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**DOCKET**
**09-AFC-7**
DATE OCT 22 2010
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October 22, 2010

California Energy Commission
Docket Unit
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: **PALEN SOLAR I, LLC'S REBUTTAL TESTIMONY: BIOLOGICAL RESOURCES**
**PALEN SOLAR POWER PROJECT**
**DOCKET NO. (09-AFC-7)**

Enclosed for filing with the California Energy Commission is the original of **PALEN SOLAR I, LLC'S REBUTTAL TESTIMONY: BIOLOGICAL RESOURCES**, for the Palen Solar Power Project (09-AFC-7).

Sincerely,

Marie Mills

# Palen Solar I, LLC's Rebuttal Testimony:

# Biological Resources

**Palen Solar Power Project (09-AFC-7)**

**October 22, 2010**

STATE OF CALIFORNIA

Energy Resources
Conservation and Development Commission

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| In the Matter of: | **DOCKET NO. 09-AFC-07** |
| Application For Certification for the PALEN SOLAR POWER PROJECT | **DECLARATION OF** Jennifer Gugliano |

I, Jennifer Gugliano, declare as follows:

1. I am presently employed by AECOM, as a Project Director and Associate Principal.

2. A copy of my professional qualifications and experience was included in my opening testimony.

3. I prepared the attached rebuttal testimony relating to Biological Resources for the Palen Solar Power Project (California Energy Commission Docket Number 09-AFC-07).

4. It is my professional opinion that the attached prepared rebuttal testimony is valid and accurate with respect to issues that it addresses.

5. I am personally familiar with the facts and conclusions related in the attached prepared rebuttal testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct to the best of my knowledge and that this declaration was executed on October 22, 2010.

Original Signed

_____

Jennifer Gugliano

STATE OF CALIFORNIA

Energy Resources
Conservation and Development Commission

| | |
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| In the Matter of: | **DOCKET NO. 09-AFC-07** |
| Application For Certification for the PALEN SOLAR POWER PROJECT | **DECLARATION OF** Alice Karl |

I, Alice Karl, declare as follows:

1. I am presently employed as an Ecologist.

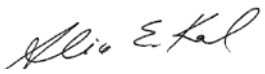
2. A copy of my professional qualifications and experience is included herewith (Attachment A to Rebuttal Testimony) and is incorporated by reference in this Declaration.

3. I prepared the attached rebuttal testimony relating to Biological Resources for the Palen Solar Power Project (California Energy Commission Docket Number 09-AFC-07).

4. It is my professional opinion that the attached prepared rebuttal testimony is valid and accurate with respect to issues that it addresses.

5. I am personally familiar with the facts and conclusions related in the attached prepared rebuttal testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct to the best of my knowledge and that this declaration was executed on October 22, 2010.



Alice E. Karl, Ph.D.

STATE OF CALIFORNIA

Energy Resources
Conservation and Development Commission

| | |
|---|---|
| In the Matter of: | **DOCKET NO. 09-AFC-07** |
| Application For Certification for the PALEN SOLAR POWER PROJECT | **DECLARATION OF** Angie Harbin-Ireland |

I, Angie Harbin-Ireland, declare as follows:

1. I am presently employed by AECOM, as a Senior Biologist.

2. A copy of my professional qualifications and experience was included in my opening testimony.

3. I prepared the attached rebuttal testimony relating to Biological Resources for the Palen Solar Power Project (California Energy Commission Docket Number 09-AFC-07).

4. It is my professional opinion that the attached prepared rebuttal testimony is valid and accurate with respect to issues that it addresses.

5. I am personally familiar with the facts and conclusions related in the attached prepared rebuttal testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct to the best of my knowledge and that this declaration was executed on October 22, 2010.

Original Signed

_____

Angie Harbin-Ireland

**PALEN SOLAR POWER PROJECT**
**BIOLOGICAL RESOURCES**
**REBUTTAL TESTIMONY**

I. Name: Jennifer Guigliano, Alice E. Karl, Ph.D, and Angie Harbin-Ireland

II. Purpose:

Our rebuttal testimony addresses the issues contained in the Opening Testimony of Ilene Anderson for Intervener CBD which was filed in the Palen Solar Power Project (09-AFC-07) proceeding.

III. Qualifications:

**Jennifer Guigliano**: I am presently employed at AECOM Design and Planning, and have been for the past 5 years and am presently a Project Director and Associate Principle with that organization. I have a Masters of Engineering Degree in Environmental Engineering and a Bachelors of Science Degree in Combined Science with Biology and Environmental Sciences Minors and I have over 12 years of experience in the field of environmental consulting and natural resources management, including biological resources, water resources and storm water management, and environmental compliance and permitting. I prepared or assisted in the preparation of post-filing information, data responses, and supplemental filings, including the mitigation planning documents for Biological Resources. A detailed description of my qualifications is contained in the resume attached to my Opening Testimony.

**Alice Karl:** I am presently self-employed and have been for the past 32 years. I have M.S. and Ph.D. degrees in ecology and I have over 32 years of experience in the field of desert ecology. I assisted in the preparation of this rebuttal testimony. A detailed description of my qualifications is contained in the attached resume .

**Angie Harbin-Ireland:** I am presently employed at AECOM Inc., and have been for the past 3 years and am presently a Senior Biologist with that organization. I have a B.S. Degree in Wildlife Biology, an M.S. Degree in Ecology, and I have over 12 years of experience in the field of wildlife biology and ecology. I prepared or assisted in the preparation of the post-filing information, data responses, and supplemental filings to the Application for Certification related to Biological Resources. A detailed description of my qualifications is contained in the resume attached to my Opening Testimony.

To the best of our knowledge all referenced documents and all of the facts contained in this testimony are true and correct. To the extent this

testimony contains opinions, such opinions are our own. We make these statements and provide these opinions freely and under oath for the purpose of constituting sworn testimony in this proceeding.

IV. Exhibits

In addition to this written testimony, we are sponsoring the following exhibits in this proceeding.

| | |
|---|---|
| Exhibit 58 | **Hyundai Motor America Mojave Proving Grounds Desert Tortoise Translocation Study 2006 Annual Summary,** dated March 2007, and docketed on October 22, 2010. |
| Exhibit 59 | **Chapter 7 Guidelines for Handling Desert Tortoises – Mojave Population and Their Eggs**, dated December 2009, and docketed on October 22, 2010. |
| Exhibit 60 | **Mechanistic Investigation of the Distributional Limits of the Desert Tortoise,** dated May 2004, and docketed on October 22, 2010. |
| Exhibit 61 | **Field Et Al. 2007 Return to the Wild: Translocation as a Tool in Conservation of the Desert Tortoise,** dated _____, and docketed on October 22, 2010. |

V. Rebuttal

**Overarching Issues**

The generalized strategy of 1:1 mitigation for desert tortoise habitat is proposed to mitigate a multitude of other species – golden eagles, migratory/special status species birds, bats, badger, kit fox, and rare plants. While the Revised Staff Assessment (RSA) requires that acquired mitigation lands must be habitat for these impacted species, because that habitat is already inhabited by the same species for which mitigation is sought, this mitigation strategy ensures a *net decrease* in habitat for impacted species. To actually provide mitigation that staunches species' habitat losses, the ratio must be higher than 1:1[1]. I recommend a *minimum* 2:1 mitigation is more appropriate to assure, not only that the project impacts are mitigated appropriately but that the net losses of habitat for rare species are stopped. This strategy is essential to prevent future listings under Endangered Species Acts – both state and federal.

***Response***

*The mitigation strategy includes compensatory mitigation for listed species that require mitigation for impacts in accordance with the status of the species and/or the habitat quality. Mitigation is proposed at ratios of 1:1 to 5:1 depending upon the resource and regulatory requirements. Stabilized and partially stabilized dunes will be mitigated at a 3:1 ratio and desert tortoise critical habitat will be mitigated at a 5:1 ratio. The balance of the habitat on site is mitigated at a 1:1 ratio. The total overall site mitigation will be greater than 1:1 given these higher ratios and the likelihood that all habitat requirements and mitigation land criteria for each resource cannot be entirely achieved on overlapping lands. All mitigation ratios for each resource are consistent with the NECO plan. As a result of field surveys, and as confirmed by the USGS model, the Palen plant site has been classified as consisting of low quality desert tortoise habitat. However, the mitigation land selection criteria as set forth in BIO-12 requires preservation of lands that will need to meet standards beyond that of the Project site. Compensatory mitigation is not required for all biological resources impacted by the project. There is not CEQA precedence or a regulatory requirement to provide compensatory mitigation for nonsensitive species or those that may be on state special concern or watch lists but have a widespread distribution such as American badger and many bird and bat species. Avoidance and minimization measures have been proposed that reduce potential impacts to individuals below a level of significance. Still, the compensatory mitigation proposed for listed species, at a greater than 1:1 ratio, will provide high value resources for co-occurring species beyond those that drive the obligation.*

*It should also be noted that no golden eagle nests with confirmed sign of reproduction were detected within the 10-mile radius survey area required*

*by the agencies and no nesting habitat is present within 1-mile of the site where indirect impacts would be most likely to occur. Still, preservation of over 7,000 acres of habitat offsite will be protected in perpetuity as foraging area for golden eagles and other raptor species.*

*The offsite mitigation land is also not the only mitigation proposed for rare plants. An entire condition of certification was developed to address mitigation requirements for special status plant species, even though no federal or state listed plants have been identified within the project disturbance area and the project redesign avoids most CNPS List plants found in the survey area. COC BIO-19 presents avoidance and minimization measures as well as potential additional compensation measures for impacts to special status plant species.*

Many of the plans that are proposed by staff to adequately minimize or mitigate impacts are either not provided in the RSA or anywhere else or are draft plans that lack specific details in order to evaluate their effectiveness. Therefore it is impossible for me to evaluate or determine the efficacy of proposed minimization and mitigation to actually adequately mitigate impacts. While I recognize that the regulatory agencies have the responsibility of assuring that mitigation meets all the LORS and conditions, I have not always found that to be the case. Studies of mitigation compliance have borne this out as well.[2] Making all of the plans available as part of the public process is important to assure the public that their public resources are being protected – without public disclosure of these plans during the process there is no way to evaluate whether the Commission has put in place adequate plans to prevent degradation of our natural heritage, clean air and water. I recommend that the Commission put in place a public process that enables public input on the plethora of "mitigation" plans that are being proposed as conditions of certification for this (and other) proposed projects.

***Response***

*Regarding the supplemental plans that present further measures to manage resources, draft plans were prepared and docketed in January 2010. No comments from agencies or interveners were ever received on these plans. The plans were prepared in accordance with guidelines and agency direction at the time. PSI recognizes that the plans will need to be updated based on project refinements, new agency guidelines, and performance standards outlined in the COCs. The plans must be approved by the agencies at identified time frames to ensure that the content is appropriate to achieve the required minimization and mitigation goals. Ms. Anderson raises a legal issue relating to adequacy of performance standards and implementation plans under CEQA. Counsel will address this issue at the hearings or in a legal brief.*

**Desert Tortoise**

I recognize that little recent desert tortoise sign was found on the proposed project site, and desert tortoise, if present currently, are likely to inhabit the site at very low densities. The project site it located in the Eastern Colorado Recovery Unit of the desert tortoise – a recovery unit that is in steep decline, having population decreases of 37% between 2005 and 2007[3], which is the most recent data publicly available. This decline is has occurred over ten years *after* the species was placed under Endangered Species Act protection.

***Response***

*USFWS (2009a) data for the Eastern Colorado Recovery Unit span 4263 km$^2$, which necessarily incorporates a continuum of tortoise densities and habitat qualities. Many areas, the Palen project included, have no or very few tortoises because of the habitat quality, not because of tortoise population declines. While tortoises there still must be protected, recovery can be best facilitated in the DWMAs, where the higher quality habitats and higher tortoise densities can promote population persistence. In fact, the density data reported by USFWS for this recovery unit are for the DWMAs, not habitat outside the DWMAs.*

*With regard to tortoises in native habitat, it is the areas with no or few tortoises that should be targeted for development. The Palen Project is in one of those areas*.

If desert tortoise are found on the proposed project site, the proposal is to move any desert tortoise through relocation or translocation. The most recent report on desert tortoise translocations document[4] an unacceptable 44% confirmed mortality of translocated desert tortoise since the translocation occurred 2008 and the last surveys in 2009. Thirty-five additional tortoises (22%) were "missing" – status unknown. Coupled with that, all translocated tortoise had tested negative for deadly diseases prior to being translocated, but post-translocation, 11% tested positive setting up a tragic epidemiological situation.

The Independent Science Advisors also offer a desert tortoise specific recommendation - "As with the Mohave ground squirrel, the advisors do ***not*** recommend translocation of desert tortoise as effective mitigation or conservation action, in part because translocated tortoises suffer high mortality rates" [original emphasis][6]. This important recommendation is additionally noteworthy because the two desert tortoise advisors, were both independent researchers on the Fort Irwin translocation effort, as well as other translocations. Their recommendation strongly suggests that translocation may do more harm than good.

***Response***

*Ms. Anderson cites a progress report (Gowan and Berry 2010) for the Fort Irwin translocation project as "the most recent report on desert tortoise translocation," implying that it is a comprehensive analysis of desert tortoise translocation. In fact, it is only one progress report for one year from one of three research groups for this project. Even so, this report documents that 44% of the original 158 translocated tortoises died within the first two years of the study. The report also identifies that by the end of 2009, 11% of the tortoises remaining alive (n=65) had test results indicating exposure to the pathogen, Mycoplasma agassizii.*

*Regarding desert tortoise mortality associated with the Fort Irwin translocation project, a joint paper produced by the principal investigators for that project (Esque et al. 2010) demonstrated that, while coyote depredation on tortoises was very high due to depleted prey conditions and elevated coyote densities (as a result of weather patterns over the previous three years), it was not significantly different among translocated, resident, and control tortoises. Furthermore, many tortoises were depredated prior to translocation. Third, coyote depredation was localized to a few geographic areas within the study, those associated with human population concentrations or low elevations. Finally, heightened coyote depredation was not isolated to Fort Irwin – it was observed elsewhere in the desert. In summary, then, they concluded that translocation was not the cause of the high mortality from coyote depredation.*

*Regarding the seroconversion observed by Gowan and Berry (2010) for their study animals, three observations are noteworthy. First, seroconversion simply indicates that tortoises have been exposed to M. agassizii; it does not identify that they are infected. The researchers do not report on clinical signs associated with these tortoises, so it is unclear if they were diseased or not. Second, this study has no controls. Without a control population for comparison, one cannot draw conclusions that any results are solely due to translocation. The note that the results are higher than 669 tortoises found two years earlier is not conclusive, because some of those tortoises may also have serocoverted during the intervening years as well and they were also from a different area.*

*Finally, the rate of seroconversion noted by the investigators was highest at two of the four study plots, most likely because of a higher incidence of diseased resident animals at those plots. Had the researchers examined tortoises from those sites prior to translocating tortoises from Fort Irwin, they might have observed that this was, perhaps, not the best location for translocation due to the number of diseased tortoises there.*

*This leads us to the next point, which is that the two scientists on the DRECP Scientific Advisory Committee are both associated with the Fort*

*Irwin translocation project, as noted by Ms. Anderson. It does not seem surprising that researchers who have had "difficult" translocation results on a single project are recommending against translocation. By contrast, several other translocation projects have had high translocation success. For example, a large-scale, multi-year translocation project in Nevada found no significant differences in mortality between translocated and resident tortoises (Nussear 2004). The principal investigator reached the following conclusion (Nussear 2004: 54):*

> *"Our study demonstrates that desert tortoises can be translocated without significant adverse effects. Indeed, by the end of our three-year study, translocated tortoises were indistinguishable from resident animals with respect to all of our measures of success. Importantly, translocated animals had similar survivorship, and produced the same number of eggs each year as did resident animals, even in the first year after translocation."*

*Field et al. (2007:242) reached similar conclusions about the potential for desert tortoise translocation:*

> *"We conclude that . . . initial success in our translocation demonstrates high potential for longer-term successes. We strongly suggest that translocation be considered a valid tool available for conservation of the Desert Tortoise."*

*In 2004 and 2005, Karl translocated 27 tortoises in the western Mojave Desert for a five-year translocation project. Two years into the study (the same time period as for the Fort Irwin progress report) Karl observed that there was no significant difference in mortality between translocatees and control tortoises (Karl 2007). Only two tortoises died in the first two years, an elderly translocatee and one control tortoise. Body condition indices were also similar for the control and translocated tortoises. Furthermore, no translocated tortoises seroconverted (i.e., became positive for exposure to M. agassizii), although one control tortoise became suspect and another control tortoise, positive for exposure to M. agassizii at the outset of the study, had reduced titer levels over time and ultimately became only suspect. A third control tortoise had titer levels that went from negative to suspect and back to negative. Tortoises had been translocated approximately 30 km from their capture site and the translocation sites had been carefully chosen and surveyed prior to tortoises being translocated there.*

Despite all of the bad news about translocation for desert tortoise and against the recommendations of the independent science advisors to the DRECP, one of the

conditions of certification (Bio – 10) requires only that a translocation and relocation plan be developed in the future. The desert tortoise translocation plan is not finalized and areas have not been identified for translocation. Based on the existing draft plan (DR-BIO-55) which no longer complies with the most recent guidelines from USFWS[7], it is very unclear to me how successful this proposal will be.

Because a final translocation plan or even a revised draft translocation plan has not been provided, there is no way for me to comment on it. However, from the information that was provided several concerns arise. For example, long-term monitoring of relocated desert tortoise is virtually absent from the Draft Desert Tortoise Translocation Plan. Because of the poor track record of successful relocation/translocation of desert tortoise[8], long-term post-relocation monitoring is essential to fully evaluate the success of any relocation effort.

In order to assure that any relocated desert tortoises do not have to be moved subsequently as avoidance and mitigation for other projects, safeguards must be put in place to preserve lands onto which any animals are relocated/translocated and the conditions of certification need to include this important concept.

***Response***

*The above discussion on translocation is largely a moot point. No desert tortoise were found within the project disturbance area associated with the plant site. The only desert tortoise sightings were south of I-10 in the outer edges of the buffer area and beyond and on the very western end of the transmission line corridor within the buffer area. Little sign was detected within the project disturbance area - only one class III burrow was identified within the plant site boundary. All other sign detected within that project disturbance area was class IV or V, indicating no recent sign of desert tortoise. The data indicate, then, that any tortoises found will be moved only a short distance, within their home range. . The greatest likelihood of encountering a tortoise during clearance surveys will be on the western portion of the transmission line in which case they will be moved onto adjacent lands within their home range but out of harm's way. So, they will not be translocated in the true biological sense of moving them outside their home range. USFWS agrees with this definition of translocation of desert tortoises as "moving them from harm's way to a location outside their home range (e.g., more than 1,000 feet 305 meter])" (USFWS 2009b) Moving tortoises less than 1,000 feet is therefore not translocation. (For ease of management directives, USFWS has recently categorized removal of a tortoise from harm's way to a point <1,000 ft away as "short distance translocation", although it is not translocation in the biological sense.)*

*Regarding the translocation plan, a draft plan was prepared and docketed in January 2010. No comments from agencies or interveners were ever received. The plan was prepared in accordance with guidelines and agency direction at the time. PSI recognizes that the plans will need to be updated based on project refinements and new agency guidelines, which were not issued until August 2010. The plan must be approved by the agencies prior to any desert tortoise clearance and translocation activities to ensure that the content is appropriate to achieve the required minimization and mitigation goals. This plan is also required to obtain the Section 7 incidental take permit and Biological Opinion from the USFWS. The final plan will include proposed translocation recipient and control sites as required by the agencies and these sites must meet the requirements identified in the USFWS guidelines (2010).*

Specifically regarding Bio-9 (1), the desert tortoise fencing along Interstate 10 needs to be installed prior to any desert tortoise relocation or translocation. Desert tortoises are known to make long distance movements after being moved and having a fence in place may help to minimize mortality.

***Response***

*As stated above, the absence of tortoise and recent sign on the site or within the buffers strongly suggest that no or very few desert tortoises will be translocated. The highest probability is for relocation of desert tortoise out of harm's way along the transmission line west of the site While it is an extremely low probability that a relocated tortoise would attempt to cross I-10, PSI agrees to install tortoise fencing at I-10 per Condition of Certification BIO-9 commensurate with installation of tortoise fencing for the site construction as long as Caltrans approves the timing of installation.*

While the RSA recognizes that the proposed project and reconfigured alternatives fall within a Northern and Eastern Colorado Plan (NECO) designated Wildlife Habitat Management Area (WHMA), it does not discuss that the area is specified for Desert Wildlife Management Area (DWMA) *connectivity*. Because the propose project and reconfigured alternatives are not only in desert tortoise habitat, but within a WHMA and WHMA for DWMA connectivity[9], the proposed 1:1 mitigation is inadequate. As stated above 1:1 mitigation ratio is not generally appropriate, even for impacts to currently unoccupied desert tortoise habitat, in this instance, the 1:1 ratio is particularly inappropriate because it does not take into consideration the importance of this specific location in the WHMA for DWMA connectivity as identified in the NECO plan. Therefore, at minimum, a 2:1 mitigation ratio needs to be implemented to truly off-set the impacts to this important linkage zone.

As part of the Desert Renewable Energy Conservation Plan (DRECP), an Independent Science Advisor committee was convened, and they have recently produced Draft Recommendations for the DRECP. In that document they state "One action that we generally do ***not*** endorse as mitigation per se—except perhaps under certain rare circumstances where scientific evidence suggests it may be warranted—is animal translocations out of proposed development areas into reserve areas. This is often done but rarely effective—a "feel-good" measure that has dubious ecological benefits and potential to do more harm than good."[original emphasis][5].

Because so many of the proposed mitigations for badger, kit fox and other species depend upon "passive relocation" or translocations and the lack of evaluation of impacts from these types of activities in the RSA,I believe a re-evaluation of impacts needs to be included in a supplemental environmental review.

***Response***

*Passive relocation of these species is a standard mitigation measure and agency preferred avoidance method. Passive relocation of badger, kit fox, and burrowing owl is necessary to avoid violation of fish and game code which prohibits take of furbearers and raptors. Agencies do not have a mechanism to permit take of these species and therefore must require passive relocation when they are present. Passive relocation of the burrowing owl, kit fox, and badger has been successful on many other project sites when suitable open lands are available adjacent to the project area, as is available adjacent to the Palen project site. Artificial burrows will be installed in the vicinity to offset the loss of active burrowing owl burrows and provide potential habitat or refuge sites for relocated owls. There is no information that could be generated by additional impact analyses on this project that would change the project impacts or mitigation as proposed.*

Despite the cumulative impacts analysis for desert tortoise, I fail to see how the proposed conditions of certifications guarantee adequate compensation for the impacts to this identified connectivity. The project is proposed in an identified linkage area for desert tortoise as per the NECO plan[10], yet the mitigation relies on "probable" linkages (RSA at C.2-177). The nearest "probable" linkage (RSA at Biological Resources Figure 6) includes another proposed large-scale industrial solar project – Desert Sunlight, which has a DEIS currently out for public review.

***Response***

*Figure 2-21 from the NECO plan referenced above is inconclusive and not supported by actions or mitigation requirements in the NECO plan. The*

*area referred to is actually referenced as "Proposed WHMA (DWMA Continuity)" and is not clearly addressing DT connectivity or implying that there is a key linkage. The area is actually a narrow strip along I-10 that is adjacent to a DWMA south of I-10 but does not actually connect to any other DWMAs. North of the area is a Proposed WHMA. It is not logical to assume that the area on either side of I-10 is a key linkage for desert tortoise, especially in light of the low tortoise densities north of I-10. Habitat adjacent to major roadways does not even qualify as mitigation land for desert tortoise due to the impacts and risks of the road on the species. This figure is taken out of context and not supported by specific requirements from the NECO plan and is not supported by field conditions and quality of habitat for the desert tortoise associated with the project site.*

*Even so, assuming that this linkage will be adopted, the only way that this linkage would promote continuity across I-10 is for the freeway to be fenced on both sides with tortoise-proof fencing, to eliminate tortoise mortality from the highway. The culverts would be unfenced and would act as pass-throughs under the freeway. The Project identified 24 underpasses for I-10, including four in the immediate vicinity of the project that were concrete bridge structures spanning large washes. As part of mitigation for the project, the Project will erect freeway fencing to facilitate the continuity proposed by NECO and eliminate tortoise mortality. The Project is also installing a box culvert to facilitate wildlife movement under the access road constructed for the project site.*

*Even with the site conditions and habitat quality mapped, mitigation for the part of the project site that is designated as critical habitat (within the DWMA) is proposed at 5:1. That is more than appropriate given that the habitat is of low quality and that desert tortoise and recent sign were not observed in the plant site. As stated above, this area does not have desert tortoise presence or sign that indicates it is an important linkage zone for the desert tortoise. In addition, the project is incorporating fencing to facilitate safe movement of tortoise along the highway to culverts and crossings.*

The RSA generally fails to recognize that based on the current desert tortoise recovery plan[11], the project is located in the *eastern* Colorado recovery unit. Instead, the analysis uses a *draft* revision of the desert tortoise recovery plan's scheme which "lumped" two currently distinct recovery units - the eastern Colorado and the northern Colorado recovery units - into a single unit – the Colorado recovery unit. However more recent data indicate that the two recovery units in the current recovery plan are genetically unique and fully justifiable[12]. The conditions of certification do not require that mitigation lands be in the eastern Colorado recovery unit, but instead include the much larger and genetically different northern Colorado recovery unit. In my mind, this also undermines the

efficacy of the proposed mitigation and fails to fully mitigate the impacts to the unique genetic type of desert tortoise found in the eastern Colorado recovery unit.

***Response***

*The analyses and measures presented are based upon the NECO plan available for consultation and reference, which is the appropriate management document for which the project is required to comply. Other professional papers and discussions that have not been fully evaluated in terms of their relevance to successful recovery of the species do not drive the regulatory requirements and LORS for which the project must comply. The current mitigation is required to be within the Colorado Recovery Unit and is governed by many biological conditions to maximize the benefit of the proposed mitigation lands to the recovery of the species, including prioritization within the Chuckwalla DWMA as first priority and the Chemehuevi DMWA as the second.*

Recent science indicates that canid predation affects both resident, control and translocated desert tortoises[13]. While the minimization measures that are proposed for reducing some predators on the proposed project site and reconfigured alternatives, the new and best available science needs to be incorporated into the Conditions of Certification for this (and other projects). Ravens, another human subsidized predator in the desert, have also been identified as predators on desert tortoises. The Conditions of Certification require that payment be made to support the USFWS Regional Raven Management Program (Bio 13(2)). The CEC or CDFG should set up and implement a similar program to address the regional canid management in support of reducing predation of desert tortoises (and other rare animals) and that payment in support of that program also be required as a Condition of Certification.

***Response***

*The project site is unlikely to attract additional canid predators. The entire site will be fenced and management measures implemented to minimize the potential for new subsidies that would attract canids. Measures in the draft raven plan facilitate implementation of measures to control subsidies for ravens and other predators. The draft desert tortoise translocation plan requires monitoring that would also identify a predation problem if one exists. The recent science referred to by CBD does not draw a direct correlation between development of a facility with low human activity levels and an increase in canid predation on tortoise populations. The Esque 2010 study rather draws a correlation with the size of human populations in nearby communities and decreased abundance of other canid prey following drought years. There is no evidence provided that a solar power plant would serve as a subsidy to canid predators that may*

*affect locally occurring or translocated tortoises. Nonetheless, the project has implemented project design features and management measures that are sufficient to reduce any potential impact from project activities to a less than significant level. It is not the responsibility of this project to facilitate development of a regional canid management program or determine if there is enough scientific evidence to warrant the need for one. Such management programs can have unintended consequences that must also be considered, particularly to native wildlife and ecosystem balance.*

**Sand Dune Community/Mojave Fringe-toed Lizard**

Bio-20 lays out criteria for compensation lands that in my opinion do not accurately mitigate the impacts to the Mojave fringe-toed lizard. This species has naturally disjunct habitat areas and reaches its southern-most range in the general vicinity of the project site. While the Mojave fringe-toed lizards require Aeolian sands and sandy substrate on which to live, its entire habitat needs to be mitigated at a 3:1 mitigation ratio including habitat that is affected by indirect impacts.

I agree with the Revised staff assessment in the cumulate analysis that 'Staff believes that by requiring the Applicant to acquire and preserve habitat within the Chuckwalla Valley dune system, at a ratio of 3:1, fragmentation from anticipated future development of private lands can be minimized by protecting, in perpetuity, these lands from future development. (RSA at C.2-181). All Mojave fringe-toed lizard habitat should be mitigated at such a level.

I found it very confusing and unclear how Bio-20 in the RSA relates to the information provided in the Data Requests of July 9, 2010. It is unclear if "high quality MFTL habitat" equates to "Zone 2 MFTL habitat" or how that relates to the *occupancy* of the lizards identified during surveys in those areas or the areas identified in the RSA as "stabilized and partially stabilized sand dunes", "non-dune Mojave fringe-toed lizard habitat". Because the focus of impact analysis and subsequent mitigation should be on the Mojave fringe-toed lizard, it is my opinion that how the habitat is affected by the impact of the project and the impact to the sand transport corridor are all direct impacts to Mojave fringe-toed lizard habitat and should be mitigated as such. Therefore, all impacts to Mojave fringe-toed lizard habitat should be mitigated at 3:1.

***Response***

*PSI made substantial efforts to redesign the project to avoid impacts to the sand dunes located east of the site. The redesigns significantly reduced impacts to the Zone 1 and 2 sand transport corridors and the habitat that they provide, removing the project disturbance area almost entirely from both zones. This effort independently reduced the significance of impacts substantially.*

*It is important to distinguish the significance of impacts to MFTLs and sand transport appropriately. The quality of MFTL habitat does not directly correlate with the sand transport corridor zones. Those zones are purely based on geomorphic processes. MFTL were found to use more than the dune habitat, though this dune habitat is an essential component without which they would likely not be present. In addition, the dune habitat provides ecological value to other endemic desert species beyond just MFTL. The importance of the dune habitat to MFTL, combined with its additional ecological value warrants the requirement for this habitat to be mitigated at a higher ratio under the NECO plan, 3:1. But, the other sites that also support MFTL on site are characterized as creosote bush scrub, which is not considered a sensitive community with special biological value. Invasive Saharan mustard is prevalent in this habitat on northeast portion of the Palen site. Criteria set forth in BIO-20 will require mitigation lands to be of higher ecological value within the vicinity of the project site. Therefore it is not reasonable to mitigate for the non-dune habitats that support MFTL at a greater than 1:1 ratio.*

**Birds**

Curiously the RSA dismisses recognized avian attractants such as evaporation ponds and agricultural fields as not occurring in the vicinity of the project (RSA at C.211). However, the proposed project is currently designed to have 2 four-acre evaporation ponds or a total of 8 acres of ponds (RSA at C.2-119) and is directly adjacent to agricultural fields (RSA at Appendix C, Figure 5 through 8). The RSA notes that ravens, "waterfowl, shorebirds and other resident or migratory birds that drink or forage at the ponds" (RSA at C.2-119). While Bio- 26 proposes netting and monitoring of the evaporation ponds, their presence will still likely attract birds to the general area, even if subsequently the birds are not able to directly access the ponds. The RSA fails to quantitatively evaluate the impact to birds based on the McCrary[15] results, which estimated 1.7 birds deaths per week on a 32 ha site – a site fifty times smaller than the proposed 1,600+ ha solar facility. Other data are available on injury and mortality associated with reflective surfaces and powerlines[16] which could have been used to evaluate impacts to birds. While avian point counts were done in 2009, these data are not folded into an analysis of the potential impacts to birds from attraction onto the site by the proposed evaporation ponds and subsequent mortality occurring from collisions with mirrors or powerlines. While Bio-16 requires monitoring, which I support, the RSA still fails to analyze the potential impact which in my opinion may be significant.

***Response***

*The project has implemented project design features to minimize the potential for the evaporation ponds to serve as new subsidies for birds. The ponds are required to be netted and monitored with an extensive program and strict requirement for reporting of bird deaths (regardless of number or significance). In addition, the condition requires implementation of adaptive management measures if bird mortality is determined to be a problem. This monitoring and adaptive management program will provide project specific data regarding the impact from the features. The McCrary report identified is not reflective of actual impacts associated with managed evaporation ponds. The site studied in this report has different environmental setting conditions that bias the risk (being located near existing open ponds and irrigated alfalfa fields that resulted in higher baseline bird populations) and included impacts from features other than evaporation ponds in the death counts (i.e., collisions with other structures). The measures required by COC BIO-26 are sufficient to minimize and manage impacts from the evaporation ponds.*

**Burrowing Owl**

I agree with the RSA that the fate of passively relocated burrowing owls is undocumented and concerning (RSA at pg. C.2-109). Therefore I was surprised to find that Bio-18 (burrowing owl mitigation requirements) failed to require long-term monitoring of passively relocated burrowing owls. While burrowing owls were documented as occurring on the project site, the RSA failed to evaluate the potential impacts to the owls in the context of the regional population. Burrowing owls populations in the eastern deserts are documented to be at low densities[17]. Data are available on burrowing owls in eastern Riverside County from the California Burrowing Owl Survey – 2006-2007[18].

The remaining stronghold for burrowing owls in California – the Imperial Valley – has had a recently documented decline of 27% in the past 2 years[19], resulting in an even more dire state for burrowing owls in California. Because burrowing owls are in decline throughout California, and now their "stronghold" is documented to be declining severely, it is my opinion that the burrowing owls on this proposed project site and reconfigured alternatives (and on other renewable energy projects) become even more important to species conservation efforts. While I support the acquisition of habitat specifically for burrowing owls as identified in the RSA, I think the mitigation of only 78 acres for 4 owls is too low, especially in the Colorado desert, as it is outdated agency guidance. Mean burrowing owl foraging territories are 242 hectares in size, although foraging territories for owl in heavily cultivated areas is only 35 hectares[20]. Regardless, the acquisition of only 78 acres (31.5 hectares) fails to mitigate for one bird even if it was relying on a heavily cultivated area. Therefore, it is my opinion that

additional mitigation acreage needs to be required – calculated using the mean foraging territory size times the number of owls. This calculation results in 968 hectares (2,391 acres). I note that using the average foraging territory size for mitigation calculations may not accurately predict the carrying capacity and may *overestimate* the carrying capacity of the impacted site, since the proposed project site at 4,024 acres only support 4 birds – it may be that in this area of the Colorado desert 4,000+ acres is necessary to support 4 burrowing owls. While the RSA relied on guidance from CDFG from 2003, that guidance is now out of date in light of identified population declines[21], a more thorough census of burrowing owls throughout the state[22] and additional research on the species habitat[23]. Lastly, because the carrying capacity is tied to habitat quality, I recommend that language be included that mitigation lands that are acquired for burrowing owl be native habitats on undisturbed lands, not cultivated lands, which are subject to the whims of land use changes. I believe the long-term persistence of burrowing owls lie in their ability to utilize natural landscapes, not human-created ones.

***Response***

*Burrowing owls (WBO) are to be passively relocated as required by the resource agencies. This passive relocation does not involve any handling of the birds which would be required for direct monitoring of relocated owls. To directly monitor, trapping and banding of the birds would be necessary. This makes the action an active activity, potentially stressing the animal, creating a higher risk for take, and therefore is not supported by the CDFG provisions for relocation activities. Monitoring of the areas where burrows will be created or enhanced in the vicinity of the site will occur for 2 years per the draft WBO mitigation plan. Passively relocated owls may be observed during these monitoring efforts if they chose to remain the area.*

*Mitigation is proposed based on the number of owls identified on the site per CDFG/CBOC guidelines. It should be noted that the northeast portion of the site is not considered suitable WBO habitat due to dense tall stands of Saharan mustard. One pair of owls was detected in the northwest corner adjacent to offsite agricultural areas, suggesting that they are likely dependent upon lands beyond the project site for foraging.*

*The current mitigation proposed is consistent with the CDFG/CBOC guidelines for burrowing owls. These are the standards currently applied to all projects and mitigation proposed is consistent with and reflective of the highest ratios identified in the guidelines. Revisions to the standard guidelines are not the responsibility of this project or applicant. The management and mitigation measures proposed are consistent with the current requirements. It is also unreasonable and biologically invalid to assume that the territory of an owl in this area is equivalent to the total*

*project area divided by the number of owls identified. The territories and presence of owls are based on several biological variables (e.g., burrow availability, forage, adjacent land uses, water, etc.), not the size of a proposed project.*

**Insects**

Sand dune habitats are notorious for supporting endemic insects, typically narrow habitat specialists[24]. The RSA completely fails to address insects on the proposed project site. While the Center has brought this issue up on our comments on the Staff Assessment, the RSA brushes off this important issue by characterizing the impact to the sand dune community without actually requiring insect surveys. Absent the surveys clearly no evaluation of impacts to rare insects can be evaluated.

***Response***

*No insect species listed under the federal or state endangered species acts have the potential to be present in the project area. There is no legal requirement nor precedence with CEC Applications for Certification to survey for insect species that are endemic but do not have an official legal status. All required focused biological surveys have been completed for the project and there has been no request by the resource agencies to do site specific surveys for invertebrates. The dune habitats that are of concern are already being mitigated at a 3:1 ratio per NECO plan recommendations, accounting for the importance of these features in the region and to the desert ecosystem. Identification of non-listed invertebrates would not change the proposed compensatory mitigation for the project.*

**Special Status Plants**

While I support late-season botanical surveys, these types of surveys should have been done prior to the assessment of impacts from the proposed project. As stated above, failure to conduct sufficient surveys prior to construction of the project effectively eliminates the most important function of surveys - using the information from the surveys to avoid and minimize harm caused by the project and reduce the need for mitigation. Often efforts to mitigate harm are far less effective than preventing the harm in the first place.

***Response***

*We agree with Condition of Certification BIO-19 which assumed presence of all special status plants and requires mitigation as if the species were present across the site. The subsequent surveys are to lessen these mitigation requirements to only habitat actually discovered during late season surveys. We recently conducted surveys following acceptable rain*

*events that resulted in plant germination and discovered no late season plants.*

**Habitat Loss and Compensatory Mitigation**

For many of the rare wildlife species, "Bio-12" is proposed as the mitigation for impacts. "Bio-12" is focused on compensatory mitigation for desert tortoise through the acquisition and conservation of a variety of number of acres based on different impact scenarios. While I support mitigation for desert tortoise, the mitigation measure needs to require that the mitigation actually benefit the other rare animals – just as it states for state jurisdictional water, where at least 608 acres of waters must be acquired.

Even with rare species occurring on the mitigation lands, the Commission must still recognize that the proposed project is a net loss of occupied habitat and possibly individuals of these species.

***Response***

*The project is already mitigating for all habitat impacted at ratios from 1:1 to 5:1. Mitigation for desert tortoise is required despite the fact that no tortoise were observed during focused surveys on the plant site project disturbance area and very limited sign with nearly no recent sign (only one Class III burrow) was present. Only three tortoises were found in the buffer to the transmission line corridor at the very far western edge. The mitigation proposed is therefore more than sufficient for anticipated impacts to desert tortoise as well as other species that benefit from the preservation of offsite lands as discussed in the 1st response.*

**Cryptobiotic Soils**

Cryptobiotic soils are an essential component in arid ecosystems to prevent desertification and perform a myriad of ecological functions including soil stability, porosity and water retention[25]. They stabilize soils and prevent erosion, decreasing fugitive dust[26]. They are easily disturbed and slow to regenerate[27]. Despite comments on the Staff Assessment requesting an evaluation of where the cryptobiotics were on the proposed project site and an analysis of the impacts of the project on these important soils, the RSA failed to do so. It is my opinion that the disturbance of these types of soil crusts will greatly increase many factors that will affect the nearby ecological functions including increased amount of PM-10 emissions from the proposed project site, alteration in hydrology and water retention among many other aspects. The final staff assessment must estimate the impact to these essential components of the landscape.

***Response***

*Soils are a single component of the habitat that is already being mitigated for as discussed in several responses above. The preservation of onsite cryptobiotic soils is unreasonable and unjustified. The project has analyzed the potential impacts to air quality and water quality from the proposed activities and has implemented measures to reduce impacts to less than significant levels, as defined in the air quality and soil and water analyses and conditions.*

**Fire Threats**

Fire in desert ecosystems is well documented to cause catastrophic landscape scale changes[28] and impacts to the local species[29]. While the FSA mentions the impacts of fire via the proliferation of non-native weeds (RSA at pg. C.2-18 through 19, and many other places), it fails to adequately analyze the impacts of this issue for this proposed project that routinely relies on superheated liquids. It fails to adequately analyze the impact that a fire could have on the natural lands adjacent to the project site if it escaped from the site or address the mitigation of this impact. Instead it defers it to the Worker Environmental Awareness Program (WEAP) and only requires "a discussion of fire prevention measures to be implemented by workers during project activities" (RSA at pg. C.2-258). A fire prevention and protection plan needs to be required to preclude the escape of fire onto the adjacent landscape (avoidance), lay out clear guidelines for protocols if the fire does spread to adjacent wildlands (minimization) and a revegetation plan if fire does occur on adjacent lands originating from the project site (mitigation) or caused by any activities associated with construction or operation of the site even if the fire originates off of the project site.

***Response***

*The project is responsible for minimizing the potential for fires onsite and for reducing conditions that would facilitate the spread of fire. The project is required to prepare and implement a weed management plan for the purposes of controlling invasive weed species that may generate a substantial amount of biomass that can proliferate fires. In addition, the project has implemented fire prevention and management measures and includes education regarding these measures in the Worker Environmental Awareness Program. The project is also paying a substantial sum of money to expand fire response services in the area.*

*Fire protection at the PSPP during operations will include measures relating to safeguarding human life, preventing personnel injury, preserving property, and minimizing downtime due to fire or explosion. Fire protection measures will include fire prevention methods to prevent the inception of fires. Of concern are adequate exits, fire-safe*

*construction, reduction of ignition sources, control of fuel sources, and proper maintenance of fire water supply and sprinkler systems. Fire suppression facilities will be designed by a Fire Protection Engineer and fire protection equipment will be installed and maintained in accordance with applicable NFPA standards and recommendations. Project facilities also will be designed and operated in conformance with Uniform Fire Code requirements for safe storage, dispensing, use, and handling of hazardous materials, as well as meeting state and local requirements for preparation of hazardous materials release plans and inventories.*

*An important consideration is that all systems and equipment at the plant will undergo extensive evaluation for operating safety, reliability, and hazard identification. Fire protection and detection systems are incorporated into the plant design. Hazards are eliminated through careful design and when dealing with chemicals, energy, or other normal operating hazards, protection and detection are built into the systems. For instance, smoke, heat, and flame detectors will be included into the critical plant control systems. Automatic deluge and sprinkler systems are included in occupied areas like the control room. Flow valves, isolation valves and other prevention measures are incorporated to contain and control qualities of exposure in the solar field areas. A Fire Risk Evaluation Plan (FREP) will be created that identifies and addresses the design criteria specific to fire protection systems and codes. Administrative controls, like inspection, observation, and periodic testing will be used to ensure that abnormal conditions are eliminated or identified before they create potential risk or exposure. Operators conduct routine frequent rounds to inspect piping, valves and systems to identify and minimize leaks. Equipment is periodically tested to ensure automatic operation of detection and fire protection equipment and systems. The operations phase Fire Prevention Plan will include:*

- *Scope, purpose, and applicability*
- *Identification of potential fire hazards*
- *Description and training and proper handling and storage of potential fire hazards*
- *Identification of potential ignition sources*
- *Control and training in the means to control potential ignition sources*
- *Identification and training of persons responsible for equipment and systems maintenance*
- *Identification of the locations and training in the use of the types of portable fire extinguishers*
- *Description of the automatic sprinkler fire suppression system*
- *Description and training of operators in the firewater system, including firewater/service water tank, firewater loop piping, electric and diesel engine-powered pumps*
- *Description and training in use of the foam trucks*

- *Identification of the local fire department, including contact information*
- *Training of operations personnel in fire fighting*
- *Description of the housekeeping procedures*
- *Description of the recordkeeping requirements.*

*Operations - Fire Protection System*
*Fire protection systems are provided to limit personnel injury, property loss, and downtime resulting from a fire. The systems include a fire protection water system, portable fire extinguishers and a foam agent. Firewater pumps, hydrant locations as well as on-site fire water piping will be designed in accordance with the local design standards and NFPA standards not limited to NFPA 850, 24 and 13. The fire protection system will be designed and certified by a California registered fire protection engineer.*

*The Project's fire protection water system will be supplied from a one (1) million gallon firewater/service water storage tank in each power block area. One (1) electric motor and one (1) diesel fueled engine backup firewater pump will deliver water at 5000 gpm to the fire protection loop piping. A smaller electric motor-driven jockey pump will maintain pressure in the piping network.*

*Fire water will be supplied from a fire water piping network about each power block. The piping will be configured in loops such that failure in any section of the loop can be quickly isolated so as not to interrupt water flow to other sections of the loops. Sectional valves will be fire rated and listed valves with post indicators. Fire hydrants will be placed at intervals throughout the area and will be supplied by the loop. Hose stations and hose cabinets will be placed as required.*

*The water supply loop will also supply firewater to a deluge system at each unit transformer, as well as to the HTF expansion tank, circulating pump area, and sprinkler systems at the steam turbine generator, lube oil tank, cooling tower, water treatment area in the administration building. The fire water piping system will also provide protection to the Shared Facilities Area, specifically the Main Office and Assembly Building.*

*HTF Fire Suppression:*
*The Heat Transfer Fluid (HTF) is a eutectic mixture of about 73.5% diphenyl oxide and 26.5% biphenyl. The HTF will freeze at 53.6 degrees Fahrenheit, flammable (flash point) at 230 degrees Fahrenheit, boiling point 494.6 degrees Fahrenheit and auto ignition at 1139 degrees Fahrenheit. Several special measures are required and will be incorporated in the design and operation of the plant to mitigate freezing, fire and contamination risks.*

*Fire protection for the solar field will be provided by zoned isolation of the HTF header piping in the event of a rupture that results in a fire. HTF fires will be suppressed and extinguished with an adequate foam agent. Two (2) fire fighting foam trucks will be on site and centrally located near the assembly hall.*

*Fire detection within the solar fields will be identified visually by operations personnel monitoring solar field operations. Operations personnel will be trained / qualified in fire fighting methods and will be the first responders.*

*The fire protection panel will be located in each power block control room. Activation of any fire detection device will be annunciated at the panel and will be immediately known to the operators.*

*<u>LPG Storage Fire Suppression</u>*
*The LPG storage tanks will be protected by a water deluge system. Adequate fire detection devices will detect the fire, initiate the water spray and annunciate in the main control room. First respondents will be on site operators who are trained and qualified as firefighters.*

*The tanks will be strategically located away from critical buildings and equipment. The fire detection and suppression will be in accordance with NFPA Standards and meet the requirements of the County of Riverside*.

# Attachment A

## Resume - Karl

# ALICE E. KARL, Ph.D.

**ALICE E. KARL & ASSOCIATES, INC.**

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Davis, California 95617
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Alice has been an environmental consultant since 1978 and is the principal for the firm Alice E. Karl & Associates, a certified woman-owned business. She has an extensive knowledge of the arid southwest, having worked continually in the southwestern deserts of the United States and Mexico for over 30 years. She has also completed biological surveys in the coastal ranges of California and the Central and San Joaquin valleys. She is a highly experienced botanist, herpetologist, small-mammalogist, and a recognized desert tortoise authority. She holds permits that allow her to conduct all activities on desert tortoises (e.g., handle tortoises, apply transmitters, collect blood for health analyses) and conduct independent Mohave Ground Squirrel trapping. She also holds a California scientific collecting permit.

Alice conducts field surveys on special-status species, assists with project permitting, conducts research and monitors construction. She regularly organizes and leads large crews to conduct the necessary biological resource surveys for projects, but also is contracted as a reviewer for other firms' biological surveys and reports. Agency coordination and permitting is a critical component of her projects and she works with agency biologists and project proponents in an efficient and scientifically credible manner to develop conservation-oriented, practical and feasible project design and mitigation measures. Research has included long-term and geographically extensive projects on (a) desert tortoise reproduction, translocation, population viability, and habitat relationships; (b) rare plants; (c) vertebrate community relationships; and (d) sampling methods, especially for desert tortoise.

In addition to being an accomplished field biologist, crew chief, and project manager, Alice has worked with agency biologists to develop protocols for desert tortoise surveys, translocation, handling, and other procedures. She has developed a sampling technique for estimating tortoise densities over large areas (TRED), which is currently being employed on large military projects. She has also contributed to several area-wide plans (West Mojave Plan, Northern and Eastern Colorado Desert Plan, Clark County HCP).

## MAJOR PROJECT CATEGORIES

- Solar energy development, hybrid and gas-fired power plants, hydropower projects
- Transmission lines and pipelines
- Wind projects
- Waste facilities
- Military
- Mining

## MAJOR TASK CATEGORIES

- Special-status species surveys
- Mitigation plan development
- Permitting (ESA, CESA, CEQA, HCPs, BAs, 2081, 1603, 404, SMARA)
- Agency coordination and workshops
- Designated Biologist/Authorized Biologist
- Research
- Construction Monitoring

## SPECIAL-STATUS PLANTS and REVEGETATION

- Principal botanist for numerous surveys of special-status plants in the Mojave and Colorado deserts (California and Nevada), the Tehachapi Mountains and the Central and San Joaquin valleys
- Extensive knowledge of Mojave and Colorado Desert flora and habitats
- Revegetation

- Wetlands delineation

DESERT TORTOISE

- Recognized desert tortoise authority, with over 32 years experience studying desert tortoises in California, Nevada, Utah, and western Arizona; habitat specialist
- 2 advanced degrees involving desert tortoises
- Holds own handling and research permits from the USFWS and the California Department of Fish and Game
- Designed and implemented one of the largest and longest desert tortoise research projects to date - approximately 130 tortoises were telemetered for 10 years to study reproduction, growth, home range, burrow use, dispersal within the context of forage production, size and gender
- Instructor for Desert Tortoise Council Technical Workshops and telemetry use; train construction employee groups and tortoise monitors for construction projects
- Over 25 Bureau of Land Management (BLM)-type trend plots or other mark-recapture plots for population studies and >3000 transects to assess relative densities
- Impacts assessment, mitigation development - numerous projects
- Development of TRED sampling model for region-wide and fine-grained density estimates
- Construction monitoring and development of monitoring protocol
- Contributor to development of methodologies for USFWS survey and handling protocols
- A primary reviewer of USFWS original listing package for desert tortoises
- Contributor to Clark County Habitat Conservation Plan, West Mojave Plan, and Northern and Eastern Colorado Coordinated Management Plan

OTHER WILDLIFE

- Extensive knowledge of southwestern reptile and amphibian fauna
- Extensive small-mammal (rodents) trapping studies in California, Nevada and Arizona, including Mohave ground squirrel and other special-status rodents.
- Survey, research, and permitting experience with the following listed species: Valley elderberry longhorn beetle, Shasta salamander (permitted), Tehachapi slender salamander, San Joaquin kit fox
- Burrowing owl surveys and mitigation
- Numerous bird surveys in desert habitat.
- Mojave ground squirrel - permitted to conduct trapping

PERMITS HELD

- Federal 10(a)(1)(A) for Desert Tortoise (permit in Alice Karl's name) (TE 746058-11)
- State MOU for Desert Tortoise
- California Scientific Collection Permit (SC001368)
- Mohave Ground Squirrel trapping (Authorized field Investigator on W. Vanherweg permit)

EDUCATION

Ph.D., Ecology - University of California, Davis. January 1998. Dissertation: Reproductive strategies, growth patterns, and survivorship of a long-lived herbivore inhabiting a temporally variable environment.

M.S., Biology - California State University, Northridge. 1982. Thesis: The distribution, relative densities, and habitat associations of the desert tortoise, *Gopherus agassizii*, in Nevada.

# PROJECT LIST

## PROJECT MANAGER and/or SOLE/LEAD BIOLOGIST:

### Military Projects

*Fort Irwin Expansion Project*, Barstow, California. 2002-2003. Authored all desert tortoise sections for the Fort Irwin Expansion Biological Assessment. Contracted to Charis Corporation, Temecula, California.

*Fort Irwin Expansion Project*, Barstow, California. 1998-2003. Developed and tested methods to quantitatively assess population levels and impacts to desert tortoises from proposed land expansion. Included mark-recapture plots (1998, 2001, 2002) and new methodology for region-wide, quantitative population assessments. Consultant to Charis Corporation, Temecula, California (1999-2002) and Chambers Group, Irvine, California (1998).

*Desert Scimitar (U.S. Marine Corps),* 2001. BA for training exercise from Colorado River to *Twentynine Palms Marine Corps Air Ground Combat Center*

*Twentynine Palms Marine Corps Air Ground Combat Center (MCAGCC),* Twentynine Palms, California. 1996-7. Consultant on desert tortoise issues for housing area expansion. Consultant to Merkel and Associates, San Diego, California.

*U. S. Air Force MX Missile Project,* Coyote Springs Valley, Nevada. Summer, l981. Intensive field survey (300 transects) of potential facility site to determine the relative densities of the desert tortoise. For Biosystems Analysis, Inc., San Francisco, California.

### Miscellaneous Projects

*San Diego County Water Authority*, 2002 - 2005. Technical consultant for biological issues relating to Quantification Settlement Agreement water transfer on Colorado River. Consultant to Greystone Environmental Consultants, Sacramento, California.

*Los Angeles County Sanitation District Palmdale Water Reclamation Plant*, Palmdale, California. 2003. Agency meetings, survey protocol development and surveys for desert tortoise presence and impacts; surveys for burrowing owl; Mohave ground squirrel trapping; habitat assessment for special-status plants. Consultant to Environmental Science Associates, Oakland, CA.

*Los Angeles County Sanitation District*, Lancaster, California. 2002. Surveys of proposed pipeline for special-status plants and animals. Special-status plants and animals of greatest concern included desert tortoise, Mohave ground squirrel, burrowing owl, alkali mariposa lily, Lancaster milk-vetch. Consultant to Los Angeles County Sanitation District, Whittier, California.

*Burlington-Northern Santa Fe Landfarm Project*, Barstow, California. 2001-2003. Assessment of desert tortoise impacts , mitigation development, agency coordination for landfarm closure. Consultant to TRC Environmental Solutions, Irvine, California.

*Central Washington University and Cal-Tech,* Barstow, California. 1994. Monitoring trenching and closure activities for Endangered Species Act compliance (desert tortoises) on

Emerson Fault research project. Consultant to Dr. Charles Rubin, Central Washington University.

*U.S. Geological Survey,* Landers, California. 1993 and 1994. Monitoring trenching and closure activities for Endangered Species Act compliance (desert tortoises) on Landers' Fault project. Consultant to Dr. David Schwartz, U.S. Geological Survey, Menlo Park, California.

*Twentynine Palms Marine Corps Air Ground Combat Center (MCAGCC),* Twentynine Palms, California. 1993. Tustin military base relocation project. Desert tortoise surveys to determine impacts and mitigation to tortoises from relocation of the base to MCAGCC . Authored several interim reports and co-authored final report to MCAGCC with Ogden Environmental, San Francisco, California

*County of San Bernardino Medical Center,* San Bernardino, California. September. 1990 General species inventory, and focused surveys for special-status plants and animals at three proposed sites for location of new medical center. Consultant to Higman-Doehle, Inc., Los Angeles, California.

*Lake Minerals Corporation,* Owens Valley, California. August, 1990 to present. Field surveys to determine tortoise presence at site of soda ash processing plant. Consultant to McClenahan and Hopkins Associates, Inc., San Mateo, California.

*Del Webb Housing Development,* Palm Desert, California. August, 1990. Assessment of tortoise habitat quality and likelihood of tortoise presence on proposed site. Consultant to Environmental Science Associates, Los Angeles, California.

*Miller Housing Development,* Palm Desert, California. 1990. Assessment of tortoise habitat and densities at proposed housing site; development of mitigation. For ERC Environmental, San Diego, California

*Great Basin Unified Air Pollution Control District, Owens Lake Dust Control Project.* December, 1989. Determined impacts to small mammal special-status species on sites proposed for disturbance. Consultant to McClenahan and Hopkins Associates, Inc., San Mateo, California.

*Pacific Agricultural Holdings, Inc.,* Piute Valley, California. Fall, 1989. Field assessment of tortoise presence on site. Consultant to Pacific Agricultural Holdings, Inc., Fresno, California.

*City of Rosamond, California, Expansion*. Spring, 1989. Field survey of expansion site to determine impacts to sensitive flora, tortoises, and Mojave Ground Squirrel. Tortoise transects, live-trapping for diurnal rodents. Consultant to CWESA, Sanger, California.

*Jet Propulsion Lab Site,* Edwards Air Force Base, California. Fall and Winter 1988. Field determination of impacts to tortoises (transects, habitat analyses) from new facility siting. Consultant to WESTEC Services, San Diego, CA.

*City of Ridgecrest Off-Road Vehicle Park,* Searles Valley, California. January to March 1988. Field determination (transects, habitat analyses) of impacts to local desert tortoise populations from siting of proposed park. Consultant to CWESA and Saito Associates, Fresno, California.

*Bullhead City Airport Expansion*, Laughlin, Nevada. October, 1987. Assessment of potential impacts to the desert tortoise from expansion of the Bullhead City Airport. Transects, habitat analyses. Consultant to Heron, Burchette, Ruckert, and Rothwell Washington, D.C.

*U.S. Borax and Chemical Co.,* Boron, California. May, 1986. Field assessment of impacts to sensitive flora and fauna on proposed Cogeneration II facility. Consultant to Dames and Moore, Santa Barbara, California.

*Propeace, Inc.,* Victorville, CA to Nevada. March, 1986. Assessment of impacts to wildlife and development of mitigation on proposed route of peace march in the Mojave Desert portion of route. Consultant to Propeace, Inc., Los Angeles, California.

Utilities and Transportation (Power Plants, Transmission Lines, Pipelines, Solar or Wind Facilities, Telecommunications, Railroads)

*Southern California Edison Palo Verde-Devers II Transmission Line,* Colorado River to Devers, California. 2002 - 2004. Surveys of proposed transmission line, in this segment, for special-status plants and animals; technical reports. Consultant to EPG Inc., Tucson, Arizona.

*Blythe Energy Project*, Blythe, California. 2000 - continuing. Designated biologist for proposed power plant and pipeline, with attendant duties including surveys; biological technical reports; B.A.; AFC assistance; development of mitigation (BRMIMP), monitoring, and education programs (WERP); implementation of mitigation measures; agency coordination; public hearings; and general document reviewer. Special-status plants and animals of greatest concern included desert tortoise, burrowing owl, Harwood's milk-vetch. Consultant to Greystone Environmental Consultants, Sacramento, California.

*Desert Southwest Transmission Project (Imperial Irrigation District*) Blythe to Niland and Blythe to Devers, California. 2000-2002. Surveys of multiple, proposed transmission lines for special-status plants and animals, technical reports, EIR. Consultant to Greystone Environmental Consultants, Sacramento, California.

*Moapa Power Project*, Las Vegas, Nevada. 2001. Initial surveys for special-status plants and animals for proposed power plant, transmission line and pipeline. Consultant to URS Corp, Santa Barbara, California.

*Ocotillo Power Project*, Palm Springs, California. 2000-2001. Surveys and biological technical report for special-status plants and animals for proposed power plant, transmission line and pipeline. Consultant to URS Corp, Santa Barbara, California.

*Imperial Irrigation District*, Blythe to Desert Center, California. 2000. Surveys for special-status plants and animals for proposed transmission line upgrade. Consultant to Greystone Environmental Consultants, Sacramento, California.

*Enron Pastoria*, Tejon Ranch (Bakersfield), California. 1999-2001. Surveys, biological technical report, and AFC preparation for special-status plants and animals for proposed power plant, transmission line and pipeline. HCP preparation for San Joaquin kit fox. Consultant for CEC hearings. Consultant to URS Corp, Santa Barbara, California.

*Enron Antelope Valley*, Victorville, California. 1999-2001. Surveys and biological technical report for special-status plants and animals for proposed power plant, transmission line and pipeline. Consultant to URS Corp, Santa Barbara, California.

*PG&E Generating Company Harquahala Power Project*, Toquop, Arizona. 1999-2000. Surveys and biological technical report for special-status plants and animals for proposed power plant and transmission pipeline. Consultant to URS Corp -Dames and Moore, Phoenix, Arizona.

*Santa Fe Pacific Pipeline Company, Concord to Colton Pipeline,* Mojave to Adelanto, California. Spring 1995. Surveys for special-status plants, desert tortoises, and Mojave Ground Squirrels (CHIEF protocol); project leader. Consultant to Woodward-Clyde Consultants, San Diego, California.

*Harper Lake Company,* San Bernardino County, California. 1994. Re-evaluation of and assistance with position paper on primary compensation measures for LUZ Harper Lake solar project. Consultant to ENSR, Fort Collins, Colorado.

*Santa Fe Railroad Company,* San Bernardino County, California. Spring 1994. (1) Monitoring construction for Endangered Species Act compliance (desert tortoises) on bridge upgrades and (2) educational presentation to Santa Fe employees. Consultant to Environmental Solutions, Inc., Walnut Creek, California.

*Western Area Power Administration,* Parker to Yuma, California. 1994. Led large crew to survey transmission line for determining impacts to desert tortoises, special-status plants, birds, amphibians, and mammals from future transmission line upgrades. Consultant to Woodward-Clyde Consultants, Denver, Colorado.

*Mojave Pipeline Operating Company,* Mojave Desert, California. 1993. Survey of five proposed compressor station sites for desert tortoise impacts. Consultant to CWESA, Sanger, California. Report submitted to Woodward Clyde Associates, Denver, Colorado.

*Mojave Pipeline Operating Company,* Kramer Junction, California. 1992-93. Led large crew to survey proposed pipeline from Kramer Junction to Inyokern for impacts to desert tortoises, special-status plants, and Mojave ground squirrels. Consultant to CWESA, Sanger, California. Report submitted to Woodward Clyde Associates, Denver , Colorado.

*Lake Minerals-Vulcan Mine Railroad Upgrade,* Searles, Indian Wells, and Owens Valley, California. 1991. Desert tortoise surveys along existing railroad to determine future impacts to desert tortoises from upgrade of railroad. Report submitted to McClenahan and Hopkins, San Mateo, California.

*U. S Ecology Radioactive Waste Facility,* Beatty, Nevada. August 1990. Survey of proposed power line route to radioactive waste site for impacts to tortoises.

*Mojave Pipeline Project,* Toquop, Arizona to Bakersfield, California. Spring, 1989-90. Lead botanist and wildlife biologist for species of concern in the Mojave Desert and Tehachapi Mountains portion of line. Included: field surveys and agency meetings; development of mitigation and relocation techniques for tortoises and training program for field observers; development of portions of Environmental Quality Assurance Program for construction phase. For CWESA, Sanger, California, and Woodward Clyde Consultants, Denver, Colorado.

*Southern California Edison Victorville/Kramer High Voltage Transmission*

*Line.* Spring 1990. Directed field study to determine tortoise abundance along proposed route. Consultant to ERC Environmental, San Diego, California.

*AT&T Fiber Optics Cable Route,* southern Nevada. 1990. Field survey of route to determine relative tortoise abundance, impacts on tortoise populations, and appropriate mitigation from burial of cable. Also involved relocation of tortoises and training of field personnel during construction. Consultant to ENSR, Fort Collins, Colorado.

*Los Angeles Department of Water and Power Telecommunications Network Project,* Los Angeles Basin, California. Winter and Spring, 1989. Field survey of proposed microwave facility sites in mountains surrounding the Los Angeles Basin to determine impacts to wildlife and botanical species of concern. Consultant to Higman Doehle, Inc., Los Angeles, California.

*AT&T Fiber Optics Line,* Victorville, California to Las Vegas, Nevada. Fall, 1988 to Winter, 1989. Field survey of route to determine relative tortoise abundance, impacts on tortoise populations, and appropriate mitigation from burial of cable. Also involved relocation of tortoises and training of field personnel during construction. Consultant to ENSR, Fort Collins, Colorado.

*Luz Engineering,* Kramer Junction and Harper Lake, California. Spring, 1987 to 1990. Led large crew to assess tortoise densities and habitat quality on relocation site for solar generating facility; density analyses and habitat assessments on facility expansion sites and relocation of tortoises during construction. Consultant to CWESA, Sanger, California, and ENSR, Fort Collins, Colorado.

*Southern California Edison Palo Verde - Devers II HVDC Transmission Line,* Colorado Desert, California. Spring, l985, Spring, 1987, Spring, 1988. Field surveys and literature determination of impacts to special-status plants and wildlife and development of mitigation procedures along new transmission line route. Consultant to E. Linwood Smith and Associates, Tucson, Arizona.

*U.S. Telecom,* Banning to Blythe, California- May, 1986 - Field assessment of impacts to special-status plants and fauna along proposed route. Consultant to E. Linwood Smith and Associates, Tucson, Arizona.

*Los Angeles Department of Water and Power, Intermountain Power Project (IPP),* Nevada-Utah. July, l982 to August, l985. Field determination of impacts to the desert tortoise (transects), development of mitigation procedures, and implementation of mitigation along two routes of the HVDC Transmission Line in southern Nevada and southeastern Utah. Also, monitoring of sensitive flora and tortoises during construction. Consultant to E. Linwood Smith and Associates, Tucson, Arizona.

*Los Angeles Department of Water and Power, Sylmar-Celilo (HVDC) Transmission Line Upgrade,* Owens Valley, California. July, l984 to December, 1987. Field determination of impacts to special-status flora and wildlife and development of mitigation procedures along the line from Sylmar, California north to Nevada. Construction monitoring and crew education. Consultant to Applied Conservation Technologies, Inc., Newport Beach, California.

<u>Mines and Aggregate Operations:</u>

*Ballast Rock Project*, Hinkley, California. 2002- continuing. Special-status species impacts assessments, surveys. Special-status plants and animals of greatest concern included desert tortoise, Mohave ground squirrel, burrowing owl, chuckwalla, Mojave monkeyflower and Barstow woolly sunflower. Consultant to Resource Design Technology, Inc., Folsom, California.

*S and V Cinder Mine,* Big Pine, California. 2002. Baseline, quantitative vegetation surveys for SMARA compliance. Consultant to Resource Design Technology, Inc., Folsom, California.

*Lehigh South (Calaveras) Cement* (limestone, shale), Shasta County, California. 1998, continuing. Field surveys, biological impacts assessment, reclamation plans, Shasta salamander 2081, Shasta salamander research, revegetation. Consultant to Resource Design Technology, Inc., Folsom, California.

*Carone Properties* (hard rock), Napa County, California. 2000, continuing. Field surveys, biological impacts assessment, California red-legged frog issues. Consultant to Resource Design Technology, Inc., Folsom, California.

*RMC Lonestar* (aggregate), Tulare County, California. 1997, continuing. Biological inventory and impacts assessment; Valley Elderberry Longhorn Beetle surveys; wetlands issues; biological portion of EIR. Consultant to RMC Lonestar, Pleasanton, California, and Resource Design Technology, Inc., Folsom, California.

*RMC Pacific Materials* (hard rock), Fresno, California. 1999, continuing. Field studies, impacts assessment. Consultant to Resource Design Technology, Inc., Folsom, California.

*Lehigh South (Calaveras) Cement* (limestone), Tehachapi, California. 1999, continuing. Field studies, impacts assessment. Consultant to Resource Design Technology, Inc., Folsom, California.

*Last Chance Sand and Gravel* (aggregate), Beatty, Nevada. 1998-9 Biological consultant for all phases of project. Surveys for desert tortoise, special-status plants, mammals, reptiles, birds. Consultant to Bill Marchand (operator), Beatty, Nevada.

*San Benito Supply* (aggregate). 1997-present. Vegetation survey to determine baseline conditions for SMARA reclamation compliance; developed revegetation plan. Consultant to Lilburn Corporation, San Bernardino, California, and Resource Design Technology, Inc., Folsom, California.

*M&T Chico Ranch* (aggregate), Butte County, California. 1997-present. Wrote biological portion of EIR. Consultant to Resource Design Technology, Inc., Folsom, California.

*Granite Construction Co.* (aggregate), Whitewater, California. 1997. General species inventory; surveyed for desert tortoises, special-status plants, mammals, reptiles, birds. Consultant to Lilburn Corporation, San Bernardino, California.

*Teichert Aggregates* (aggregate), Esparto, Yolo County, California. 1996. Wrote biological portion of EIR. Consultant to Lilburn Corporation, Folsom, California.

*Teichert Aggregates* (aggregate), Woodland, Yolo County, California. 1996. Wrote biological portion of EIR. Consultant to Lilburn Corporation, Folsom, California.

*Cache Creek Aggregates* (aggregate), Yolo County, California. 1996. Wrote biological portion of EIR. Consultant to Lilburn Corporation, Folsom, California.

*Asphalt Construction Company* (aggregate), Ridgecrest, California. 1995. Vegetation surveys to determine baseline and regrowth conditions for SMARA compliance. Consultant to Lilburn Corporation, Folsom, California.

*Castle Mountains Gold Mine* (mineral), San Bernardino County, California, 1995, 1996. Assessment of desert tortoise impacts from proposed expansion (field surveys, habitat analysis). Also included re-evaluation of existing mitigation and compensation measures. Consultant to Lilburn Corporation, Folsom, California.

*Santa Fe Pacific Gold* (mineral), Glamis, California. 1994. (1) Examination of potential drilling sites for desert tortoise impacts (field surveys) and (2) developed proposal to assess remaining tortoise habitat on mine site. Consultant to Santa Fe Pacific Gold Corporation, Reno, Nevada.

*Goldfields Mining Company* (mineral), Brawley, California. 1991-92. Field surveys and habitat analysis of gold mine site. Co-authored Biological Assessment. Developed mitigation plan and impacts studies. Led large crew for desert tortoise clearance surveys. Trained core group of facility employees in tortoise handling. Consultant to Environmental Solutions, Inc., Irvine, California.

*Cactus Gold Mine* (mineral), Mojave, California. August, 1990. Assessment of tortoise presence on site of heap leach pad extension. Consultant to McClenahan and Hopkins Associates, Inc., San Mateo, California.

Waste Facilities

*Mesquite Regional Landfill,* El Centro, California. 1992 to 2000. Led large crew to conduct desert tortoise surveys for determining impacts and mitigation to tortoises from construction and maintenance of proposed landfill and associated rail spur. Co-authored Biological Assessment. Expert witness to address activists' concerns. Developed research program (mitigation) to track ecosystem health effects from landfill development. Consultant to Environmental Solutions, Inc., Irvine, California, Arid Operations, El Centro, California, and Resource Design Technology, Inc., Folsom, California.

*NORCAL Sanitary Landfill,* Victorville, California. Spring, 1997. General species inventory on expansion area; special surveys for desert tortoises, special-status plants, mammals, reptiles, birds. Consultant to Lilburn Corporation, San Bernardino, California.

*NORCAL Sanitary Landfill,* Landers, California. Spring, 1997. General species inventory on expansion area; special surveys for desert tortoises, special-status plants, mammals, reptiles, birds. Consultant to Lilburn Corporation, San Bernardino, California.

*U.S. Ecology/California Department of Health Services Low-level Radioactive Waste Facility,* Ward Valley, California, March. 1987 to 2001. Determined impacts to and developed mitigation for desert tortoises in association with construction and maintenance of proposed facility. Developed and conducted a ~10 year, continuous research project on tortoise translocation that focused on effects to reproduction, movements, physiology and mortality. Study cohort included ~150 radiotelemetered tortoises. Principal author of two biological assessments. Reviewer of numerous project opponents' papers and author of response documents. Consultant to U.S. Ecology, Rocklin, California.

*RAIL-CYCLE (Waste Management of North America, Inc. and the Atchison, Topeka, and Santa Fe Railway Company).* 1994, 1997. Expert witness for biological impacts at County of San Bernardino hearings for proposed landfill. Consultant to Waste Management of North America, Inc., Pasadena, California.

*RAIL-CYCLE,* Amboy, California, 1991 - Led large crew for desert tortoise surveys to determine impacts and mitigation to tortoises from construction and maintenance of proposed landfill. Report submitted to Ecological Research Services, Claremont, California and Jacobs Engineering, Pasadena, California.

*Yucca Mountain Nuclear Waste Project,* Nevada Test Site, Nevada. Fall 1989-90. Determination of tortoise abundance, distribution and habitat associations on proposed site of high-level nuclear waste. With Environmental Science Associates, San Francisco, California

*Hidden Valley Resources Toxic Waste Disposal Facility,* Newberry Springs, California. June to September 1988. Determination of impacts to and mitigation for desert tortoises from construction and maintenance of facility. Transects and habitat analyses. Consultant to J&M Land Restoration, Bakersfield, California.

Non-Military Government Contracts:

*U.S. Army Corps of Engineers Construction Engineering and Research Laboratory (CERL).* Spring 2003. Trained biologists in desert tortoise telemetry techniques, handling, and behavior for tortoise activity project near Barstow, California. Contacts: Mr. Andrew Walde and Dr. Larry Pater.

*Joshua Tree National Monument,* Twentynine Palms, California. 1987-88. Assessed status of the desert tortoise throughout the monument (transects, habitat analyses); developed relocation techniques and assessed sites for tortoises turned in to headquarters. Contact: Dr. Jerry Freilich.

*Bureau of Land Management,* Las Vegas, Nevada. June to October, 1987 (employee). Developed new method for estimating tortoise densities from transects; led team to estimate tortoise densities from transects throughout southern Nevada; developed habitat assessment technique from quantitative habitat analyses. Supervisor: Sidney Slone.

*Nevada Department of Wildlife,* Las Vegas, Nevada. Spring, l984 to 1989. Development of a comprehensive, computerized data base of locations and habitat associations of all vertebrate taxa in Nevada through field, literature, and museum collections' surveys. Field research included live-trapping of all taxa, quantitative censuses of birds, rodents, and carnivores, statistical analyses, and development of baseline research methods for the Department of Wildlife. Contract No. 84-33.

*Bureau of Land Management,* Riverside, California. March to August, l980. Independent, 60-day quantitative and qualitative study of a population of desert tortoises in eastern California. Included extensive analysis of the site's vegetation. Technical report emphasized the relationship of primary production, disturbance, and geo-characteristics to the population demographics of the desert tortoise in this area. Contract No. CA-060-CTO-3.

*Bureau of Land Management,* Las Vegas, Nevada. March, l979 to August, l982. Sole project to date to determine the distribution and relative densities of the desert tortoise in Nevada;

also delineated habitat requirements of the tortoise in Nevada. Solitary research involving foot-transecting over 450 miles in Clark, Lincoln, and Nye counties. Also included qualitative and quantitative examinations of three populations of tortoises similar to those mentioned above. Contract No. YA-512-CT9-90.

*Bureau of Land Management,* Riverside, California. Spring, l979. Independent, 60-day quantitative and qualitative study of a population of desert tortoises in the western Mojave Desert. Included aforementioned aspects. Contract No. CA-960-CT9-106.

*Bureau of Land Management,* Riverside, California. Spring, l978. Independent 30-day quantitative and qualitative study of population of desert tortoises in eastern San Bernardino County, California. Included aforementioned aspects. Contract No. CA-060-CT8-000042.

*California Department of Fish and Game,* Chino, California. June to December, l978 - Independent, foot-transecting of over 400 miles of the Mojave and Colorado deserts in California to assist in the determination of the status of the desert tortoise in California. Additional study of pupfish (*Cyprinodon maculatus*) in the Salton Sea, California.

ASSOCIATE PROJECT BIOLOGIST:

*Mojave Ground Squirrel Behavioral Project*. 2003. Trapping and telemetry with Drs. Phil Leitner and John Harris near Ridgecrest, California.

*Eagle Mountain Landfill*, Desert Center, California. 1996**.** Desert tortoise surveys on proposed site. Consultant to Circle Mountain Consultants, Wrightwood, California.

*City of Rosamond General Plan.* 1992. Trapping ssessment of Mohave Gound Squirrel population status. Consultant to CWESA, Sanger, CA.

*Clark County Desert Tortoise Habitat Conservation Pla*n. 1990-91. Reviewer and partial author of HCP and member of biological technical team; also included field assessments of tortoise habitat quality. Consultant to RECON, San Diego, California.

*Desert Tortoise Council.* 1990-present. Requested by Council to present techniques for finding tortoises, identifying sign and analyzing data to biologists, developers, and consultants at annual techniques workshop.

*American Motorcycle Association/U.S. Fish and Wildlife Desert Tortoise Listing.* 1989-90. Review of U.S. Fish and Wildlife Service's basis for Emergency Endangered Listing of the desert tortoise. Examination of all available data, both published and unpublished, to analyze status of the desert tortoise. Draft report heavily cited by U.S. Fish and Wildlife as support for their final listing determination. Subcontracted to Biosystems Analysis, Inc., Tiburon, California.

*Salt River Project,* Quemado, New Mexico. September, l985, 1987. Determination of impacts to vegetation and evaluation of re-vegetation success (quantitative vegetation transects) from mining coal reserves. In association with E. Linwood Smith and Associates, Tucson, Arizona.

*Sonora Mining Corporation,* Sonora, California. Fall, 1986. Assessment of impacts to fish populations (electro-shocking)in Woods Creek, from mining operations. CWESA, Sanger, California.

*UNOCAL Platform Irene Project,* Lompoc, California. September, 1986. Monitoring of pipeline construction for sensitive wildlife and floral issues. CWESA, Sanger, California.

*Southern California Edison,* Kingman, Arizona. May, 1986. Botanical survey along proposed transmission line route; Kingman, Arizona to Boulder City, Nevada. Biosystems Analysis Inc., Santa Cruz, California

*Belridge Cogeneration Project,* Bakersfield, California. Spring, 1985. Field survey of the blunt-nosed leopard lizard (Gambelia silus) and analysis of vegetation. CWESA, Sanger, California.

*CWESA ,* Sanger, California- September, l984. Field survey of the blunt-nosed leopard lizard in the San Joaquin Valley, California, to determine population dynamics and ecology.

*U.S. Forest Service,* Klamath Forest, California. Summer, l983. Project to determine the population dynamics, behavior, and effective control techniques of pocket gophers (Thomomys bottae) in red fir clearcuts. Field work included use of radio telemetry and live trapping. Walter E. Howard, U.C., Davis.

*Southwest Biological Associates*, Encinitas, California. Winter, l978. Literature search on the herpetofauna of central and southern California.

*Bureau of Land Management,* Riverside, California. Summer, l978 - Field study of the effects of grazing and urbanization on reptiles at two Mojave Desert sites.

EDUCATIONAL EMPLOYMENT

Collector and preparer, Museum of Vertebrate Zoology, Wildlife and Fisheries Biology, University of California, Davis, California. l983-l985 - Included trapping, preparation (skeletal and study skin preparation, live-pose taxidermy, freeze-drying), and cataloguing of specimens.

Teaching Assistant, U. C. Davis. l983-85. Courses in wildlife ecology and museum science.

Teaching Assistant, California State University, Northridge. September, l981 to June, l982. Courses in general biology, physiological ecology and local California flora and fauna.

PUBLICATIONS AND PRESENTED PAPERS (not including technical reports associated with most projects)

Karl, A. l980. The distribution and relative densities of the desert tortoise, *Gopherus agassizi,* in Nevada. *In*: K. Hashagen, ed., Proceedings of the l980 Desert Tortoise Council Symposium, Riverside, California. Pp 75-87. (Paper also presented.)

Karl, A. l981. The distribution and relative densities of the desert tortoise, *Gopherus agassizi,* in Nevada. Part II. *In*: K. Hashagen, ed. Proceedings of the l981 Desert Tortoise Council Symposium, Riverside, California. Pp76-92. (Paper also presented.)

Karl, A. and E. Smith. l984. - Densities of and impacts to the desert tortoise, *Scaptochelys agassizii,* along the proposed 500 kv D.C. Intermountain Power Project Transmission Line in

Nevada and Utah. Paper presented at the Desert Tortoise Council Symposium, Lake Havasu, Arizona.

Karl, A. 1994. Reproduction in desert tortoises - ecological and evolutionary perspectives. Paper presented at both the 1994 Desert Tortoise Council Symposium, Las Vegas, Nevada and the American Society of Ichthyologists and Herpetologists Meetings, Los Angeles, California.

Karl, A. 1995. Indirect censusing methods for desert tortoises. Paper presented at an invitational workshop on censusing desert tortoises. Reno, Nevada.

Karl, A. 1997. Factors affecting reproduction of desert tortoises and resultant implictions for management. Paper presented at the 1997 Desert Tortoise Council Symposium, Las Vegas, Nevada

Karl, A. 1997. Reproductive strategies of the desert tortoise. Paper presented at the 1997 American Society of Ichthyologists and Herpetologists Meetings, Seattle, Washington.

Karl, A. 1998. Growth patterns of the desert tortoise in an East Mojave population. Paper presented at the 1998 Desert Tortoise Council Symposium, Tucson, Arizona.

Karl, A. 2002. Revised techniques for estimating desert tortoise abundance in the Fort Irwin National Training Center Expansion Area in 2001 and the results of those studies. Paper presented at the 2002 Desert Tortoise Council Symposium, Palm Springs, California.

Karl, A. In prep. Drought effects on the desert tortoise and population recovery.

Freilich, J., R. Camp, J. Duda and A. Karl. 2004. Problems with sampling desert tortoises:: a simulation analysis based on field data. In press.

MEMBERSHIPS

California Native Grass Association
California Native Plant Society
Desert Tortoise Council
Herpetologists' League, Inc.
Ecological Society of America
Society for the Study of Amphibians and Reptiles
Society for Ecological Restoration

**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA**
**1516 NINTH STREET, SACRAMENTO, CA 95814**
**1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION FOR THE *PALEN SOLAR POWER PLANT PROJECT***

**Docket No. 09-AFC-7**

***PROOF OF SERVICE***
**(Revised 8/27/10)**

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*indicates change

## DECLARATION OF SERVICE

I, Marie Mills, declare that on October 22, 2010, I served and filed copies of the attached PALEN SOLAR I, LLC's REBUTTAL TESTIMONY: BIOLOGICAL RESOURCES, dated October 22, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:
[http://www.energy.ca.gov/sitingcases/solar_millennium_palen]

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

### FOR SERVICE TO ALL OTHER PARTIES:

__X__ sent electronically to all email addresses on the Proof of Service list;

_____ by personal delivery;

__X__ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "email preferred."

*AND*

### FOR FILING WITH THE ENERGY COMMISSION:

__X__ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

*OR*

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-7
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Marie Mills

*indicates change