental study center on 70 acres provides for the study of indigenous plants, animals, reptiles, fishes, and migratory birds. Mrs. Birnbaum drafted CEQA/NEPA Environmental Checklist for the project, detailing all issues (biological resources, noise, traffic, etc.) that must be addressed before construction may take place.

Botanist

Botanical Survey, Mojave Desert, CA. Calico Solar Project, Tessera Solar North America. March and September 2010. Performed focused botanical surveys for a 8,230 acre site in the Mojave Desert near Newberry Springs, CA. Documented existing vegetation and rare plant occurrences in compliance with USFWS and CDFG botanical survey protocol. Also documented occurrence of weed populations.

Botanical Survey, Sonoran/Colorado Desert, CA. Imperial Valley Solar Project, Tessera Solar North America. February, March and September 2010. Performed focused botanical surveys for a 6,500 acre site in the Sonoran/Colorado Desert near Plaster City, CA. Documented existing vegetation and rare plant occurrences in compliance with USFWS and CDFG botanical survey protocol. Also documented weed populations.

California Valley Solar Ranch Project, Carrizo Plain, San Luis Obispo County, March – September 2009: Led crew of 3-6 biologists surveying for special-status plant species on approximately 3,000 acre site and mapped vegetation communities. Personally authored the botanical survey report for submittal to SunPower and the County.

Vegetation Restoration Monitoring, Santa Barbara, CA. Santa Barbara Airport Wetland Restoration Project, City of Santa Barbara, June 2008-Present: Assisted in restoration for 65 acres of wetland, coastal sage scrub, and riparian habitats. Monitoring program consisting of point-intercept transect and quadrat data collection and maintenance monitoring. Participated in native seed collection. Supported the production of annual reports detailing restoration success.

Wetland Biologist

Wetland Delineation, Santa Barbara, CA. San Jose Creek Bikeway, City of Goleta. November 2009. Managed and performed a wetland delineation for a 0.5 acre site in Goleta Slough. Lead author for wetland delineation report.

Tidewater Goby Presence/Absence Survey, Santa Barbara, CA, Creek Desedimentation Project, Santa Barbara County Flood Control, August -October 2009: Performed presence/absence U.S. Fish

and Wildlife Service protocol surveys for tidewater goby in all locations prior to construction in San Pedro, San Jose, and Atascadero creeks.

Nextlight's Antelope Valley Solar Ranch One Project, Los Angeles County, CA, January 2009: Performed jurisdictional determination mapping for a 2,000 acre site in the Mojave Desert.

Wetland Delineation Mapping, Santa Barbara, CA. Santa Barbara Airport Wetland Restoration Project, City of Santa Barbara, Novemeber 2008-February 2009: Performed wetland delineation mapping for 40 acres in Goleta Slough. Aided in authoring the summarization report.

Tidewater Goby Presence/Absence Survey, Santa Barbara, CA, Creek Desedimentation Project, Santa Barbara County Flood Control, July 2008 - October 2009: Performed presence/absence U.S. Fish and Wildlife Service protocol surveys for tidewater goby in all locations prior to construction in San Pedro, San Jose, and Atascadero creeks. Medium and large water body protocol.

Stormwater Monitoring, Santa Barbara, CA. Santa Barbara Airport Wetland Restoration Project, City of Santa Barbara, June 2008-Present: Assisted in restoration for 65 acres of wetland, coastal sage scrub, and riparian habitats. Conducted stormwater sampling throughout airport impact areas and drafted report.

Lower Ventura River Algae Inventory, October 2008-February 2010: Surveys of freshwater algae in the lower Ventura River in an effort to determine the effects of tertiary-treated effluent on algal distribution and abundance.

Jurisdictional Determination, California Valley, CA. California Valley Solar Ranch, SunPower Corporation Systems, July 2009. Performed jurisdictional determination and mapping for a 4,575 acre site in the Carrizo Plain. Assisted with jurisdictional determination report.

Tidewater Goby Presence/Absence Survey, Santa Barbara, CA, Tecolotito Bridge Retrofitting Project, City Santa Barbara Public Works Department, October - November 2008: Performed presence/absence U.S. Fish and Wildlife Service protocol surveys for tidewater goby prior to construction. Medium water body protocol.

Wildlife Biologist

Flat-Tailed Horned Lizard Survey, Sonoran/Colorado Desert, CA. Imperial Valley Solar Project, Tessera Solar North America. September 2010. Performed focused flat-tailed horned lizard surveys for a 6,500 acre site in the Sonoran/Colorado Desert near Plaster City, CA. Documented horned lizard sign according to established survey protocol.

Desert Tortoise Survey, Mojave Desert, CA. Calico Solar Project, Tessera Solar North America. April - May 2010. Performed USFWS protocol 100% coverage desert tortoise surveys on a 8,230 acre site and 23,000 acre relocation area in the Mojave Desert near Yucca, CA. Responsible for data collection and analysis as team leader.

Blunt-Nosed Leopard Lizard Surveys, Bakersfield, CA, Hydrogen Energy California (HECA), May – September 2009: The HECA project is an Integrated Gasification Combined Cycle power plant that will take petroleum coke, biomass, coal or blends of each, combined with non-potable water to convert them into hydrogen and carbon dioxide (CO2). The hydrogen gas will be used to fuel a net 250-megawatt power station that will provide new, clean electric power to 150,000 homes in the local community. Conducting protocol level surveys for blunt-nosed leopard lizard.

Blunt-Nosed Leopard Lizard Surveys, California Valley, CA, Renewable Energy, March – September 2009: Surveyed for blunt-nosed leopard lizards using the CA Department of Fish and Game Protocol.

Desert Tortoise Surveys, 550 mw Solar Thermal Site in Johnson Valley, CA, Renewable Energy, June-July 2008: Performed USFWS protocol desert tortoise surveys on a 9,315 acre site and 10 mile long transmission and gas routes.

Small Mammal Surveys, California Valley, CA, Renewable Energy, July 2008: URS is aiding with their planned 250 MW solar ranch, which would be located in San Luis Obispo County's California Valley. Mrs. Birnbaum conducted small mammal surveys for the proposed project site.

Desert Tortoise Surveys, San Bernardino Mojave Desert CA, Renewable Energy, May 2008: Protocol biological surveys for a large-scale solar project site being considered in the San Bernardino County, California, including Desert Tortoise surveys. Mrs. Birnbaum conducted presence/absence surveys for the Desert Tortoise.

Urban Levee Geotechnical Evaluation Program in Woodland, CA, DWR, March 2008 – June 2008: DWR's geotechnical exploration, includes testing and analysis of state and federal levees. Mrs. Birnbaum monitored the drill crews to ensure that no sensitive biological resources are compromised. Survey efforts concentrate upon monitoring for giant garter snake as the levee area is considered ideal habitat for the species, as well as valley elderberrry beetle, riparian brush rabbit, tri-colored blackbird, bank swallows and San Joaquin kit foxes.

CalNev Pipeline Project, Las Vegas to San Bernardino, Kinder-Morgan, Biological Resources, March – April 2008: Kinder Morgan Energy Partners, L.P. is expanding the 550-mile CALNEV pipeline system. URS conducted a biological survey for 150 miles of Desert

Tortoise habitat, the area being surveyed was approximately 500 feet wide, and covered the possible routes for the pipeline. Mrs. Birnbaum conducted presence/absence surveys for the Desert Tortoise.

California Emergency Levee Erosion Repair, Stockton and Sacramento, CA, for California Department of Water Resources, 2007 – 2008: Mrs. Birnbaum is conducting biological field surveys, including for kit foxes and elderberry plants, for the Sacramento and American Rivers in the central valley region. As part of this work, she is locating and protecting sensitive species and habitats within levee reconstruction areas.

Professional Societies/Affiliates

Botanical Society of America

California Native Plant Society

Specialized Training

2010: Basic Wetland Delineation Training (40-hour), Wetland Training Institute, San Diego, Ca.

2010: Flat-Nosed Leopard Lizard Survey Training, Bureau of Land Management, El Centro, Ca.

2009: Blunt-Nosed Leopard Lizard Identification Workshop, Wildlife Society, Bakersfield, Ca

2009: Introduction to the Second Edition of the Manual of California Vegetation Workshop, CNPS, John Sawyer, Tod Keeler-Wolf, and Julie Evans, Yolo, Ca

2009: Measuring and Monitoring Plant Populations and Vegetation Workshop, California Native Plant Society 2009 Conservation Conference, John Willoughby, Sacramento, Ca

2008: Clean Water Act Regulatory Updates, presented by the Association of Environmental Professionals, Ventura, Ca

Languages

Basic conversational/written proficiency in French and Spanish.

Chronology

6/08- Present: URS Corporation, Santa Barbara, CA.
11/07 – 6/08: URS Corporation, Sacramento, CA.
01/05 – 08/07: Masters of Science study, Humboldt State University.
06/04 – 11/04: Biological Technician, USDA Forest Service – Sierra Nevada Research Center, Quincy, CA.
06/03 – 10/03: Team Leader, Student Conservation Association – Seeds of Success, Prineville, Oregon.

Contact Information

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805-964-0259 fax
Jessica_birnbaum@urscorp.com

Karen Brimacombe

Biologist

Areas of Expertise

Botany
Ecology
Ecological and Botanical Field Surveys

Years of Experience

With URS: < 1 Year
With Other Firms: 11 Years

Education

MS/Botany; Ecology, Evolution, and Conservation Biology Specialization Program/2003/University of Hawaii
BA/Psychology/1992/Miami University

Overview

Ms. Brimacombe is a Botanist/Ecologist with over eleven years of experience, including experience in plant ecology, wetland biology, rare plant surveys, field survey and monitoring techniques, and design, monitoring, and maintenance of mitigation and restoration sites. She is proficient in the design and implementation of botanical and ecological field studies and is skilled in the identification of native and invasive plant species. In 2003, she received her Masters degree in Botany with a specialization in Ecology, Evolution, and Conservation Biology. Her thesis research focused on wetland restoration, specifically the reintroduction of native flora into degraded wetland areas. She has attended Wetland Delineation Workshops in both Hawaii and Washington. She also has excellent technical writing and editing skills and has taken on the lead role in preparation of vegetation and wetland resources sections for several Environmental Impact and Environmental Assessment Reports and has assisted with authoring other sections including wildlife, threatened and endangered species, and socioeconomic sections. She is familiar with NEPA, ESA, Section 404, and other regulatory laws and regulations. In addition, she has experience with database management and knowledge of GIS software and applications.

Project Specific Experience

Botanical and Wetland Surveys

Crew Chief/Biologist, Wetland Surveys-Alaska Pipeline Project, Gailbraith Lakes, AK, TransCanada and ExxonMobil, 2010, $NA: Conducted wetland surveys in northern Alaska along a portion of the 800-mile survey corridor. Surveys were conducted in support of a proposed natural gas pipeline.

Botanist, Botanical Surveys and EIR Preparation, Fresno to Bakersfield, CA, California High Speed Rail Authority/U.S. Department of Transportation, 2010 – Present, $38M: Assisted in botanical surveys along the 120 mile Botanical Survey Area corridor proposed for construction of a high speed train line. Helped prepare botanical sections for the Environmental Impact Report based on these surveys.

Task Lead/Botanist, Vegetation Surveys and EIS Preparation, Lower Monumental – Central Ferry Transmission Line Project, Garfield, Walla Walla and Columbia Counties, WA, Bonneville Power Administration, 2009 – Present, $NA: Conducted vegetation and rare plant surveys in southeastern Washington along two 40 mile right-of-way corridor alternatives proposed for transmission line

construction. Prepared a vegetation resource report based on these studies. Currently authoring the vegetation section for the Environmental Impact Statement for this proposed project.

Task Lead/Botanist, Botanical and Wetland Surveys – Gold Mine Exploration, Okanogan County, WA, Crown Jewell, 2009 – 2010, $NA: Conducted rare plant, noxious weed, cultural plant and wetland surveys. Classification and mapping of "meadows of interest" for range management was also conducted. Botanical and Wetland Delineation and Survey Reports were prepared based on these surveys. These reports will be used for preparation of an Environmental Impact Statement for proposed mine exploration activities.

Task Lead/Botanist, Botanical and Wetland Surveys and Environmental Assessment Preparation, Stevens Pass Ski Area, Mount Baker-Snoqualmie National Forest, WA, Harbour Mountain LLC, 2008 – 2010, $NA: Conducted rare plant surveys, mapped vegetation communities, and performed wetland delineations for the preparation of resource reports and an Environmental Assessment for a proposed water pipeline and mountain bike trail installation. Assessed potential impacts to vegetation and wetlands in order to help determine appropriate mitigation measures.

Task Lead/Botanist, Vegetation and Rare Plant Surveys – Withrow Wind Energy Project, Douglas County, WA, Douglas County Public Utility District #1, 2008 – 2010, $NA: Conducted vegetation and rare plant surveys to determine the distribution and condition of vegetation types and locations of rare plants in the area proposed for the Withrow Wind Energy Project. Prepared a Botanical Resource Report and Botanical Resource Sections for an expanded State Environmental Policy Act document.

Task Lead/Botanist, Rare Plant Surveys – Verizon Cellular Tower, Dallesport, WA, Verizon Wireless, 2008, $NA: Conducted a rare plant survey in the area proposed for construction of a Verizon Wireless cellular tower. Federal and state threatened, endangered, and sensitive plant species were surveyed for. Plants endemic to the Columbia River Gorge and vicinity were also surveyed for. Potential impacts to plant species were also assessed.

Biologist, Wetland and Waters of the U.S. Surveys – Stateline 3 Wind Energy Project, Umatilla County, OR and Walla Walla County, WA, NextEra, 2008 – 2009, $NA: Assisted in field surveys of wetlands and streams in Eastern Oregon and Washington for preparation of a wetland report for inclusion in Energy Facility Siting Council (EFSC) application for a wind energy project. Provided peer review of this wetland report. Met potential contract engineers on-site to advise on environmental constraints.

Biologist, Wetland Delineation, Lakewood, WA, McChord Air Force Base, 2008 – 2009, $NA: Assisted in field studies mapping, delineating, and conducting functional assessment ratings for 46 wetlands located on McChord Air Force Base, Washington. The report based on these studies will be used in avoiding impacts to wetlands during base project development and construction.

Restoration and Monitoring Projects

Botanist/Ecologist,

Botanist/Ecologist, Riparian and Restoration Management – Meacham Creek Stream Restoration Project, Umatilla County, OR, Confederated Tribes of the Umatilla Indian Reservation, 2009 – 2010, $NA: Responsible for designing a riparian vegetation restoration and management plan for an aquatic habitat restoration and improvement project in northeastern Oregon. Responsibilities include providing cost estimates, species selection, planting design, and noxious weed and monitoring plans.

Biologist, Aquatic Habitat and Project Effectiveness Monitoring, WA, Statewide Salmon Recovery Funding Board (SRFB), 2008 – 2010, $NA: Responsible for riparian vegetation and aquatic habitat monitoring of selected aquatic habitat restoration projects. Tasks include collecting and compiling field data following the SRFB effectiveness monitoring protocols. These protocols are used for monitoring stream restoration projects throughout Washington State. The sites monitored include estuarine as well as freshwater stream habitat sites. Assisted in re-writing protocols for monitoring riparian planting projects.

Botanist, Vegetation Monitoring for Coal Creek Outfall Repair, Bellevue, WA, City of Bellevue, 2008, $NA: Monitored mitigation plantings at five culvert repair mitigation sites in the City of Bellevue. Monitoring was required to determine if mitigation plantings were on track to meeting required mitigation standards. Prepared report documenting results of the monitoring surveys.

Environmental Report Writing

Author/Editor, Travel Management Plan Environmental Assessment, Klamath Falls, OR, USDA Forest Service, Winema-Fremont National Forest, 2010, $18K: Edited and assisted in authoring Introduction, Alternative Analysis, and Environmental Effects chapters for a Draft Travel Management Environmental Assessment. Compiled and edited specialist reports, including socioeconomics, wildlife, botany, fisheries, soils, hydrology, range, and roads resources for inclusion in the Environmental Effects chapter of the Environmental Assessment.

Biologist, Third Party Environmental Impact Assessment – Palomar Natural Gas Pipeline Project, OR, Federal Energy

Regulatory Commission (FERC), 2008 – 2009, $NA: Assessed potential impacts to vegetation and wetland communities, as well as, threatened and endangered plant species from the construction of a natural gas pipeline in Oregon. Assisted in authoring the Vegetation, Threatened and Endangered Plant, and Wetland sections of the EIS.

Biologist, White Chuck Road Repair Environmental Assessment, Darrington, WA, Mount Baker-Snoqualmie National Forest, 2008 – 2009, $NA: Lead author of the Botany section of the EA assessing impacts to vegetation from a proposed road repair project. Co-authored the Introductory, Access and Road Management, Timber Management, Recreation, Wild and Scenic Rivers, Riparian Reserves, Aquatic Conservation, Visual Resources, and Heritage sections of the EA. Assisted in writing the Biological Assessment/Evaluation for the proposed road repair project.

Wildlife Surveys

Biologist, Northern Goshawk Surveys, Sun River, OR, Newberry Geothermal, 2008, $NA: Field crew member surveying for Northern Goshawk over a 7500-acre area proposed for a geothermal development project. Surveys were conducted to determine presence and nesting and breeding range in the project area.

Specialized Training

2010/Technical Writing Training
2009/NEPA Training
2009/Wetland Delineation and Management
2008/Project Management Training
2008/Using the Revised Washington State Wetland Rating System
2008/Grass, Sedge, and Rush Identification for Western Washington Lowland Habitats Training
2007/Wetland Identification and Delineation Training
2006/Managing Environmental Data with Microsoft Access

Chronology

04/10 – Present: URS Corporation, Biologist, Oakland, CA
02/08 – 04/10: Tetra Tech, Botanist/Biologist, Seattle, WA
03/07 – 02/08: Snohomish County Public Works, Ecologist, Everett, WA
02/04 – 11/06: Fourth Corners Nurseries, Botanist/Propagation Specialist, Bellingham, WA
08/01 – 08/03: University of Hawaii-US Fish and Wildlife Service, Research Biologist, Honolulu, HI
08/00 – 08/01: University of Hawaii, Teaching Assistant, Honolulu, HI
08/00 – 08/01: University of Hawaii, Teaching Assistant, Honolulu, HI
06/00 – 08/00 The Berry Botanic Garden, Conservation Assistant, Portland, OR
09/99 – 06/00: Oregon State University, Teaching Assistant, Corvallis, OR

05/99 – 09/99: Oregon Department of Agriculture, Field Botanist, Corvallis, OR
04/98 – 10/98: US Forest Service/Mt. St. Helens National Volcanic Monument, Biological Sciences Technician, Amboy, WA

Contact Information

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Neal Kramer, M.S.

Botanist/Ecologist, Certified Arborist

Areas of Expertise

1985-2005 Nursery Management, Nurserymen's Exchange, Half Moon Bay CA
1982-1984 Graduate Research/Teaching Assistant, Moscow ID Published *"Mature forest seed banks of three habitat types in central Idaho"*, Canadian Journal of Botany, Vol. 65, 1987
1975-1979 Wildfire Suppression/Helicopter Forman, USFS & BLM, Calif. & Wyoming

Years of Experience

29 Years

Education

BA/Botany/1981/University of California, Berkeley
MS/Forest Ecology/1984/University of Idaho, Moscow
30 different floristic workshops (including Eastern Mojave Desert Flora)/1996-2007/University of California, Jepson Herbarium
Basic Wetland Delineation Certification/2006/Wetland Training Institute
Arborist Certification/2007/International Society of Arborists

Overview

Mr. Kramer has experience with native flora and plant communities in 28 different California counties, in Arizona, Idaho, Nevada and Oregon, and internationally in the countries of Honduras, Ecuador and Peru. His experience includes plant inventories, rare plant surveys, tree surveys, invasive plant survey and eradication work, wetland delineations and revegetation projects for a wide variety of habitats. Rare plant surveys have included more than a dozen different San Francisco Bay Area sites, vernal pools in Fresno and Madera Counties and Delta marshland in Sacramento County. Neal is experienced in wetland delineation for a variety of wetland types including vernal pools. He has extensive experience using GPS systems for the purpose of mapping rare plants, invasive weeds and wetland delineations.

Mr. Kramer has 20 years of management experience with Nurserymen's Exchange in Half Moon Bay, Ca. where he was directly responsible for potted plant production on 35 acres of greenhouses and fields with a full time staff of 130 and up to 300 additional seasonal employees.

Neal is an experienced photographer with more than 1100 digital images posted on the Calphotos website. His photos can be found on the California Native Plant Society's online Inventory of Rare and

Endangered Plants, and have been used in publications by the Peninsula Open Space Trust, Oregon State University Extension, UC Santa Barbara Department of Geology, and PG&E. In 2008, Mr. Kramer participated in multi-season floristic surveys across the Mojave Desert for the CalNev pipeline project between Las Vegas and San Bernardino

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Glenn Rink

Far Out Botany
801West Birch Street
Flagstaff, AZ 86001
928-779-5820
glenn_rink@hotmail.com

Years of Experience

29 Years

Education

BS/Geology/1985/Northern Arizona University
MS/Botany/2003/Northern Arizona University

Botanical Publications

Christie, K., G.R. Rink, and T.J. Ayers, in review, Additions to the flora of Grand Canyon National Park during recent vegetation mapping efforts. Canotia.

Rink, G.R., A. C. Cully, and D.A. McCallum. 2009. A checklist of the vascular flora of El Morro National Monument, Cibola County, New Mexico. Journal of the Torrey Botanical Society 136(3) pp. 403-421.

Rink, G.R. and A. Cully. 2008. A checklist of the vascular flora of Aztec Ruins National Monument, San Juan County, New Mexico. Journal of the Torrey Botanical Society 135(4) pp.571-584.

Rink, G.R. 2007. A checklist of the vascular flora of Yucca House National Monument, Montezuma County, Colorado. Journal of the Torrey Botanical Society 134 (2) pp. 289-300.

Rink, G.R., 2005, A checklist of the vascular flora of Canyon de Chelly National Monument, Apache County, Arizona. Journal of the Torrey Botanical Society 132(3) pp. 510-532.

Overview

Rare Plant and Floristic Field Experience

2009, October 31 – Collected putative *Zigadenus vaginatus* from a remote hanging garden within Grand Canyon for molecular analysis related to population genetics study, reference: Emily Palmquist, MS student at Northern Arizona University, emily.palmquist@nau.edu. 1 day.

2009, October 30 – Mapped vegetation and made a vascular plant list at a re-vegetation project site in lower Glen Canyon, Grand Canyon Wildlands Council. 1 day.

2009, October 19-26 – Collected biomass production information (plant ID and weights) from random plots at remote locations on the Navajo Reservation along the Utah/ Arizona border, Ecosphere Environmental, looked for *Astragalus cutleri*, *Astragalus humillimus*, *Atriplex garrettii* var. *navajoensis*, *Erigeron rhizomatus*, *Penstemon navajoa*, *Sclerocactus mesa-verdae*, *Asclepias welshii*, and *Polygala acanthoclada*, reference: Alexis Watts, Sr. Project Biologist, Ecosphere Environmental Services, 112 W. Montezuma Ave., Suite 4, Cortez, CO 81321, 970-564-9100, cell: 928-386-1777, watts@ecosphere-services.com. 8 days.

2009, August 31-September 9 – Vegetation mapping (plant ID and cover estimates) on the North Rim of Grand Canyon, Kass Green and Associates. 10 days.

2009, July 7-10; 2008, May 6, August 27- September 2, October 8-10; 2007, April 27-28 – Vouchered plant survey of Surprise Canyon, a remote tributary of the Colorado River within Grand Canyon, **Mohave County, Arizona**, Far Out Botany. Rare plants looked for include: *Epilobium nevadense*, *Mentzelia hualapaiensis* sp. nov., *Ericameria arizonica*, *Aletes macdougalii* ssp. *macdougallii*, *Camissonia specuicola* ssp. *hesperia*, *Carex scirpoidea* var. *curatorum*, *Crossosoma parviflorum*, *Cryptantha capitata*, *Flaveria macdougallii*, *Fraxinus cuspidata* var. *macropetala*, *Hesperodoria scopulorum* var. *scopulorum*, *Imperata brevifolia*, *Ostrya knowltonii*, *Primula specuicola*, and *Pteryxia petraea*, references listed below. 17 days.

2009, July 13-17, September 10; 2008, July 13-17, August 4-8; 2007, August 4-9, July 5-8 – Vouchered plant survey of the North Rim of Grand Canyon, Grand Canyon Field Institute and Far Out Botany. Rare plants looked for include: *Castilleja kaibabensis*, *Penstemon pseudoputus*,

Hymenoxys subintegra, *Draba asprella*, *Selaginella watsonii*, *Ericameria arizonica*, and *Beckmannia syzigache*, references listed below. 25 days.

2009, June 2-4, 2008, June 10-17, vouchering rare and other plants from springs and hanging gardens in Bright Angel Canyon, Grand Canyon National Park, Far Out Botany. Rare plants searched for included: *Ericameria arizonica*, *Aletes macdougalii* ssp. *macdougallii*, *Camissonia specuicola* ssp. *hesperia*, *Carex scirpoidea* var. *curatorum*, *Crossosoma parviflorum*, *Cryptantha capitata*, *Flaveria macdougallii*, *Fraxinus cuspidata* var. *macropetala*, *Hesperodoria scopulorum* var. *scopulorum*, *Imperata brevifolia*, *Ostrya knowltonii*, *Primula specuicola*, *Pteryxia petraea*, and *Silene rectiramea*, 11 days.

2009, March 29 – April 9, April 13-17, April 20-27 – Plant list and rare plant survey of about 8000 acres in **Clark County, Nevada** for solar power development, Tetratech and Kiva Biological Consulting. Rare plants surveyed for included: *Arctomecon californica*, *Astragalus geyeri* var. *triquetrus*, *Astragalus mohavensis*, *Calochortus striatus*, *Cryptantha insolata*, *Eriogonum corymbosum* var. *nilesii* (Las Vegas buckwheat), *Eriogonum viscidulum*, *Opuntia whipplei* var. *multigeniculata*, *Penstemon albomarginatus*, and *Penstemon bicolor*, reference: Ron Gregg, Senior Project Manager, TetraTech, 1940 E. Deere Ave. Suite 200, Santa Ana, CA 92705, 949-756-7574, cell: 949-922-9140, Ronald.gregg@tteci.com; also, Jina Sagar, Biologist, Tetratech, 1750 SW Harbor Way, Suite 400, Portland, OR 97201, jina.sagar@tetratech.com, 503-721-7210, cell 503-734-9506. 25 days.

2009, March 24-27 - Plant list and rare plant survey of Arizona Public Service powerline along Arizona State Highway 72 in the vicinity of Bouse, **La Paz County, Arizona**, Envirosystems Management, rare plants surveyed for: *Pholisma arenaria*, and *Astragalus magdalenae* var. *niveus*, reference: Stephanie Treptow, Envirosystems Management, 23 E. Fine, Flagstaff, AZ 86001, 928-22600236, streptow@esmaz.com. 4 days.

2008, March 2 – Plant list and rare plant survey of 80 acres in the Mohave Valley of **Mohave County, Arizona**, Circa Cultural Consulting, Rare plants surveyed for: *Camissonia brevipes* and *Enceliopsis argophylla*, reference,: Peter Bungart, Circa Cultural Consulting, 4 North San Francisco, Flagstaff, AZ 86001, 928-213-0984, pbungart@circaculture.com. 1 day.

2008, September 12-18, May 15-21, April 16-May 5 – Vouchered plants in Grand Canyon as part of vegetation mapping effort, National Park Service, rare plants surveyed for included: *Epilobium nevadense*, *Mentzelia hualapaiensis* sp. nov., *Ericameria arizonica*, *Aletes macdougalii* ssp. *macdougallii*, *Camissonia specuicola* ssp. *hesperia*, *Carex scirpoidea* var. *curatorum*, *Crossosoma parviflorum*, *Cryptantha capitata*, *Flaveria macdougallii*, *Fraxinus cuspidata* var. *macropetala*, *Hesperodoria scopulorum* var. *scopulorum*, *Hesperodoria salicina*, *Imperata brevifolia*, *Ostrya knowltonii*, *Primula specuicola*, *Pteryxia petraea*, *Arctomecon californica*, *Argemone arizonica*, *Euphorbia aaron-rosei*, *Rosa stellata* ssp. *abyssa*, and *Silene rectiramea*, references below. 34 days.

2008, September 19-October 2; 2007, April 6-30; 2006, May 3016, June 5-10; 2005, September 2-26; 2004, March 6-April 1; 2003, May 13-23, Vouchered plants in Grand Canyon National Park, Far Out Botany, rare plants looked for included: *Epilobium nevadense*, *Mentzelia hualapaiensis* sp. nov., *Ericameria arizonica*, *Aletes macdougalii* ssp. *macdougallii*, *Camissonia specuicola* ssp. *hesperia*, *Carex scirpoidea* var. *curatorum*, *Crossosoma parviflorum*, *Cryptantha capitata*, *Flaveria macdougallii*, *Fraxinus cuspidata* var. *macropetala*, *Hesperodoria scopulorum* var. *scopulorum*, *Hesperodoria salicina*, *Imperata brevifolia*, *Ostrya knowltonii*, *Primula specuicola*, *Pteryxia petraea*, *Arctomecon californica*, *Argemone arizonica*, *Euphorbia aaron-rosei*, *Rosa stellata* ssp. *abyssa*, and *Silene rectiramea*, references below. 124 days.

2008, May 25-27, June 21-22, 28-29, July 6, 27-28, August 24 – Vouchered plant list of Barbershop Canyon, Coconino County, Arizona, Far Out Botany, rare plants looked for included: *Rumex orthoneurus*, *Arenaria aberrans* – Mt. Dellenbaugh sandwort, *Aquilegia desertorum* – Mogollon columbine, *Astragalus troglodytes* – creeping milkvetch, *Calypso bulbosa* – western fairy slipper, *Cirsium parryi* ssp. *mogollonense* – Mogollon thistle, *Eriogonum jonesii* – Jone's buckwheat, *Hedeoma diffusa* – Flagstaff pennyroyal

Helenium arizonicum – Arizona sneezeweed, *Heuchera eastwoodiae* – Eastwood alum root, *Hymenoxys jamesii* – James hymenoxys, *Malaxis porphyrea* – purple adder's mouth

Phlox amabilis – Arizona phlox, *Talinum validulum* – Tusayan fameflower, *Cimicifuga arizonica* – Arizona bugbane, *Listera convallarioides* – broadleaf twayblade, *Potentilla multifoliolata* – Arizona cinquefoil, *Triteleia lemmoniae* – Mazatzal triteleia, *Spiranthes romanzoffiana* – hooded ladie's tresses, *Erigeron anchana* – Mogollon fleabane, *Erigeron saxatilis* – rock fleabane, reference: Barb Phillips, National Forest Zone Botanist, 1824 S. Thompson Street, Flagstaff, AZ 86001, 928-527-3600, bgphillips@fs.fed.us. 11 days.

2008, April 12-15 – Rare plant survey in Johnson Valley, **San Bernardino County, California**, URS, rare plants surveyed for included: *Astragalus albens*, *Astragalus tricarinatus*, *Calochortus striatus*, *Calochortus plummerae*, *Camissonia boothii* ssp. *boothii*, *Castilleja cinerea*, *Chamaesyce platysperma*, *Erigeron parishii*, *Eriogonum ovalifolium* var. *vineum*, *Linanthus maculates*, *Mimulus mohavensis*, *Penstemon albomarginatus*, *Phacelia parishii*, *Plagiobothrys parishii*, *Polygala acanthoclada*, and *Saltugilia latimeri*, reference: John H. Davis IV, URS, 130 Robin Hill Road, Suite 100, Santa Barbara, CA 93117, 805-964-6010, cell: 805-202-9560, john_davis@urscorp.com. 4 days.

2007, October 10-13 - Plant list and rare plant survey of ca 2000 acres east of the San Rafael Swell in Utah, Circa Cultural Consulting, rare plants surveyed for: *Grindelia fastigiata*, *Platyschkuhria integrifolia* var. *ourolepis*, and *Eriogonum scabrella*, reference,: Peter Bungart, Circa Cultural Consulting, 4 North San Francisco, Flagstaff, AZ 86001, 928-213-0984, pbungart@circaculture.com. 4 days.

2007, August 30 – Rare plant survey of Portonova Ranch east of Flagstaff, Arizona, Fred Phillips Consulting, rare plants surveyed for: *Arenaria aberrans*, *Aquilegia desertorum*, *Astragalus cremnophylax*, *Astragalus troglodytes*, *Chrysothamnus molestus*, *Erigeron saxatilis*, *Eriogonum jonesii*, *Hedeoma diffusa*, *Hymenoxys jamesii*, *Potentilla multifoliolata,* and *Talinum validulum*, reference: Fred Phillips Consulting, LLC,401 South Leroux St.,Flagstaff, AZ 86001, (928) 773-1530, fphillips@commspeed.net. 1 day.

2007, May 27- June 3 – Survey for rare *Echinocereus fendleri* var. *kuenzleri* and species list in Lincoln National Forest, New Mexico, Southwest Botanical Research, Marc Baker, 1217 Granite Creek Lane, Chino Valley, AZ 86323, 928-713-7009, marcbaker@cableone.net. 8 days.

2007, March 20 – Rare plant survey of Arizona Public Service powerlines in Gila County, Arizona, Envirosystems Management, rare species surveyed for: *Abutilon parishii*, *Agave arizonica*, *Agave delmateri*, *Echinocereus triglochidiatus* var. *arizonicus*, *Erigeron piscatus*, *Heuchera glomerata*, *Mabrya acerifolia*, *Penstemon discolor*, *Perityle saxicola*, and *Salvia amissa*, reference: Stephanie Treptow, Envirosystems Management, 23 E. Fine, Flagstaff, AZ 86001, 928-22600236, streptow@esmaz.com. 1 day.

2007, August 4, June 28, May 5-7, 25-26; 2006, August 25-27, October 4-5 - Vouchered species list for Aztec Ruins National Monument, San Juan County, New Mexico, National Park Service, rare plants surveyed for: *Aletes macdougalii* ssp. *breviradiatus*, *Aliciella formosa*, *Astragalus humillimus*, *Astragalus micromerius*, *Sclerocactus cloveriae* ssp. *brackii*, *Sclerocactus cloveriae* ssp. *cloveriae*, *Sclerocactus mesae-verdae*, *Penstemon breviculus*, and *Proatriplex pleiantha*, reference: Theresa Nichols, Aztec Ruins National Monument Resource Manager, 84 County Road 2900, Aztec, NM 87410, Terry_Nichols@nps.gov, 505-334-6372, 12 days.

2007, August 1-2, June 3-4, 23-24, May 3-4, 12, 26-27; 2006, September 2-4, 21-22, October 3 - Vouchered species list for El Morro National Monument, Cibola County, New Mexico, National Park Service, rare plants surveyed for: *Besseya arizonica*, *Erigeron acomanus*, *Helianthus paradoxus*, *Physaria newberryi* var. *yesicola*, *Astragalus accumbens*, and *Phacelia serrata*, reference: Lisa Thomas, Coordinator, Southern Colorado Plateau I&M Network, Northern Arizona University, P.O. Box 5765, Flagstaff, AZ 86011, (928) 523-9280, Lisa_Thomas@nps.gov. 17 days.

2007, November 7 – Survey for rare plants on US Forest Service and BLM lands for the Arizona Department of Transportation, Envirosystems Management, reference: Stephanie Treptow, Envirosystems Management, 23 E. Fine, Flagstaff, AZ 86001, 928-22600236, streptow@esmaz.com. 1 day.

2006, April 16-19, Voucher of plants along Trout Creek, Mohave County, Arizona, Far Out Botany, rare plants surveyed for: *Allium bigelovii*, *Arenaria*

aberrans, *Arctomecon californica*, *Penstemon bicolor*, *Polygala rushyi*, *Purshia subintegra*, and *Salvia davidsonii*. 4 days.

2006, March 27-28, February 23-24 - Plant list and rare plant survey of a proposed gravel pit in the Sacramento Valley, **Mohave County, Arizona**, Circa Cultural Consulting, rare plants surveyed for: *Arctomecon californica*, *Cynanchum utahense*, *Enceliopsis argophylllus*, *Eriogonum viscidulum*, *Penstemon bicolor*, *Polygala acanthoclada*, and *Selinocarpus nevadensis*, reference: Peter Bungart, Circa Cultural Consulting, 4 North San Francisco, Flagstaff, AZ 86001, 928-213-0984, pbungart@circaculture.com. 4 days.

2005, November 14-17 and December 13-18 – Powerline survey for rare plants and to make a plant list between Boulder City and Davis Dam, **Clark County, Nevada**, Circa Cultural Consulting, rare plants surveyed for: *Arctomecon californica*, *Cynanchum utahense*, *Enceliopsis argophylllus*, *Eriogonum viscidulum*, *Penstemon bicolor*, *Polygala acanthoclada*, and *Selinocarpus nevadensis*, reference: Peter Bungart, Circa Cultural Consulting, 4 North San Francisco, Flagstaff, AZ 86001, 928-213-0984, pbungart@circaculture.com. 10 days.

2005, November 18-19, October 8 - Plant list and rare plant survey of roads in **Mohave County, Arizona**, Circa Cultural Consulting, rare plants surveyed for: *Arctomecon californica*, *Cynanchum utahense*, *Enceliopsis argophylllus*, *Eriogonum viscidulum*, *Penstemon bicolor*, *Polygala acanthoclada,*and *Selinocarpus nevadensis*, reference: Peter Bungart, Circa Cultural Consulting, 4 North San Francisco, Flagstaff, AZ 86001, 928-213-0984, pbungart@circaculture.com. 3 days.

2005, August 24-25 - Plant list and rare plant survey of Arizona Public Service powerline from Grey Mountain to Tuba City, Navajo Reservation, Arizona, Envirosystems Management, Rare plants surveyed for: *Amsonia peeblesii*, *Astragalus sophoroides*, *Cymopterus megacephalus*, *Asclepias welshii*, *Errazurizia rotundata*, *Pediocactus peeblesianus* var. *fickeiseniae*, and *Puccinellia parishii*, reference: Stephanie Treptow, Envirosystems Management, 23 E. Fine, Flagstaff, AZ 86001, 928-22600236, streptow@esmaz.com. 2 days.

2005, June 23-25 – Voucher plants along Fossil Creek, central Arizona, for future monitoring, Northern Arizona University. 3 days.

2005, June 8-11, Rare plant survey and voucher of plants between Hance and Cremation Creeks, Grand Canyon National Park, National Park Service, rare plants surveyed for: *Ericameria arizonica*, *Aletes macdougalii* ssp. *macdougallii*, *Camissonia specuicola* ssp. *hesperia*, *Carex scirpoidea* var. *curatorum*, *Crossosoma parviflorum*, *Cryptantha capitata*, *Flaveria macdougallii*, *Fraxinus cuspidata* var. *macropetala*, *Hesperodoria scopulorum* var. *scopulorum*, *Hesperodoria salicina*, *Imperata brevifolia*, *Ostrya knowltonii*, *Primula specuicola*, *Pteryxia petraea*, *Arctomecon californica*, *Argemone arizonica*, *Euphorbia aaron-rosei*, *Rosa stellata* ssp. *abyssa*, and *Silene rectiramea*, references below. 4 days.

2005, May 27- June 5, April 10-15, Rare plant survey and voucher of plants in Glen Canyon National Recreation Area, Far Out Botany, rare plants surveyed for: *Astragalus harrisonii*, *Astragalus musiniensis*, *Cirsium rydbergii*, *Cycladenia humilis* var. *jonesii*, *Carex scirpoidea* var. *curatorum*, *Erigeron kachinensis*, *Erigeron zothecinus*, *Perityle specuicola*, *Platanthera zothecina*, *Carex specuicola*, *Primula specuicola*, and *Zigadenus vaginatus*, Far Out Botany. 16 days.

2005, May 13-18, Rare plant survey and voucher of plants along the Bass Trail, Grand Canyon National Park, National Park Service, rare plants surveyed for: *Ericameria arizonica*, *Aletes macdougalii* ssp. *macdougallii*, *Camissonia specuicola* ssp. *hesperia*, *Carex scirpoidea* var. *curatorum*, *Crossosoma parviflorum*, *Cryptantha capitata*, *Flaveria macdougallii*, *Fraxinus cuspidata* var. *macropetala*, *Hesperodoria scopulorum* var. *scopulorum*, *Hesperodoria salicina*, *Imperata brevifolia*, *Ostrya knowltonii*, *Primula specuicola*, *Pteryxia petraea*, *Arctomecon californica*, *Argemone arizonica*, *Euphorbia aaron-rosei*, *Rosa stellata* ssp. *abyssa*, and *Silene rectiramea*, references below. 6 days.

2004, October 6-9 – Survey for rare *Coryphantha scheerii* var. *robustispina* within Mexico along the US border south of **Pima County, Arizona**, Southwest Botanical Research, Marc Baker, 1217 Granite Creek Lane, Chino Valley, AZ 86323, 928-713-7009, marcbaker@cableone.net.. 4 days.

2004, September 22-25, Vouchered plants on the Shivwits Plateau, Mohave County, Arizona, Far Out Botany. 4 days

2004, June 19-20 – Rare plant survey at Lowell Discovery Channel Telescope site near Happy Jack, Arizona, Envirosystems Management, rare plants surveyed for: *Arenaria aberrans*, *Astragalus rushyi*, *Helenium arizonicum*, *Heuchera eastwoodiae*, and *Penstemon nudiflorus*, reference: Stephanie Treptow, Envirosystems Management, 23 E. Fine, Flagstaff, AZ 86001, 928-22600236, streptow@esmaz.com. 2 days.

2004, May 27, July 13, August 2 – Vouchered plant list for Edgemont Highlands, a housing development east of Durango, Colorado, Linda Robinson Studios. 3 days.

2004, May 16-19, 24-25, 30-31, June 1, 5, July 23-August 2, September 4-7; 2003, March 8, 25-27, April 13-20, June 26-30, July 6-9, 14-19, 22-27, 29-30; September 21-22, 27 – Vouchered plant survey and rare plant survey of portions of the San Juan River Basin for the San Juan Flora Project, San Juan College, Farmington, New Mexico, too many rare plants surveyed for to mention, reference: Ken Heil, Math-Science Division, Room 1807, **San Juan College,** 4601 College Boulevard, Farmington, New Mexico 87402-4699, heilk@sjc.cc.nm.us. 64 days.

2004, April 29-30, May 1, 26, 28; 2003, July 27, August 21-22, September 23 – Vouchered species list for Yucca House National Monument, Montezuma County, Colorado, National Park Service, rare plants looked

for: *Aletes macdougalii* ssp. *breviradiatus*, *Astragalus coltonii* var. *moabensis*, *Astragalus cronquistii*, *Astragalus naturitensis*, *Astragalus newberrryi*, *Astragalus schmolliae*, *Astragalus tortipes*, *Eriogonum clavellatum*, *Eriogonum leptocladon* var. *ramosissimum*, *Hackelia gracilenta*, *Iliamna grandiflora*, *Penstemon parviflorus*, *Penstemon utahensis*, *Penstemon breviculus*, *Penstemon lentus*, and *Sclerocactus mesa-verdae*, reference: Lisa Thomas, Coordinator, Southern Colorado Plateau I&M Network, Northern Arizona University, P.O. Box 5765, Flagstaff, AZ 86011, (928) 523-9280, Lisa_Thomas@nps.gov. 9 days.

2004, April 14-18 and 2001, five days in March – Survey for the rare plant *Astragalus magdalenae* var. *peirsonii* in the Algodones Dunes of **Imperial County, California**, Botanical and Environmental Consulting, other rare plants surveyed for: *Astragalus lentiginosus* var. *borreganus*, *Croton wigginsii*, *Helianthus niveus* ssp. *tephrodes*, *Palafoxia arida* var. *gigantea*, and *Pholisma sonorae*, reference: Arthur Phillips, Botanical and Environmental Consulting, PO Box 173, Eckert, CO 81418, Nn7a@aol.com, 970-250-8112. 5 days.

2004, April 9 – Survey of Tapco powerline in central Arizona, Envirosystems Management, rare plants surveyed for: *Purshia subintegra*, *Eriogonum ripleyi*, *Eriogonum ericifolium*, and *Polygala rusbyi*, reference: Stephanie Treptow, Envirosystems Management, 23 E. Fine, Flagstaff, AZ 86001, 928-22600236, streptow@esmaz.com. 1 day.

2003, April 25, 30, June 6-9, 17-20 – Rare and sensitive plant survey of portions of Prescott National Forest, Envirosystems Management, rare plants surveyed for: *Agave delamateri*, *Arenaria aberrans*, *Erigeron saxatilis*, *Eriogonum ericifolium* var. *ericifolium*, *Eriogonum ripleyi*, *Hedeoma diffusum*, *Heuchera eastwoodiae*, *Lupinus latifolius* ssp. *leucanthus*, *Phlox amabilis*, *Polygala rusbyi*, and *Salvia dorrii* ssp. *mearnsii*, reference: Stephanie Treptow, Envirosystems Management, 23 E. Fine, Flagstaff, AZ 86001, 928-22600236, streptow@esmaz.com. 10 days.

2001-2003, April –November, Vouchered plant species list for Canyon de Chelly National Monument, Apache County, Arizona, National Park Service, rare plants surveyed for: *Allium gooddingii*, *Astragalus chuskanus*, *Cirsium chellyense*, *Lupinus caudatus* ssp. *cutleri*, *Opuntia* x*viridiflora*, *Platanthera zothecina*, *Zigadenus vaginatus*, *Carex curatorum*, and *Carex specuicola*, reference: Lisa Thomas, Coordinator, Southern Colorado Plateau I&M Network, Northern Arizona University, P.O. Box 5765, Flagstaff, AZ 86011, (928) 523-9280, Lisa_Thomas@nps.gov. 110 days.

1996-2004, survey for rare plants and vouchering of plants on remote portions of the Navajo Reservation, rare plants surveyed for: *Carex specuicola*, *Primula specuicola*, *Zigadenus vaginatus*, *Polygala acanthoclada*, *Platanthera zothecina*, *Errazurizia rotundata*, *Perityle specuicola*, *Cirsium rydbergii*, and *Euphorbia aaron-rosei*, Daniela Roth, U.S. Fish and Wildlife Service, 2369W. Orton Circle, Suite 50, West Valley City, UT 84119-7603, 801-975-3330 x123, daniela_roth@fws.gov. 20 days.

599 days of rare plant surveying, and collecting and vouchering plants. Over 9000 specimens collected and vouchered in museums.

References for Grand Canyon rare plant and floristic work:

Wendy Hodgson
Desert Botanical Garden
1201 North Galvin Parkway
Phoenix, AZ 85008
whodgson@dbg.org
480-941-1225

Lori Makarik
Vegetation Manager
Grand Canyon National Park
823 North San Francisco Street
Flagstaff, AZ 86001
Lori_makarick@nps.gov
928-226-0165

Dina Robertson

Project Ecologist

Areas of Expertise

Natural Resource Management
Vegetation Ecology
Plant Identification
Ecological Restoration and Monitoring
Federal and State Environmental Compliance
Impact Analysis

Years of Experience

With URS: 5 Year
With Other Firms: 7 Years

Education

MS/Range Management/2004/University of California, Berkeley
BS/Biology/1997/University of California, Santa Cruz

Overview

Ms. Robertson is a biologist with more than 12 years experience in environmental science and natural resource management. She is skilled in land management planning, plant identification, ecological restoration, conducting biological inventories, vegetation monitoring and mapping and ecological research. Ms. Robertson has conducted rare plant and vegetation community surveys in northern, central and southern California. She has worked with agencies, nonprofits and private landowners to meet NEPA, CEQA, ESA and CWA requirements. She is also skilled in conducting wetland delineations, wildlife surveys (avian), technical writing and Geographic Information Systems (GIS).

Project Specific Experience

Natural Resource Management

Project Manager, Presidio Trust Restoration Site Monitoring and Rare Plant Research, San Francisco County, CA: $97K: Managed the Design and implementation (baseline monitoring) of a long-term monitoring program for multiple restoration sites on the San Francisco Presidio. The study provided:

- An assessment of the ecological health of the restoration sites,
- A cost effective and implementable long term monitoring plan,
- Decision-making procedures that can help determine thresholds for maintenance actions and focus any necessary maintenance activities on those actions that will preserve the ecological health and viability of the restoration sites over time.
- **A repeatable, easy to implement statistically defensible design that is comparable between sites and between years.**
- **Baseline dataset for long term monitoring.**

Project Manager, California Department of Fish and Game (DFG), Land Management Plan (LMP) for the Napa-Sonoma Marshes Wildlife Area, Solano, Sonoma and Napa Counties, CA, $200K: **Currently writing LMP for 15,000 acre public land preserve. Project involves vegetation mapping, land ownership/leases/easement mapping, extensive data collection, synthesis and review, interagency coordination and restoration planning.**

Project Manager, Biological Services, Golden Gate National Recreation Area (GGNRA), Marin, San Francisco, and San Mateo Counties, Golden Gate National Parks Conservancy (GGNPC), $200K. Example projects:

- New Parklands Sensitive Habitat Mapping, 2009-present**: Currently modeling suitable habitat for over 20 sensitive wildlife an plant species; habitat maps will be used to identify sensitive areas for avoidance in the GGNRA General Management Plan.**
- Big Lagoon Restoration Project, Non-native Plant Mapping, 2008: **Mapped 20 non-native plant species in 38 acre parcel; made recommendations for pre-construction treatment.**
- New Parklands Acquisition Sensitive Species Data Gaps Analysis, 2007-2008: **Conducted data gaps analysis for sensitive plant and wildlife for GGNRA new San Mateo lands. Compiled data and provided a GIS database of up to date sensitive plant and wildlife species occurrence data.**
- Dias Ridge Realignment Grassland Community Mapping, 2006-2008: **Mapped extent of grasslands, wetlands and exotic plants near Muir Beach for trail realignment in the GGNRA.**
- Rare Plant Modeling, 2005: **Developed a GIS based predictive model for rare plant in the GGNRA. GIS software was used to analyze environmental variables and habitat characteristics associated with known rare plant occurrences, including slope, aspect, soils and vegetation communities.**
- Fort Baker Native and Exotic Vegetation Mapping, Marin County, CA, GGNRA, 2006: **Measured and mapped all trees and vegetation communities for the National Park Service to aid in restoration and fire protection of new conference and retreat center.**

Project Manager, Resource Planning Services. California Coastal Conservancy. Solano, Marin and Contra Costa County, $60K. Example projects:

- Restoration Opportunities and Constraints for the North Richmond Shoreline Conservation Planning Area (NRSCPA), Contra Costa County, 2009: **Evaluated restoration opportunities and provided a GIS geodatabase of data used for restoration planning in the NRSCPA.**
- Scoping for Rush Ranch Preserve Resource Management Plan (RMP), Solano County, CA, 2007: **Wrote detailed scope and budget for RMP for a preserve in Suisun Marsh. Created geodatabase, reviewed existing documents and identified critical data gaps for writing RMP.**

Senior Biologist, Auburn State Recreation Area (ASRA) Resource Management Plan (RMP), Nevada and Placer Counties, CA, California State Parks, 2006, $362K: **Currently writing biological resources section of RMP for ASRA. RMP compiles and summarizes existing information on sensitive plant, wildlife, vegetation communities and invasive plants in the ASRA, identifies sensitive areas within the**

recreation area, recommends location of new roads and trails to optimize resource protection as well as additional studies and monitoring required for park planning.

Biological Science Technician, Fire Monitoring Program for the Golden Gate National Recreation Area and Point Reyes National Seashore, Marin County, CA, National Park Service, 1999, $NA: Monitored vegetation response to fire in multiple NPS park units. Served on a prescribed and wild land fire crew. Collected, identified, and inventoried plants for herbarium collection.

Project Manager, Grassland Monitoring Project, Contra Costa and Alameda Counties, CA, East Bay Regional Park District, 2002-2004, $NA: Designed and implemented an ecological study of soil, vegetation and environmental variables. Coordinated the field work of student researchers in monitoring plant and avian species in eight regional park units.

Independent Consultant, Vegetation Monitoring and Inventory Projects, Various Locations, Northern California, Marin, San Francisco and San Mateo Counties, 1998-2000, $40K: Managed all tasks required to census and monitor rare plants and complete a large scale vegetation map along the coast of the San Francisco Bay Area. Located and recorded populations of exotic plants in multiple open space preserves.

Habitat Restoration

Senior Biologist, Blackie's Pasture Wetland Restoration Design, Marin County, CA, California Coastal Conservancy, 2006, $17K: Prepared restoration plan (vegetation) for a proposed tidal slough in Richardson Bay.

Project Ecologist, Habitat Reserve Program (HRP) Mitigation Site Design, San Francisco Public Utilities Commission (SFPUC), 2009-present, >$1M: Currently working with the SFPUC in the design of multiple restoration sites in the Alameda Creek Watershed. Habitats include oak woodland, riparian, seasonal wetlands and Sycamore Alluvial woodlands. Task management includes vegetation plans and specs, grazing, weed and pond management.

Project Manager, Marin Headlands Mission Blue Butterfly Habitat Enhancement and Protection, Sausalito, CA, Golden Gate National Recreation Area, 2001, $NA: Worked collaboratively with National Park Service (NPS) engineers, contractors, resource staff and roads and trail crews to ensure compliance with federal environmental laws. Planned and implemented restoration projects on a 1500-acre reserve. Designed and administered federal contracts for enhancement of endangered species habitat. Hired contractors and recruited and supervised volunteers in habitat restoration projects. Team leader for Americorps members.

Trained members in GIS, habitat restoration, plant identification, community outreach, endangered species habitat enhancement and monitoring.

Restoration Technician, Restoration Implementation, Circuit Riders, Inc., Sonoma, Napa, Alameda, Placer and Sacramento Counties, CA, 1998, $NA: Restored habitat through exotic plant removal and planting of native species in a variety of vegetation types on private and public lands.

Habitat Restoration Specialist, Habitat Restoration and Protection, Marin County and San Francisco Counties, CA, Golden Gate National Recreation Area, 1997-1998, $NA: Americorps Member. Coordinated and led volunteer programs in habitat restoration. Responsible for native plant nursery operations, seed collection, exotic plant removal and out planting of native species. Developed and presented trainings on plant taxonomy. Created herbarium specimens through collection, identification and mounting of type specimens. Restored sites included coastal dune, coastal scrub, riparian and grassland habitats.

Impact Analysis

Senior Biologist. Soil Aquitard Study, Beale Air Force Base, Yolo County, Ca, 2008, $171k: Managed the design and implementation of a soil aquitard study of vernal pools at Beale Air Force Base. The study was used to determine average depth to soil aquitard on different geologic formations. Data will inform impact avoidance measures associated with base operations.

Project Ecologist, Remediation Project, Napa County, CA, Mercury Mine (Private Client), 2006-present, $86K: Conducted habitat assessment for plants and wildlife at a proposed mine remediation site. Completed biological permitting; currently preparing biology section for CEQA Initial Study.

Senior Biologist, Merced Dominion Annexation, Merced County, CA, City of Merced, 2006, $108K: Conducted sensitive plant surveys (vernal pool species) and wrote final floristic report for a proposed development.

Biologist, Calaveras Dam Replacement Project, Santa Clara County, CA, San Francisco Public Utility Commission (SFPUC), 2005-2006, $3M: Evaluated biological issues for activities associated with the replacement of Calaveras Dam. Biological resources included serpentine grasslands, Callippe and Bay Checkerspot butterflies and California red-legged frog. Conducted rare plant surveys for dam design alternatives.

Biologist, Habitat Conservation Plan (HCP), Various Locations, Desert Regions of California and Arizona, Metropolitan Water District (MWD), 2005, $100K: Conducted extensive rare plant and wildlife surveys along over 100 linear miles in the Mojave and Sonoran Desert.

Biologist, Wind Power Project, Solano County, CA, Sacramento Municipal Utility District (SMUD), 2005, $94K: Conducted burrowing owl and avian mortality surveys for a planned wind power project.

Transportation Projects

Project Manager, Greenwood Creek Bridge Replacement, Mendocino County, CA, Caltrans, 2005-2009, $203K: Manage all tasks related to bridge replacement project.

Senior Biologist, SR 36 Culvert Replacement, Lassen and Plumas Counties, CA, Caltrans, 2006, $140K: Coordinated and conducted rare plant surveys for a culvert replacement project.

Senior Biologist, Caltrans Willits Bypass Project, Willits, CA, 2006, $150K: Conducted rare plant surveys and vegetation mapping along the proposed road alignments.

Senior Biologist, SR 50 and SR 89 Improvements for Lake Tahoe Water Quality, El Dorado County, CA, Caltrans, 2006, $890K: Conducted wetland delineation of proposed water treatment sites along 30 miles of highway in the Lake Tahoe Basin. Evaluated potential impacts to sensitive plants, natural communities, Tahoe Regional Planning Agency (TRPA) Stream Environment Zones (SEZ) and wetlands resulting from the project for Programmatic Natural Environment Study (NES).

Biologist, Schooner Gulch Highway 1 Relocation, Mendocino County, CA, Caltrans, 2005-2006, $80K: Conducted rare plant surveys for coastal prairie species for a bridge replacement project.

Biologist, Vernal Pool Mitigation Bank, Butte County, CA, Caltrans, 2005, $192K: Conducted rare plant surveys for vernal pool plant endemics for a proposed mitigation bank.

Professional Societies/Affiliates

California Native Plant Society (CNPS)
Society for Ecological Restoration (SER)
California Botanical Society
California Invasive Plant Council (Cal-IPC)

Awards

National Park Service/STAR/Award for outstanding work performance

Languages

Conversational Spanish

Publications

Robertson, Dina. 2004. “Relationships Between Historic Land Use, Plant Species Composition and Environmental Factors in the Foothills South of Mount Diablo, California”. MS Thesis, University of California Berkeley

Stampe, E., K. Schwartz, and D. Robertson. 1998. "Plant Families of the Golden Gate National Recreation Area". Technical manual, Golden Gate Parks Association

Chronology

12/04 - Present: URS Corporation, Senior Ecologist, Oakland, CA

02/02 – 07/04: University of California, Berkeley, Graduate Student Researcher, Berkeley, CA

01/01 – 12/01: Natural Park Service, Natural Resource Project Manager, Sausalito, CA

07/99 – 11/99: National Park Service, Fire Effects Technician, Marin, CA

03/98 – 12/00: Consultant, North and Central Coast, CA

01/98 – 03/98: Circuit Rider Productions, Inc., Restoration Technician, CA

11/97 – 11/98: Americorps, Habitat Restoration Specialist, National Park Service, Marin County, CA

Contact Information

URS Corporation
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Tel: 510.893.3600
Direct: 510.893.1751
Fax: 510.874.3268
Dina_Robertson@urscorp.com

Cecile Shohet

Botanist, Terrestrial Plant Ecologist

Professional Experience

2008-present/Public Education Coordinator, Jepson Herbarium, Berkeley.
2008/Consulting Botanist, Rogue River/Siskiyou National Forest, Medford, Oregon.
2007-2008/Consulting Botanist, Roseburg Bureau of Land Management, Roseburg, Oregon.
2005-2007/Consulting Botanist, Plumas National Forest, Northern Sierra Nevada, California.
2005-2007/Special Project Botanist (GS-11), Rogue River-Siskiyou National Forest, Medford, Oregon.
2005-2006/Botanist (GS-11), Columbia River Gorge National Scenic Area, Hood River, Oregon.
2005/Botanist (GS-11), Stanislaus National Forest, Sonora, California
2005-2006/Consulting Botanist, Illinois Valley Community Response Team, Cave Junction, Oregon.
2000-2004/District Botanist (GS-9), Illinois Valley and Galice Ranger Districts, Rogue River-Siskiyou National Forest, Oregon.

Years of Experience

21 Years

Education

M.S./Botany, Arizona State University/1999
Biology, Queens College of the City University of New York/1989
Post Graduate Work, lichens and bryophytes, Southern Oregon

Overview

Ms. Shohet has over ten years of experience in botanical resource management, education, ecological research, and field inventory/survey work. Worked extensively with the vegetation of Northern California, Southern Oregon, and Arizona; both for the federal government and in the private sector as sole proprietor of Calypso Consulting. Currently works for the Jepson Herbarium at the University of California at Berkeley, creating and implementing educational programming for botanical professionals and enthusiasts. She has been awarded multiple federal and local government contracts to conduct rare plant surveys, including surveys of non-vascular species, on thousands of acres of federal lands in northern California (Sierra) and southern Oregon. She has six years of experience as a botanist for regions 5 and 6, U. S. Forest Service, Lassen and Rogue River-Siskiyou National Forests. As District Botanist for the Illinois Valley and Galice Ranger Districts, Ms. Shohet developed and implemented a complex botanical management program encompassing 500,000 acres of floristically diverse federal lands rich in serpentine endemic species. The program included extensive inventory and survey work of both vascular and non-vascular species of concern; supervision of seasonal field crews; resource management of timber, mining, engineering, recreation, and fuel reduction projects; grant writing (received over $150,000 in grant funding) and subsequent project implementation.

Ms. Shohet implemented and supervised a noxious weed program with $50,000 annual budget. As part of the program, supervised crews and volunteers; development of an off-road vehicle management plan for the Eight Dollar and Days Gulch botanical areas. She managed ArcGIS based databases of rare species and noxious weeds, and has prepared numerous NEPA documents, including Environmental Impact Statements (EIS) and Environmental Assessments (EA).

Through her graduate work at Arizona State University, Ms. Shohet gained strong familiarity with the Sonoran Desert flora.

Kristiaan G. Stuart

Project / Supervising Biologist/Consultation/Coordination/Project Manager

Areas of Expertise

NEPA/CEQA Documentation
Endangered Species Act Documentation
Botanical Assessments
Wildlife Assessments
Wetland Delineations
Riparian Restoration
Program Coordinator
Project Management
Task Order Manager

Years of Experience

With URS: 4 Years
With Other Firms: 14 Years

Security Clearance

Department of Homeland Security - Nov/2009

Education

MS/Biology, Plant Ecology/2000/ University California, Chico

BS/Biology, Ecology/1997/ University California, Chico

Registration/Certification

2009/Authorization to Collect Voucher Specimens of State Designated Endangered, Threatened and Rare Plants, Voucher Permit/CA/#2081(a)-09-63-V

2005/Scientific Collecting Permit for the Collection of Intertidal Marine Vertebrate and Invertebrate Species/OR

Overview

Mr. Stuart has more than 19 years of professional experience in environmental consulting and resource assessments. His areas of expertise include; NEPA and CEQA compliance and documentation, environmental permit integration, botanical & wildlife resource surveys, wetland delineations, stream inventory surveys, mitigation development and implementation. Mr. Stuart frequently works with personnel from U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Army Corps of Engineers (USACE) and state and local agencies to facilitate achieving project goals while maintaining compliance. The range of his experience, for example, includes working as a NEPA specialist for FEMA in the post Katrina/Rita and Gustav/Ike hurricane disaster recovery effort in Louisiana, environmental program coordination for California Department of Water Resources (DWR) Levee Geotechnical Evaluation Project and conducting environmental resource surveys for clients throughout Oregon, California, Nevada and Louisiana. Additionally, Mr. Stuart is fluent in the collection, processing, mapping and analysis of resources using Trimble GPS units and integrating this data into a geographical information system (GIS).

Project Specific Experience

Federal Projects - NEPA Compliance & Documentation

Senior Environmental Specialist, U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA), Public Assistance, Disasters Including: Katrina, Rita, Gustav & Ike; New Orleans, LA, 2008-2009, $13,600,000,000: Mr. Stuart served as NEPA, ESA and Executive Order specialist/contractor for FEMA. He reviewed FEMA 2008 and 2009 Louisiana disaster related projects totaling over $13.6 billion for Statutory and Categorical Exclusions; Endangered Species Act, Coastal Zone Management Act, Coastal Barriers Resource Act, Fish & Wildlife Coordination Act, Clean Water Act, River and Harbors Act, Essential Fish Habitat, Executive Orders and project level NEPA compliance. Mr. Stuart used the NEMIS & EMIS database systems to review, comment on potential project related effects and determine eligibility based on federal and state acts, laws and executive orders. He was responsible for coordinating with USFWS, NMFS and USACE to facilitate project eligibility and legal compliance through consultation. He authored informal consultation letters to USFWS, NMFS and USACE to expedite program goals while maintaining

environmental compliance. Additionally, he served as liaison to subgrantees answering concerns regarding environmental constraints and project eligibility. He participated in project kick-off meetings to qualify sub-applicants to the Public Assistance disaster relief process and environmental law requirements relating to NEPA compliance.

Senior Biologist, Multi-Project Environmental Assessment (EA), Beale Air Force Base, Yuba County, Beale AFB, CA, U.S. Air Force, 2008: Mr. Stuart initiated the review process for a multi-project EA in northern California. Project attributes included: to disclose and analyze potentially significant environmental impacts expected from implementation of the Proposed Actions that include development projects and long-term mission-based actions at Beale AFB in accordance with the General Plan; secondary objectives included determining potential cumulative impacts to air quality, biological resources, water resources, hazardous materials and waste management, noise, safety and military munitions response program, and transportation resources.

Environmental Specialist, Public Assistance, Northern California Flood Disasters (1646), Sacramento, CA, Federal Emergency Management Agency (FEMA), 2007-2008: Mr. Stuart prepared a multi-project biological assessment for California Department of Water Resources (Applicant). The biological assessment included the review of repairs to public infrastructure for San Joaquin, Stanislaus, Madera and Fresno counties. Project entailed the biological assessment of nine separate actions at 32 different sites including 25 different federally listed species.

Senior Biologist, Public Assistance, Northern California Flood Disasters (1646), Sacramento, CA, Federal Emergency Management Agency (FEMA), 2006-2007: Mr. Stuart authored several Biological Assessments (BA) for USFWS and NOAA-NMFS jurisdictional species for several post-disaster Public Assistance projects throughout northern California. Methods included site visitations and applicant interviews, species geo-database reviews, agency consultation, report preparation, GIS and peer review process. California Counties included: Butte, Calaveras, Contra Costa, Mendocino, Merced, Napa, San Joaquin, San Mateo, Santa Cruz, Sonoma and Stanislaus.

Environmental Specialist, Public Assistance, Northern California Flood Disasters, Rancho Cordova, CA, Federal Emergency Management Agency (FEMA), 2005-2006, $200,000,000: Mr. Stuart served as NEPA and ESA specialist/contractor for FEMA. He reviewed over 3000 FEMA 2005 and 2006 California disaster related projects covering 35 counties and totaling over $200 million for Endangered Species Act, Coastal Zone Management Act, Fish & Wildlife Coordination Act, Clean Water Act, River and Harbors Act, Executive Orders and NEPA compliance. Used the NEMIS database system to

review, comment on potential project related effects and determine eligibility based on the above acts and orders. Mr. Stuart utilized the California Natural Diversity Data Base (CNDDB), USFWS and NMFS GIS spatial data through ArcReader to determine potential impacts to federally listed species and topographical data for impacts to waters of the United States. He coordinated with USFWS, NMFS and USACE to facilitate in project eligibility and legal compliance through informal consultation. Additionally, he authored letters to USFWS and NMFS for requests of formal consultation. He served as liaison to subgrantees answering concerns regarding environmental constraints and project eligibility. As coordinator for staff biologists, he managed project review proficiency, logistics, and editorial reviews.

Ecologist/Canby I'SOT Geothermal Project/US Department of Energy – National Renewable Energy Laboratory (NREL), Environmental Assessment, Canby, CA, 2002: Mr. Stuart was responsible for identifying and mapping botanical resources, conducting a wetland delineation, reviewing bioaccumulation study on mercury input to Pit River, EA preparation, and client consultations on environmental compliance.

State Projects - Program Coordination, CEQA Compliance, Environmental Surveys

Senior Biologist & Field Manager/California High Speed Train (HST)/Fresno, Kings, Tulare & Kern Counties, CA/California High Speed Rail Authority, 2010 – Present, $: Mr. Stuart served several different roles on the HST project including: Field Manager, Team Leader, Technical Editor, Wetland Delineator, Botanist and Wildlife Biologist. As a field manager Mr. Stuart was responsible for the coordination and oversight of a 120 mile supplemental biological resource survey effort which included the efforts of three different environmental disciplines. As a wetland delineator, Mr. Stuart trained several different junior level biologists while in the field conducting professional level wetland delineations. He also resolved several problem areas where additional data was required or was in need of correction. As a botanist, Mr. Stuart conducted late season, comprehensive, botanical resource surveys in habitat areas including alkali flats, vernal pool/swale, alkali annual grassland/wetland mosaics, and riparian areas. As a wildlife biologist, Mr. Stuart recorded data on the available habitat and presence of existing species of fauna including vernal pool shrimp species, spade foot toads, San Joaquin kit fox, golden eagle and Swainson's hawk.

Senior Biologist/Solano Phase III Wind Turbine Project EIR/Solano County, CA/Sacramento Municipal Utility District (SMUD), 2009, $375,000: Mr. Stuart supported the development of the recirculated Environmental Impact Report (EIR) for SMUD's Phase III wind turbine generator (WTG) facility in Solano County. Tasks included

responding to agency comments from the draft EIR, responding to changes in scope with appropriate environmental policy and species specific mitigation measures.

Environmental Clearance Program Coordinator/Biologist, Levee Geotechnical Investigations, Various Locations Northern CA, California Department of Water Resources, 2006 - 2009, $70,000,000: Mr. Stuart evaluated potential impacts of subsurface soil explorations on special status species, wetlands and other sensitive biological resources for over 350 miles of project levee's. He routinely provided environmental training to all field personnel. He worked with field crews to avoid sensitive biological resources, managed sub-contractors to facilitate in the completion of task goals, worked with local, state and federal agencies to facilitate project goals while maintaining environmental compliance, and prepared environmental documentation for state and federal permits and technical assistance, respectively. California counties included: Butte, Yuba, Sutter, Yolo, Sacramento, Stanislaus and San Joaquin.

Biologist, Mineral Curve Shoulder Widening Project, Tehama County, Mineral, CA, Caltrans, 2007, $20,000: Mr. Stuart conducted botanical resource surveys at a project area adjacent to Hwy 36 where the road will be widened. The Project constraints included many sensitive wildlife and botanical species as well as adjacent wetlands.

Biologist, RSP/Drainage Repairs – Hwy 96, Humboldt County, Hoopa, CA, Caltrans, 2006, $NA: Mr. Stuart conducted wildlife and botanical surveys and wetland delineations on three project areas requiring culvert replacements and road shoulder buttressing. He completed all necessary permitting per project area requirements.

Biologist, Wall Failure Repair Project – Hwy 169 Humboldt County, Hoopa, CA, Caltrans, 2006, $NA: Mr. Stuart conducted wildlife and botanical surveys and wetland delineations on two project areas requiring the excavation and repair of road shoulders that were damaged in winter storms. He completed all necessary permitting per project area requirements.

Biologist, Storm Damage Repairs – Hwy 169 Humboldt County, Hoopa, CA, Caltrans, 2006, $55,000: Mr. Stuart conducted wildlife and botanical surveys and wetland delineations at nine project areas requiring the excavation and repair of road shoulders and culvert replacements that were damaged in winter storms. He completed all necessary permitting per project area requirements.

Biologist, Red Rock Permanent Restoration – Wetland Delineation Studies and Biological Studies, Lassen County, Doyle, CA, Caltrans, 2006, $20,000: Mr. Stuart conducted wildlife and botanical surveys and wetland delineations at a project area adjacent to Hwy 395 where the road

slope had failed adjacent to a wetland area. He completed all necessary permitting per project area requirements.

Plant Ecologist, Botanical Survey for Sensitive Plant Species at the Sunnyvale (Stevens Creek) Stream Crossing, California Department of Fish and Game, Santa Clara County, CA, 2001: Conducted botanical resource surveys and report. Key species included: western leatherwood.

Municipal Projects

Project Manager, San Francisco Public Utilities Commission, Ocean Beach Western Snowy Plover Monitoring, San Francisco County, San Francisco, CA, 2008, $35,000: Mr. Stuart provided oversight for project activities and technical review of project related documents.

Plant Ecologist/Project Manager, Bidwell Park Trails Project, Multi-season Botanical and Wetland Resource Surveys, City of Chico Parks Dept., Butte County, Chico, CA, 2001-2002, $40,000: Mr. Stuart conducted comprehensive multi-season botanical surveys throughout the 3,600 acre wild land park. He performed wetland delineations as needed for Park Dept. and developed invasive-exotic plant species inventory and distribution maps. Mr. Stuart used Trimble GeoExplorer GPS unit to accurately map sensitive species as part of a GIS. Performed all GIS tasks related to mapping of botanical resources, wetlands and invasive-exotic plant species. He participated in Park Commission public meetings.

Plant Ecologist/Project Manager, Bidwell Park Invasive Exotic Species Inventory, Distribution & Eradication, City of Chico Parks Dept., Butte County, Chico, CA, 2001-2002: Mr. Stuart inventoried and mapped, using Trimble GPS combined with GIS, all major invasive exotic plant species in the Bidwell Park system. Plant species with the greatest potential to diminish landscape quality and utility were treated with herbicides whereas less rapidly invasive species were recommended for mechanical and grazed removal. Notable invasive species included: perennial pepperweed, periwinkle, English ivy, tree of heaven and Himalayan blackberry.

Plant Ecologist/Project Manager, Cohasset Road Widening Project, Multi-season Botanical Resource Surveys, City of Chico Public Works Dept., Butte County, Chico, CA, 2001-2002, $8,000: Mr. Stuart conducted comprehensive botanical resource surveys. Mapped sensitive habitat areas with Trimble handheld GPS unit. Mapped all data in a GIS.

Plant Ecologist/Project Manager, South Volonte and River Park Expansion Projects, City of Anderson, Shasta County, CA, 2000, $25,000: Mr. Stuart performed botanical and wildlife resource surveys;

wetland delineation reports and USACE verifications for two municipal parks for the City of Anderson.

Plant Ecologist, Reconstruction and Widening of Roadway on East Side Potter Valley Road Potter Valley Wetland Delineation and Botanical Resource Survey, County of Mendocino Department of Transportation, , Mendocino County, CA, 2001: Conducted wetland delineations and botanical surveys along a 9 mile linear project area.

Plant Ecologist, Botanical Survey for Sensitive Plant Species at Cypress Ave. Bridge (BR 6-41), City of Redding, Shasta County, CA, 2001: Conducted botanical resource surveys. Key species included: bristly sedge, fox sedge, silky cryptantha and four-angled spikerush.

Plant & Wetland Ecologist, Nelson Park Expansion Project, Parks & Recreation Dept, City of Oroville, Butte County, CA, 1999, $20,000: Mr. Stuart conducted botanical and wildlife resource surveys and wetland delineations, including USACE verification and joint agency pre-application meeting resulting in vernal pool conservation area and multi-use recreation areas.

Renewable Energy Projects

Task Leader - Plant Ecologist/Calico Solar Project/San Bernardino County, CA/ Tessera Solar, 2010, $: Mr. Stuart conducted comprehensive spring and late summer botanical resource surveys for a proposed solar energy installation site located approximately 37 miles east of Barstow, CA. The approximately 8,200 acre site is located in the Mojave Desert, on a bajada below the Cady Mountains. Surveys included GPS guided line transects over large areas, covering approximately 13 miles per day. Species included crucifixion thorn, white margined beardtongue penstemon, small-flowered androstephium, fish-hook cacti, fringe-toed lizard, and desert tortoise.

Senior Biologist/Solano Phase III Wind Turbine Project EIR/Solano County, CA/Sacramento Municipal Utility District (SMUD), 2009, $375,000: Mr. Stuart supported the development of the recirculated Environmental Impact Report (EIR) for SMUD's Phase III wind turbine generator (WTG) facility in Solano County. Tasks included responding to agency comments from the draft EIR, responding to changes in scope with appropriate environmental policy and species specific mitigation measures.

Senior Biologist, Solano Wind Project, SMUD, Solano County, CA, Sacramento Municipal Utility District, 2006: Mr. Stuart conducted comprehensive botanical surveys and wetland delineations for the Phase 3 project area. He served as wetlands expert for project problem areas and independent technical review (ITR).

Ecologist, Canby I'SOT Geothermal Project, US Department of Energy – National Renewable Energy Laboratory, Environmental Assessment, Modoc County, Canby, CA, 2002: Mr. Stuart was responsible for identifying and mapping botanical resources, conducting a wetland delineation, reviewing bioaccumulation study on mercury input to Pit River, EA preparation, and client consultations on environmental compliance.

Wildlife Biologist, Goshawk Surveys, Medicine Lake Geothermal Project Area, Calpine Corporation, Siskiyou County, Medicine Lake, CA, 2002: Mr. Stuart conducted protocol level goshawk surveys for proposed transmission routes.

Linear Projects

Senior Biologist, #4-12 Pipeline, Chevron Pipeline, Richmond & Pinole, Contra Costa County, CA, 2007: Mr. Stuart conducted botanical resource and wetland delineation surveys. He prepared a Joint Aquatic Resource Permits Application (JARPA) for wetlands and other waters identified in the project area.

Senior Biologist, Chico Area Bridges Replacement Project, Union Pacific Railroad, Butte County, Chico, CA, 2006: Mr. Stuart conducted botanical, wildlife and wetland resource surveys for bridge replacement project. Constraints included wetlands, rare plants and sensitive wildlife species including Townsend's big-eared bat and Pallid bat.

Project Biologist/Environmental Inspector, Williams Communication Company, Fiber Optic Installation; Point Arena, CA to Reno, NV, 1999-2000, $5,000,000: Mr. Stuart was responsible for the management of approximately 20 environmental monitors/environmental inspectors on a fiber optic installation route extending from Sacramento, CA to Reno, NV (~150 mi). Duties included leading morning kick-off meetings with client, environmental monitors and contract crews, writing project variances for changes to scope of work, designing BMP's and mitigation measures for unique scenarios and educating monitors and contractors on proper implementation, solving project crisis situations with impromptu mitigations and resolutions, meeting and coordinating with agency personnel from RWQCB's, California Dept. of Fish and Game, U.S. Fish and Wildlife Service, National Marine Fisheries Service and U.S. Army Corps of Engineers to co-solve crisis situations and work with contractors on avoidance and minimization measures to sensitive habitats and species, conducted impromptu environmental resource surveys (botanical, wildlife & wetland) when needed due to changes in scope of work. This position required Mr. Stuart to function as a biologist and a project manager and to posses the knowledge of all environmental laws and project related environmental documentation, BMP's, construction practices: trenching, directional

boring, bridge attachments and aerial installations; comprehension of and revisions to engineer drawings. California counties included: Mendocino, Sonoma, Lake, Napa, Solano, Sacramento, Nevada, Placer and El Dorado.

Project Biologist / Environmental Inspector, AT&T Cable Removal Project, Tehama County, CA, 2002,: Mr. Stuart served as Lead Biologist, responsible for identifying and mapping all environmental resources prior to immediate construction, ensuring client/contractor environmental compliance through BMP implementation and resource avoidance, identifying suitable staging areas, and linear routes of ingress and egress. Agencies involved included California Public Utilities Commission, CaDFG, NMFS and USACE.

Plant and Wetlands Ecologist, Pacific Gas & Electric, Hydroelectric Dam and Pipeline Installation, Lassen & Tehama Counties, CA, 2001: Project entailed a feasibility study for FERC licensing. Mr. Stuart was responsible for conducting botanical and wetland delineation surveys, mapping and reports, extensive use of GPS units and data analysis, and identifying project constraints.

Plant and Wetlands Ecologist, Gasquet: Hwy 199 AT&T Fiber Optic Installation Route, Del Norte County, Gasquet, CA, 2002, $500,000: Responsible for botanical and wetland delineation surveys, mapping and reports, extensive use of GPS units and data analysis, identifying project constraints., infrastructure additions to engineer drawings, report preparation and client consultations.

Plant and Wetlands Ecologist, Quest Fiber Optic Installation Route, Lassen County, CA, 2000,: Responsible for botanical and wetland delineation surveys, mapping and reports, extensive use of GPS units and data analysis, identifying project constraints and report preparation.

Plant Ecologist, Lower San Jose Ring Stream Crossing, Worldcom – MCI Metro, San Jose, Santa Clara County, CA, 2001: Conducted botanical resource and bay checkerspot butterfly host plant surveys and report. Key species included: Mt. Hamilton thistle, Congdon's tarplant, Contra Costa goldfields, smooth lessingia, Metcalf Canyon jewel-flower, most beautiful jewel-flower, Santa Clara valley dudleya, Hall's bush mallow, fragrant fritillary and robust spineflower.

Various Projects – Plant Ecology

Plant Ecologist, Pre- and Post-Burn Vegetation Monitoring for the Lassen Foothills Project: Denny Ranch, Dye Creek & Vina Plains Preserve, The Nature Conservancy, Tehama County, CA, 2001: Conducted transect based, GPS assisted surveys on several large habitat areas including: blue oak woodland, foothill and valley grassland and vernal pool and vernal swale wetland to determine the efficacy of controlled burning in the reduction of medusa-head and yellow star thistle

and the affects to native plant associates. Data included a comprehensive species list, .25m^2 species point relevé data and cover abundance for the target invasive exotic species.

Plant Ecologist, Wetland Delineation, Freeport Shores Sports Complex, City of Sacramento Parks and Recreation Department, Sacramento County, CA, 2001: Conducted wetland delineation and botanical resource surveys and report. Constraints included a frequent disturbance regime in mixed soils.

Plant Ecologist, Botanical Survey for Sensitive Plant Species at Soda Bay Bridge (Cole Creek Crossing) Replacement Project, Lake County Department of Public Works, Lake County, CA, 2001: Conducted botanical resource surveys and report. Key species included: Baker's navarretia, beaked tracyina, bent-flowered fiddleneck, big-scale balsamroot, Bogg's Lake hedge hyssop, bristly sedge, Cobb Mountain lupine, Colusa layia, Jepson's milk-vetch, Mayacamas popcorn-flower, round-leaved filaree, and wooly meadowfoam.

Plant Ecologist, Twelve Bridges Vernal Pool Mitigation Monitoring, City of Lincoln, Placer County, CA, 2001: Conducted vernal pool plant and hydrology mitigation monitoring for hundreds of vernal pools in the Twelve Bridges project area.

Plant Ecologist, Cable Installation Route Wetland Delineation and Botanical Resource Surveys, Hallwood-Cordua Irrigation District, Yuba County, CA, 2000: Conducted wetland delineation and botanical resource surveys and report in foothill grassland, valley grassland and vernal pool wetland habitats.

Professional Societies/Affiliates

Cal-IPC (California Invasive Plant Council) Member

California Society for Ecological Restoration

California Native Grasslands Association

Ecological Society of America Member

California Association of Environmental Professionals

California Native Plant Society

Awards

1993/Cash Award/USFS

1996/Vesta Holt Merit Project Award/CSUC Dept. of Biological Sciences

Languages

Spanish (reading and some spoken)

Specialized Training

2010 – National Safety Council Defensive Driving Course Certification

2010 – BNSF & eRailsafe Safety Training

2009/EMIS Database Training - FEMA

2009/ NEPA, NHPA, ESA, Floodplain, Environmental Justice, CBRA, and Clean Water Act Training - FEMA

2008/Environmental Databases: California Natural Diversity Database (CNDDB) Rarefind, CalPhotos online database, CNPS Inventory of Rare and Endangered Plants of California, USFWS Threatened and Endangered Species System (TESS)

2006/Dept. of Homeland Security / FEMA / NEMIS Database System – FEMA

2006/Operations 1 Training – FEMA

2006/Project Worksheet Development Training – FEMA

2002/CalFlora Database (www.calflora.org) contributor

2001/Panel Judge for California Botanical Society Graduate Student Competition – Chico, CA

2000/Union Pacific Railway Safety Training

1999/DOI Aviation Safety Training, Helicopter & Fixed Wing Aircraft (OAS Course B-3) – USGS

1997-Current/GIS skills: ESRI ArcView, ArcReader, Global Mapper, Trimble GeoExplorer GPS units & post processing software

1997/Wetland Delineation Training (scored 100% on field delineation and written exam) - CSUC

1997/Certified in ArcView GIS - BCC

1997/NEPA & CEQA training - CSUC

1993/Stream Inventory Training – Region 6, USFS

1992/Wildland Fire Fighting Training – USFS

1992/Marbled Murrelet Identification Training – USFS

1992/Improvised Explosive Device Identification & Avoidance Training – USFS

Research Projects – Plant Ecology

Plant Ecologist, Pre- and Post-Burn Vegetation Monitoring for the Lassen Foothills Project: Denny Ranch, Dye Creek & Vina Plains Preserve, The Nature Conservancy, Tehama County, CA, 2001: Conducted transect based, GPS assisted surveys on several large habitat

areas including: blue oak woodland, foothill and valley grassland and vernal pool and vernal swale wetland to determine the efficacy of controlled burning in the reduction of invasive exotic plant species: medusa-head and yellow star thistle and the affects to native plant associates. Data included a comprehensive species list, .25m² species point relevé data and cover abundance for the target invasive exotic species.

Plant Ecologist/Principal Scientist, Ecology of Perennial Pepperweed (*Lepidium latifolium*), US Geological Survey, Klamath and Colusa National Wildlife Refuges and Grizzly Island State Wildlife Refuge, Klamath, Colusa and Solano Counties, CA, 1998 – 2001: Studied the ecology of perennial pepperweed, an invasive exotic plant species; in three different ecological settings in California. Studies included determining the rate and behavior of spread of nascent foci populations per soil moisture, salinity and associate species diversity and abundance. Research was also conducted on plant morphology, phenotypic plasticity, growth and reproductive biology. Plant community data was taken to be analyzed by using spatial autocorrelation.

Plant Ecologist, Effects of Soil Stratification Properties on Sacramento River Riparian Restoration Species, The Nature Conservancy; Tehama, Glenn and Butte Counties, CA, 1996: Conducted hundreds of hand auger tests to 16 foot depths classifying soils in one foot increments among several Sacramento River pre-restoration sites. Data was collected for analysis of species response to soil mosaic conditions in peer reviewed article. Mr. Stuart suggested a restoration planting regime that would target appropriate restoration species to different soil mosaic properties to maximize restoration efforts, cost and efficiency.

Publications

Riparian Forest Restoration Along Large Rivers: Initial Results from the Sacramento River Project. Restoration Ecology 1999 Vol 7(4): 360-368.

Perennial pepperweed research findings presented at California Dept. of Fish and Game, Pesticide Applicators Seminar, Fresno, CA - 3/10/99

Perennial pepperweed preliminary research findings presented to US FWS Ecological Service as an infield tutorial of the ecology of perennial pepperweed, Colusa NWR, Colusa, CA - 7-22-99

Perennial pepperweed research findings presented for Ecology and Conservation of Native Plants in California class at Dept. of Biological Sciences, California State University, Chico 10-21-99

Chronology

06/06 - Present: URS Corporation, San Diego, CA

08/03 – 08/04: Pacific High School, Port Orford, OR

12/00 – 08/04: Stuart Consulting, Proprietor, Chico, CA

04/96 – 11/00: Jones & Stokes Associates, Inc., Sacramento, CA

06/96 – 11/00: Independent Botanical and Wetlands Consultant, Chico, CA

08/97 – 05/00: Department of Biological Sciences, California State University, Chico, CA

06/98 – 08/99: United States Geological Survey, Dixon, CA

04/98 – 06/98: CSU, Chico Research Foundation, Chico, CA

07/96 – 10/96: The Nature Conservancy (cooperation with CSUC), Chico, CA

07/95 – 06/96: School of Agriculture, CSU, Chico, CA

6/92 – 8/94: United States Forest Service, Gold Beach, OR

Contact Information

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Years of Experience

20 Years

Education

Ph.D., Botany (Systematic Botany), May, 1985, Arizona State University Tempe, Arizona. Dissertation: Evolution of a hybrid polyploid complex in Opuntia, subgenus Cylindropuntia (Cactaceae).

M.A., Biology (Systematic Botany and Ethnobotany), June, 1980, Humboldt State University, Arcata, California. Thesis: Ethnobotany of the Yurok, Karok, and Tolowa Indians of Northwest California.

B.A., Botany, June, 1975, San Jose State University, San Jose, California.

A.A., Forestry, June, 1972, Bakersfield Community College, Bakersfield, California.

Research Interests

Evolution and systematics of Cactaceae; the role of polyploidy, hybridization, asexual reproduction, and geographic isolation in evolution. Flora, plant community dynamics, and ecology of the Southwestern United States, especially within the Sonoran Desert Biome; rare plant biology; currently working on the Cactaceae for the Intermountain Flora.

Research Skills

Transmission electron microscopy, scanning electron microscopy, thin-layer chromatography, high-performance liquid chromatography, cytological analysis of chromosomes of root-tips and microsporogenesis, herbarium techniques, ethnographic techniques, GPS, vegetation sampling and plant identification, especially for Arizona, Baja California, California, and New Mexico, computer data base systems, GIS, and graphics.

Institutional Affiliations

Southwest Botanical Research (duns no. 80-367-5776), Chino Valley, AZ: sole proprietor

Graduate Advisor, Prescott College, Prescott, Arizona

Adjunct Professor, Arizona State University, Tempe, Arizona

Native Plant Law Technical Advisory Board, Phoenix, AZ: member

Organizational Memberships

- Botanical Society of America
- International Association of Plant Taxonomists
- Arizona-Nevada Academy of Sciences
- Arizona Riparian Council
- California Botanical Society
- California Native Plant Society

Foreign Languages:

Spanish

Botanical Experience

1988 to present. Owner of Southwest Botanical Research. Consulting services that include Biological Assessments and Evaluations and the collection, identification, survey, and other types of research on vascular plants of Arizona, California, Nevada, and New Mexico.

1993-present. Botanical consultant for Kiva Biological Consulting. August 1993-2007: Arizona Game & Fish Desert Tortoise Survey (contract # G30061-B). Study included plant identification and vegetation sampling. 2008-2009: Fort Irwin Desert tortoise surveys; 2009: Rare plant surveys, Clark County, Nevada. Primary contact: Pete Woodman.

2005-present. Botanical consultant for Jones and Stokes, Sacramento, California. Including rare plant surveys in the Spring and Las Vegas Mtns., Clark County, Nevada, rare plant surveys in the Lake Mead area for the government of Clark County; and wetland delineation in the Barstow, San Bernardino, California area.

2008-present. Botanical consultant for URS, Santa Barbara and San Diego Offices. Projects included Mojave Desert rare plant surveys and USFWS protocol 100% coverage desert tortoise surveys.

2010. Botanical consultant for Tetratec, Inc., Mojave Desert rare plant surveys in Nye County, Nevada

1997-2007. Botanical consultant for Ecosystems Management, Inc. Projects include sensitive plant surveys for the Navajo Transmission line, Arizona/ New Mexico; sensitive plant survey for the Pittsburgh & Midway Coal Mine expansion near Ratón, New Mexico; and B.I.A. range surveys for the Navajo Partition Land, east of Flagstaff, AZ; range analysis for the Roswell BLM District, Roswell, NM. Principle contact: Bill Hevron, tel: (505) 884-8300.

1995-2006. Botanical consultant for Environet, Inc., Phoenix, Arizona. Projects include surveys for special status species, and Biological Assessment and Evaluations. Principle contact: Jill Himes, tel: (602) 438-0318.

1997 to 2002. Botanical consultant for Biozone, Inc., Prescott, Arizona. Projects include Vegetation characterization of the Watson Woods Riparian Preserve, Vegetation Characterization of the Walnut Creek Research and Learning Center, Survey for T&E species for the Hopi Reservation, and surveys.

1998. Biological consultant for Mojave Engineering Associates, Inc. Projects include Biological Assessment and Evaluations.

1994-1999. Botanical consultant for Johnson Associates Inc. Owner: Robert Johnson, tel: (408) 897-2473; projects have included biological surveys for housing developments and land fills.

1995. Botanical consultant for Hughes Environmental Consultants. Project included pipeline right-of-way Desert tortoise and botanical survey near Bullhead City, AZ and pipeline right-of-way botanical survey near Farmington, NM.

Aug 1990-1996. Botanical consultant for SWCA Associates. Subcontract duties included plant identification (including rare plant surveys in Clark County, NV), vegetation mapping and vegetation volume sampling for ASARCO, Kearny, Arizona; vegetation sampling for the San Tan Tortoise Survey, Maricopa County, Arizona; sensitive plant survey for the Wickieup-Bagdad gas pipeline, vegetation mapping for the Phelps Dodge Mine Expansion Project, Morenci and Safford, AZ, the distribution and taxonomy of *Echinocereus arizonicus* and related taxa in Arizona and New Mexico; Project coordinators: Jim Tress, Tina Lee, Scott Mills, tel: 602-325-9141.

1993-1994. Botanical consultant for Resources Management International (RMI), including a plant survey for the Wickieup-Bagdad proposed Citizens' gas pipeline, project coordinator: Catherine LeBlanc.

Jan 1991-January 1995. Botanical consultant for the Department of Anthropology, Contract Archeology, Arizona State University. Research included vegetation mapping and floristic analysis of the Tonto Basin, Arizona. Project coordinator: Glen Rice, tel: 602-479-2406, 965-7181.

1991-1992. Botanical consultant for the Army Corps of Engineers. Duties include plant collection and identification for the construction of an herbarium of Arizona wetlands plants. Project coordinator: Karen Reichhardt.

1988-1991. Botanical consultant for Ruffner Associates. Subcontracts included a three year study of the sensitive plant species of Organ Pipe Cactus National Monument; *Tumamoca* surveys for private firms; and Vegetation mapping in southern California for the Riverside Water District.

1985-1987. New York Botanical Garden, Chief Investigator, *Plant Resources of the Ecuadorean Amazon* Project. Duties included creating an integrated program of teaching and ethnography with the Shuar (Jivaro) culture.

Selected Contracts And Research Awards

2010. Current knowledge of *Pediomelium pentaphyllum* and *Cirsium wrightii* and an assessment of their geographic distribution. University of Arizona (Purchase order Y551887, $31.180). Contract: Dr. Michelle McMahon.

2010. Current knowledge of *Eriogonum terrenatum* and an assessment of the geographic distribution. University of Arizona (Purchase order Y551887, $15,590). Contract: Dr. Michelle McMahon.

2009. Verde River Vegetation monitoring. Prescott National Forest (Order no. AG-94TZ-P-09-0016, $22,050). Contact: Mike Leonard (928 443-8211).

2009. Cook's Lake Vegetation study. Bureau of Reclamation. Phoenix Area Office (Order No. R09PX32003, $21,820). Contact: Diane Laush (623-773-6255).

2008. Botanical Survey 2008 Season- Kuenzler's cactus surveys, Guadalupe Ranger District, Lincoln National Forest (contract no. AG-7512-P-07-0066). Contact: Larry Paul (505-887-9296).

2008-Present. Vegetation characterization of the Watson Woods Riparian Preserve, Prescott, Arizona. Prescott Creeks Preservation Association. Contact: Michael Byrd, 928-445-5669.

2007. Rare plant surveys for the Turkey-Gavilon Fuel Units Project, Lincoln National Forest, Alamogordo, New Mexico (Contract no. AG-7512-P-07-0017, $12,130). Contact person was Larry Cordova (505-630-3007)

2007. Rare plant consultation for the Prescott National Forest, Prescott, Arizona (Contract no. AG-8191-P-0009, $5,000).

2006-7. Geographic Distribution of *Coryphantha robustispina* ssp. *robustispina* (Pima Pineapple Cactus) and *Echinomastus erectocentrus* var. *erectocentrus* (Needle-spined Pineapple Cactus) within the extended City of Tucson HCP Southlands planning area. Contract with the City of Tucson ($23,535).

2006. Morphological analysis of *Echinocactus horizonthalonius*. State of Arizona, Tucson.

2006. Geographical and morphological analysis of *Echinocereus fendleri*. Lincoln National Forest, Alamogordo, New Mexico.

2005-2012. Monitoring of *Coryphantha robustispina* var. *robustispina* in the Alter Valley, Pima County, Arizona. Grant from the Bureau of Reclamation, Phoenix, Arizona.

2005-6. Plant surveys for the Lincoln National Forest. Alamogordo, New Mexico (contract no. AG-7512-06-0016, $8,400). Contact person was Linda Baker (505) 434-7263

2005-7. Floristic study of Rancho del Cielo, Pima County, Arizona. U. S. Bureau of Reclamation. Phoenix, Arizona. (Order no. 05PG321037).

2001-2006. Riparian vegetation monitoring for the Hubbell Trading Post National Historic Site, Ganado, Arizona. (Order No. P742004032). Contact persons: Nancy Stone, Ann Worthington (928-755-3477).

2005. A phenetic analysis of the Acuña cactus, *Echinomastus erectocentra* var. *acunensis* and its relatives: *E. erectocentrus* var. *erectocentrus*, and *E. johnsonii* . State of Arizona, Tucson, (Order no.432672).

2004. Geographic distribution and DNA analysis of *Coryphantha robustispina* ssp. *robustispina*. Arizona Department of Game & Fish, Phoenix, Arizona.

2004. Five-year monitoring study for the Pima pineapple cactus (Coryphantha robustispina ssp. robustispina). U. S. Bureau of Reclamation. Phoenix, Arizona.

2003. Rare plant surveys for the Coronado National Forest, Tucson, Arizona. (Order no. 43-8197-3-0038, $12,200)

2003. Botanical survey of the Timberon/Culp Peak Fuel Reduction Project. Lincoln National Forest, Alamogordo, New Mexico. (Order No. 0308-03-10).

2003. Elucidation of the intraspecific taxonomy of *Coryphantha scheeri* using multivariate techniques. A study in cooperation with the U. S. Fish and Wildlife Service, Tucson, Arizona.

2003. Re-measurement of riparian transects along the lower Verde River. Rocky Mountain Forest and Range Experimental Station.

2002-3. Status report of *Cylindropuntia multigeniculata*, including further morphometric studies. U. S. Fish and Wildlife Service, Las Vegas, Nevada.

2002-3. Monitoring of *Coryphantha robustispina* var. *robustispina* for the Arizona-Sonora Desert Museum, Tucson, Arizona.

2001. Rare Plant and noxious weed survey of the Bradshaw Ranger District. Prescott National Forest. (order no. 43-94TZ-1-0164; $15,800)

2002. Survey and documentation of noxious weeds for the Coconino County Department of Public Works, Flagstaff, Arizona. ($6,100).

2002. Range analysis for the Chino Valley Ranger District (Prescott National Forest), Chino Valley, Arizona.

2001-2006. Botanical surveys and monitoring for the Scott Able Fire, Sacramento Ranger District, Lincoln National Forest, New Mexico. (43-7512-1-0113; $54,000). Contact person was Linda Baker (505) 434-7263

2001. Geographic survey of the a new species of *Leptodactylon* from Arizona. Prescott National Forest. ($2,500).

2001. Re-measurement of riparian transects along the upper Verde River and its tributaries. Rocky Mountain Forest and Range Experimental Station ($18,000).

2000. Re-measurement of riparian transects along the upper Verde River. Rocky Mountain Forest and Range Experimental Station (REC206, $5,000).

2000. Surveys and autecology of the Pima Pineapple Cactus (*Coryphantha scheeri*). Bureau of Reclamation. (00PG321054; $14,123.23).

2000. Vegetation mapping of the Peoria Planning Area. Maricopa County Water Conservation District, Phoenix, Arizona ($18,000). [study included mapping 40,000 acres of Sonoran Desert vegetation).

1999. Plant Status Reports for five plant species (Conioselinum mexicanum, *Erigeron arisolius, Eupatorium bigelovii, Lupinus huachucanus,* and *Stellaria porsildii*). Coronado National Forest (43-8197-9-0099, $2,500).

1999. Vegetation mapping of the greater Phoenix and Tucson Metropolitan Planning Areas as a part of the CAP water reallocation EA. Bureau of Reclamation, Phoenix, Arizona ($55,000). [study includes mapping 1.2 million acres of Sonoran Desert vegetation]

1999. Vegetation mapping of the Santa Cruz River Flood Plain, Pima Co., Arizona. Bureau of Reclamation, Phoenix. (Contract no. 99320500061, $9,750).

1999. Weed survey for the Coronado National Forest, Tucson, Arizona. (contact nos. 43-8167-8-0089, 43-8197-9-0077, $21,350, $4,600).

1999. Rare plant survey for the Lincoln National Forest. Alamogordo, New Mexico. (Contract no. 443-7512-8-0081, $1,850).

1998. Multivariate analysis and DNA study of the Blue Diamond Cholla and related taxa. U.S.F.W.S., Reno, Nevada.

1998. Riparian vegetation inventory for the middle Verde River, Rocky Mountain Research Station (contract no. 43-8167-8-0069, $5,000).

1998. Range analysis for the Prescott National Forest (contract no. 43-8167-8-0089, $23,000).

1998. Riparian vegetation baseline for the Hubbell Trading Post National Historic Site ($2,900).

1998. Floristic analysis of the Walnut Creek Riparian Preserve.

1998. Cactus research at Carlsbad National Park (contract no. 1443-cx-7170-98-001, $10.000).

1997. Range analysis for the Prescott National Forest (contract no. 43-8191-7-0106, $8,600).

1997. Riparian vegetation inventory for the upper Verde River, Prescott National Forest. (contract no. 43-8191-7-0104, $5,000).

1996. Vegetation characterization of the Watson Woods Riparian Preserve, Prescott, Arizona ($12,761).

1996. Identification and annotation of the Yavapai College Herbarium (YCH). Yavapai College, Prescott, Arizona ($6,270).

1996. Plant identification for the USDA, Forest Service Intermountain Research Station, Ogdon, Utah.

1995. Plant inventory in the Wet Beaver Creek Wilderness, Arizona. Coconino National Forest, U. S. Forest Service P. O. 43-8167-5-033 (6,800).

1995. Vegetation characterization of Cooks Lake, Arizona. U. S. Bureau of Reclamation contract No. 1425-5-PG-32-03630 (14,400).

1995. Botanical survey of the China Dam Grazing Allotment, Chino Valley Ranger District, Prescott National Forest, Chino Valley, Arizona. Share-Cost Agreement No. CCS-09-01-95-0127-MC-26801 ($37,616).

1995. Survey for endangered or candidate plant taxa of proposed National Forest land exchanges within the Verde Valley, Yavapai County, Arizona. Coconino National Forest contract No. 43-8167-5-0171 ($2,450).

1994. Botanical survey of the Limestone Grazing Allotment, Chino Valley Ranger District, Prescott National Forest, Chino Valley, Arizona. Share Cost Agreement No. CCS-09-94-076-26201 ($36,810)

1994. Reproductive status of *Vauquelinia californica* ssp. *pauciflora*. Contract from the Arizona Department of Agriculture, Phoenix, Arizona through the Arizona State University Department of Botany, ASU No. 94-0925 (4,000).

1994. Nutrioso milk-vetch (*Astragalus nutriosensis*) status survey. Contract from the Arizona Department of Agriculture, Phoenix, Arizona ($4,000).

1993. Botanical survey of the Camp Wood, Williamson Valley, Yolo North, and Yolo South grazing allotment of the Chino Valley Ranger District, U. S. Forest Service, Chino Valley, Arizona. Contact No. 43-8191-3-0132 ($22,292).

1992. Prescott National Forest. Botanical Survey of the Woodchute, Juniper Mesa, Sycamore Canyon and Apache Creek Wilderness Areas. Contact No. 43-8191-2-0221 ($17,797).

1992. U. S. Army Corps of Engineers. Construction of a Arizona Riparian plant reference collection. Contract No. DACW09-92-M-0103 ($2,500).

1991. U. S. Army Corps of Engineers. Construction of a Arizona Riparian plant reference collection. Contract No. DACW09-91-M-0342 ($2,500).

1982. Research assistantship, cytogenetic analysis of *Cowania* and *Fallugia* (Rosaceae). The feasibility of host range expansion in nitrogen_fixing non_legumes. Arizona State University Research Fund 521475, and National Science Foundation grant # TCM_8204885. Tempe, Arizona.

1981. Research assistantship, alkaloid analysis of *Opuntia* (Cactaceae). Arizona State University, Tempe, Arizona.

1980. Inventory of the rare and endangered species of Six Rivers National Forest. United States Forest Service contact, Eureka, California.

1979. Distribution of the rare and endangered plant species, *Arabis mcdonaldiana*. United States Forest Service contract, Eureka, California.

1978-1979. Sensitive species inventories for proposed timber sales. Bureau of Indian Affairs; Eureka, California.

1978. Autecology of the rare plant species, *Pityopus californicus*. United States Forest Service contact. Eureka, California.

Teaching And Related Experience

1996 to present. Graduate advisor for Prescott College, Prescott, Arizona.

1996. Short courses in plant identification for the U. S. Forest Service Intermountain Research Station and the Prescott National Forest.

1987-1997. Independent study advisor for Prescott College, Prescott, Arizona.

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