Attachment F

Memorandum of Understanding between Boulevard and the Arizona Game and Fish Department and Scope of Work

MEMORANDUM OF UNDERSTANDING

BETWEEN THE ARIZONA GAME AND FISH COMMISSION AND SONORAN SOLAR ENERGY, LLC

This Memorandum of Understanding ("MOU") is entered into between the Arizona Game and Fish Commission ("Commission") and Sonoran Solar Energy, LLC ("Sonoran"), a Delaware limited liability corporation authorized to do business in the State of Arizona (collectively "Parties" and singularly "Party").

RECITALS

WHEREAS, the Commission is authorized to enter into this MOU pursuant to A.R.S. § 17-231(B)(7);

WHEREAS, the Commission has statewide responsibility for the management and preservation of wildlife;

WHEREAS, the Arizona Game and Fish Department ("Department") acts under the authority of the Commission;

WHEREAS, the Parties desire that the Department work with Sonoran to conduct fish and wildlife management, surveys, monitoring and research activities;

WHEREAS, the Parties recognize and encourage a continued commitment to maintaining and enhancing fish and wildlife populations throughout Arizona;

WHEREAS, the Parties wish to act cooperatively for the management and preservation of fish and wildlife resources of the State through the identification and protection of fish and wildlife habitat.

NOW, THEREFORE, consistent with the foregoing Recitals, and for good and valuable consideration, it is the understanding of the Parties that:

1. **The Department shall**:
   A. Study existing fish and wildlife populations pursuant to a written Scope of Work for projects related to fish and wildlife which will be prepared by Sonoran and the Department.
   B. Provide Sonoran with current and accurate information and data on wildlife studies for documenting project progress and completion.
   C. Upon execution of a Scope of Work, submit a monthly invoice to Sonoran for reimbursement of time and materials {"project costs") utilized by the Department for the project, with the total reimbursement amount not to exceed the costs identified in the Scope of Work.

D. Appoint a Project Manager to coordinate with Sonoran for each project.

2. **Sonoran shall**:

   A. Remit payments to the Department for project costs according to specified conditions within each collection agreement associated with an approved Scope of Work, upon receipt of a monthly invoice from the Department.

   B. Appoint a Project Manager to coordinate with the Department for each project.

   C. Review project documents and provide written comments to the Department through the completion of each Scope of Work and acceptance of the project.

3. **The Parties mutually agree:**:

   A. To cooperate in the development of a Collection Agreement with an acceptable Scope of Work for each project, which shall identify project deliverables, an implementation schedule, and an approved budget.

4. Effective Date and Duration. This MOU is effective as of the last signature date below, and expires five (5) years from that date, unless terminated earlier by the Parties. This MOU may be extended for additional terms through the issuance of a written modification, signed and dated by all Parties.

5. Termination. Either Party may terminate this MOU upon thirty (30) days written notice to the other Party. Upon termination, all work performed pursuant to this MOU shall cease. Sonoran shall be liable for payment to the Department for only those project costs, as stated in the Statement of Work, performed or incurred by the Department up to the date of termination.

6. Notices. All written notices concerning this MOU shall be delivered in person or sent by certified mail, return receipt requested, to the Parties as follows:

   A. For the Commission:
   Larry D. Voyles, Director
   5000 W. Carefree Highway
   Phoenix, Arizona 85086

   B. For Sonoran Solar Energy, LLC:
   Matthew Handel, Vice President
   700 Universe Boulevard
   Juno Beach, FL 33408

7. Non-discrimination. In carrying out the terms of this MOU, the Parties agree to comply with Executive Order 99-4 prohibiting discrimination in employment, the provisions of which are incorporated herein by reference.

8. Audit. Pursuant to A.R.S. § 35-214, all books, accounts, reports, files, electronic data, and other records relating to this MOU shall be subject at all reasonable times to inspection and audit by the State of Arizona for five (5) years after completion of this MOU.

9. Arbitration. To the extent required pursuant to A.R.S. § 12-1518, the Parties agree to use arbitration to resolve any dispute arising under this MOU, with each Party to bear its own attorneys' fees and costs.

10. Termination for Conflict of Interest. This MOU is subject to termination pursuant to A.R.S. § 38-511.

11. Termination for Non-Availability of Funds. Every obligation of the Parties under this MOU is conditioned upon the availability of funds appropriated or allocated for the payment of such obligation. If funds for the continuance of this MOU are not allocated or are not available, this MOU shall terminate automatically on the date of expiration of funding. In the event of such termination, the Parties shall incur no further obligation or liability under this MOU other than for payment of services rendered prior to the expiration of funding.

12. Other Agreements. This MOU in no way restricts either Party from participating in similar activities with other public or private agencies, organizations, or individuals.

13. Compliance with Applicable Law. All work performed pursuant to this MOU shall be in compliance with all applicable state and federal laws and regulations.

14. Integration. This MOU constitutes the entire agreement between the Parties pertaining to the subject matter herein and accurately sets forth the rights, duties, and obligations of each Party. All prior or contemporaneous agreements and understandings, oral or written, are hereby superseded and merged herein. The provisions of this MOU may be abrogated, modified, rescinded, or amended in whole or in part only by mutual written consent executed by the Parties.

15. Severability. In the event that any provision of this MOU or portion thereof is held invalid, illegal, or unenforceable, such provision or portion thereof shall be severed from this MOU and shall have no effect on the remaining provisions of this MOU, which shall remain in full force and effect.

16. No Partnership or Joint Agency. Nothing in this MOU shall be construed to create any partnership or joint agency relationship between the Department and Sonoran.

IN WITNESS WHEREOF, the Parties hereto have executed this MOU:

SONORAN SOLAR ENERGY, LLC

Matthew Handel
Vice President, Development

11/14/11
Date

BOS
PC

ARIZONA GAME AND FISH COMMISSION

for _____ Deputy Director
Larry D. Voyles
Director, Arizona Game and Fish Department and
Secretary to the Commission

29 OCT 11
Date

Scope of Work:
Wildlife Mitigation and Monitoring for the Sonoran Solar Energy Project

Prepared By:
David D. Grandmaison
Arizona Game and Fish Department

September 2011

Background:
Careful planning in the placement, configuration, and extent of individual solar projects are the first steps in minimizing impacts to wildlife populations. Mitigation measures that seek to reduce unavoidable impacts such as habitat loss and fragmentation can be implemented as a means to protect the region's biota. Unfortunately, there is a dearth of information regarding the extent of the impact that utility-scale solar energy developments have on wildlife populations. Without this information, appropriate planning and mitigation strategies are undefined. In order to develop the region's solar energy resources in a way that protects wildlife populations, the solar industry and the wildlife management community must understand the true impacts that utility-scale solar developments have on wildlife populations and their habitats.

Objectives:
Mitigating the impacts that utility-scale solar energy developments have on wildlife communities requires that we identify the spatial extent at which the impacts occur. Only when the extent of the impacts is known can appropriate mitigation strategies be developed. As such, the overall objective of this monitoring program is to answer the critical question: "*What are the impacts that utility-scale solar developments have on Sonoran Desert wildlife communities?*"

To obtain information regarding impacts of utility-scale solar development on Sonoran Desert wildlife communities, the primary set of objectives for this project is:

1. Identify the spatial extent of the impact that the proposed Sonoran Solar Energy Project (SSEP) may have on local wildlife populations (e.g., presence, population density, species diversity, etc.).
2. Provide management recommendations that can be used to mitigate and monitor any potential impacts that future solar energy projects may have on wildlife species.

However, given the sensitive nature of kit foxes and desert tortoises to habitat disturbances, our second set of objectives is:

1. Survey the SSEP area for presence and/or sign of kit foxes and desert tortoises.
2. If kit foxes are present, estimate their numbers within the project boundary.
3. If kit foxes and/or desert tortoises present, determine if additional funding should be allocated to identify the impacts that relocation efforts have on survival and movement patterns for these species.

Approach:
Funding Constraints[1] -- Funds to support the planned monitoring work on the SSEP will be provided in $100,000 disbursements, 90-days prior to the initiation of each of three construction phases, with a maximum funding allotment of $300,000. This assumes that all three phases move forward and the project reaches full build-out.

[1] This assumes that the Bureau of Land Management (BLM) selects the photovoltaic (PV) alternative as the "preferred alternative" under the National Environmental Policy Act (NEPA) Environmental Impact Statement process. BLM may also select a two-phase concentrated solar power (CSP) alternative. In this scenario, funding for wildlife monitoring would be divided equally between the two phases, 90-days prior to construction and additional funds would be provided to relocate a stock tank impacted by the CSP project.

Project Work Plan -- Monitoring actions after the initial pre-construction clearance surveys will be influenced by survey results. Kit fox and/or desert tortoise detections during clearance surveys may trigger species-specific mitigation actions. Funding for the mitigation actions may impact the funding available for the community impacts study (Appendix A). Due to the uncertainty of survey results, this work plan provides guidance regarding how funds may be allocated and if additional funding should be obtained from additional funding sources to gather the most information possible regarding the impacts that utility-scale solar developments have on Sonoran Desert wildlife communities. The key feature of this work plan is that it provides an adaptable framework that meets the desired objectives identified by Sonoran Solar Energy, LLC, AGFD, and BLM.

Pre-Construction Clearance Surveys

General Sampling Design -- We will use a belt transect approach to conduct a complete coverage survey of the project area (i.e., all three phases). We will first establish a series of 50 meter wide belt transects that cover the entire solar field portions of the project area (approximately 2,000 acres (PV) – 3,700 acres (CSP)). Biologists will then record the location of kit foxes and desert tortoises detected as they move along each belt transect[2]. In addition to live animals, surveyors will record the location of all sign (e.g., scat, tracks, active burrows, etc.) detected during the effort. Cost Estimate: $26,000.

Possible Mitigation Actions -- Based on the results of the initial pre-construction clearance surveys, AGFD will determine if the following actions are warranted (see also Figure 1):

- If kit foxes (or kit fox sign) are detected, remotely triggered cameras will be deployed to obtain an estimate of the number of individuals present within the project footprint. The following mitigation options will then be evaluated by AGFD personnel:
    - Option #1 – Passive Relocation: Use 1-way box traps to exclude kit foxes from burrows as those burrows are scheduled to be impacted by construction activities. Cost Estimate: $3,000 per phase.
    - Option #2 – Passive Relocation and Monitoring: If 10 or more kit foxes are detected within the project area, capture up to 10 individuals and deploy GPS tracking units to monitor movements and survival as kit foxes are excluded from burrows and forced to relocate outside of the project footprint. Cost Estimate: $50,000 per phase.
- If desert tortoises (or tortoise sign) are detected, the following mitigation options will be evaluated by AGFD personnel:
    - Option #1 – Active Relocation: Move desert tortoises out of project footprint[3].
    - Option #2 – Active Relocation and Monitoring: Deploy up to 10 GPS and/or VHF tracking units on tortoises to monitor movements and survival as desert tortoises are moved outside of the project footprint. Cost Estimate: $10,000 per phase.
- If funds are diverted to address kit fox or desert tortoise mitigation and monitoring, any remaining funds will be allocated towards initiating community impacts monitoring.

[2] Wild At Heart (WAH) will identify burrowing owl occupancy within the project area. AGFD will coordinate with WAH to share information on all species of concern (i.e., burrowing owl, kit fox, badger, desert tortoise).

[3] If tortoises are present and must be moved, AGFD guidelines for tortoise relocation specify that tortoises should be moved no more than 0.5 miles (http://www.azgfd.gov/hgis/pdfs/Tortoisehandlingguidelines.pdf). However, specific relocation sites will be based on the identification of the nearest appropriate habitat by AGFD personnel.

However, reductions in the funding available for the community study will necessitate reducing the scope of the project (e.g., focus on herpetofauna and small mammals only) unless budget shortfalls can be augmented with additional funding streams from other agencies. Given survey results, additional funding streams may be sought to implement species-specific mitigation and monitoring as described above.

- If neither kit foxes nor desert tortoises are detected, remaining funds from the initial disbursement will be allocated to collecting data for the wildlife community study. Under this scenario, the available funding is estimated as $274,000[4].

Projected Outcome -- If kit foxes and/or desert tortoises are detected during initial clearance surveys, AGFD will determine the appropriate course of action. If warranted, we will implement a monitoring program designed to identify the impact that passive and active relocation efforts have on kit foxes and desert tortoises, respectively. Specifically, this program would examine impacts to survival rates and movement patterns.

Monitoring Impacts to Wildlife Community

General Sampling Design -- The scope of work for monitoring the impacts of utility-scale solar developments on wildlife communities in the Sonoran Desert is included in Appendix A. Briefly, the following design elements are included:

- Control-Impact design where the SSEP serves as the "impact" site and a nearby, undisturbed location is considered the "control" site[5]. This design provides a robust approach for evaluating any impacts that utility-scale solar development may have on wildlife communities.
- Wildlife community monitoring will begin after the completion of final phase of construction and continue for up to two years post construction.
- The following taxonomic groups may be included: lizards, snakes, small mammals, birds, and mammalian meso-predators[6].
- Response variables may include: presence/absence, relative abundance, density, and diversity indices.

Adaptability of Monitoring Methodology -- If kit foxes and/or desert tortoises are detected within the project area and allocation of monitoring funds is used for species-specific mitigation, there is an option to modify the community impacts scope of work to include fewer taxonomic groups. For example, sampling could be modified to focus monitoring efforts on lizards, snakes, and small mammals. However, we will ensure that the integrity of the study is kept intact so that reliable information is obtained to meet the objectives of the community impacts study.

If all three construction phases move forward, monitoring will begin at the completion of construction (at both the impact and control sites). If Phases II and III of the construction plan do not move forward, monitoring will begin immediately following the completion of Phase I. This will also impact the funding available for the community impacts study and decisions will need to be made on which taxonomic groups to monitor given reductions in funding.

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[4] Assuming that all three construction phases move forward.
[5] Additional funding sources may be sought to include an additional control site.
[6] If present, desert tortoise monitoring will have been addressed as described under "*Possible Mitigation Actions*".

Projected Outcome -- The monitoring program outlined here will allow us to estimate the "effective footprint" that the SSEP may have in the Little Rainbow Valley and answer the question: "*What is the appropriate spatial extent for mitigation strategies to reduce impacts of utility-scale solar development on wildlife communities?*" While the results of this monitoring program will evaluate site-specific implications, they will also form the basis of future mitigation strategies designed to minimize the conflicts between wildlife conservation and renewable energy development.

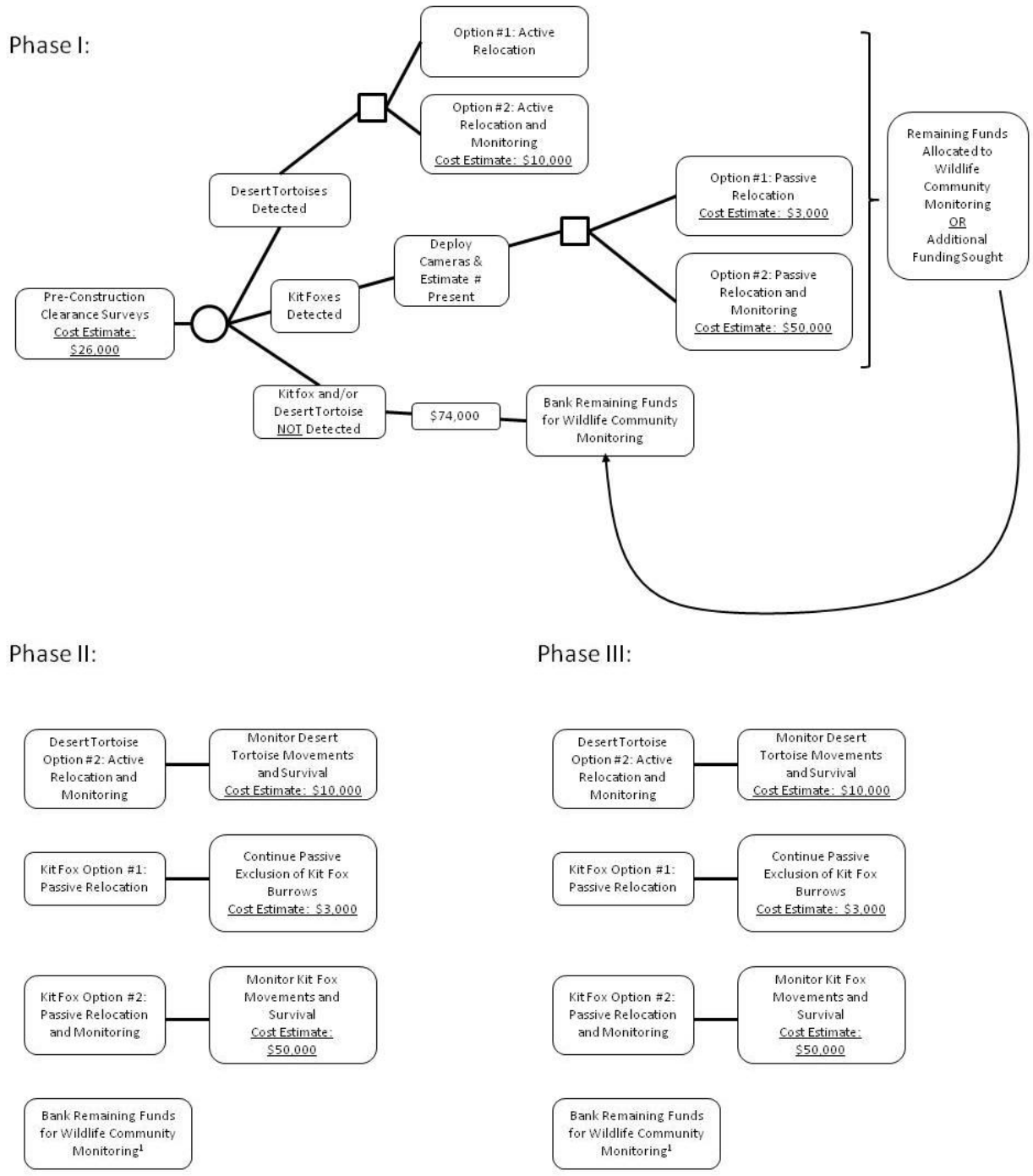

Figure 1. Work plan decision tree for mitigation and monitoring efforts on the Sonoran Solar Energy Project.

Appendix A: Community Impacts Scope of Work

Potential Impacts of Utility-Scale Solar Energy Development on Wildlife Communities within and around the proposed Sonoran Solar Energy Project in Little Rainbow Valley, Arizona

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Responsible management of ecological systems requires balancing the benefits of renewable resource development against environmental degradation. Despite the benefits of solar energy development, there is an increasing awareness that utility-scale energy projects will have adverse impacts to wildlife and their habitat. It is well known that anthropogenic barriers to wildlife movement and habitat fragmentation pose significant threats to the long-term persistence of wildlife populations worldwide (Noss 1983, Wilcox and Murphy 1985, Noss 1987). The construction of solar generation plants, transmission lines, and infrastructure will reduce the availability and quality of wildlife habitat, impede wildlife movement, and fragment remaining habitat into smaller and more isolated patches.

Careful planning in the placement, configuration, and extent of individual solar projects are the first steps in minimizing impacts to wildlife. Mitigation measures that seek to reduce unavoidable impacts such as habitat loss and fragmentation can be implemented as a means to protect the region's biota. Unfortunately, there is a dearth of information regarding the extent of the impact that utility-scale solar energy developments will have on wildlife populations. Without this information, appropriate planning and mitigation strategies are unclear. In order to develop the region's solar energy resources in a way that protects wildlife populations, the solar industry and the wildlife management community must understand the true impacts that utility-scale solar developments have on wildlife, their habitat, and the landscape linkages that connect

the large intact ecosystems that wildlife need to survive and work together to minimize those impacts.

Sonoran Solar Energy, LLC (Sonoran Solar), a subsidiary of NextEra Energy Resources, LLC (NextEra), is nearing completion of the permitting phase for an approximately 2,000-acre solar facility. The Sonoran Solar Energy Project (SSEP) is adjacent to the Sonoran Desert National Monument in Little Rainbow Valley, Arizona (Figures 2 and 3). Habitat will be completely lost within the fenced boundary of the solar facility, and this alteration will most likely render the area within the project footprint unsuitable for wildlife. What is less certain is the impact that the SSEP will have beyond the physical footprint. To what extent does modification to the landscape within the project's boundary impact adjacent habitat? This question remains unanswered although we can look to other types of development, such as road construction and urban development for clues.

Broadly defined, the "road-effect zone" is the area over which ecological impacts extend beyond the road's physical footprint (Forman and Deblinger 2003). For wildlife, the "road-effect zone" results in habitat adjacent to the roadway exhibiting lower occupancy relative to habitat more distant from the roadway. This avoidance pattern has been documented for snakes (Rudolph et al. 1999, Shine et al. 2004, Andrews and Gibbons 2005), salamanders (Semlitsch et al. 2007), desert tortoises (von Seckendorff Hoff and Marlow 2002, Boarman and Sazaki 2006), birds (van der Zande et al. 1980, Reijnen et al. 1995, Pocock and Lawrence 2006), bobcats (Lovallo and Anderson 1996), black bears (Brody and Pelton 1989), desert bighorn sheep (McKinney and Smith 2007), elk (Rowland et al. 2000) and mule deer (Rost and Baily 1979). Similarly, a "disturbance zone" in which animals avoid seemingly suitable habitat adjacent to urban development (Theobald et al. 1997) has been documented for lizards (Germaine and Wakeling 2001), gray fox (Harrison 1997), deer (Vogel 1989), and other species. These studies indicate that the influence of anthropogenic features such as roads and urban development extend beyond the physical footprint of the structures themselves, degrading adjacent habitat and altering species composition. What remains unclear is the response of wildlife to utility-scale solar power developments in the southwest.

We propose to document the "effective footprint" of the SSEP. The primary purpose of this research project is to identify the extent of the "effective footprint" of a solar facility so that mitigation strategies can be implemented at the spatial extent of the impact on future projects. Specifically, we will conduct post-construction wildlife surveys for a range of species and compare the results to undisturbed sites nearby.

Objectives

We recognize that the first step in preventing impacts to wildlife caused by solar energy facilities is to identify where conflicts may exist. The following project objectives will be addressed:

1. Identify the spatial extent of the impact that the proposed SSEP will have on wildlife populations (e.g., presence, population density, species diversity, etc.), and;
2. Provide management recommendations that can be used to mitigate and monitor any potential impacts that future solar energy projects may have on wildlife species.

General Approach

- We will implement a before-after-control-impact monitoring design to assess the spatial extent of the SSEP's impact on wildlife and their habitat. The project footprint is considered the "impact" site and an undeveloped site within the same eco-region will serve as the "control" site.
- Field monitoring will begin just after construction on the impact and control sites and will continue for two years.
- We will employ mark-recapture methods (Manly et al. 2004) to obtain density estimates for **lizards and snakes** using a trapping design modified from Campbell and Christman (1982) and Greenberg et al. (1994). Each trap station will consist of two 15 meter silt fences forming an 'L' shape with 3 pitfall traps (1 at each end and 1 at the center), and 4 funnel traps placed on both sides of the fences. Pitfall traps will be constructed from plastic 5-gallon buckets buried at the end of each fence such that the top of the bucket is flush with the ground and the fence intersects the center of the pitfall traps. Funnel traps will be constructed from 3.18 millimeter aluminum mesh hardware cloth with funnel openings on both ends. One funnel trap will be placed on either side, and halfway along, both legs of the L-shaped fence. Trapping sessions will consist of a 15-day sampling period each month. Traps will be checked once daily between 6 am and 11 am during each 15-day session. All individuals captured will be identified to species and marked to recognize recaptures. Analyses will be conducted using Program MARK (White and Burnham 1999).
- The trapping web design (Anderson et al. 1983) will be used to obtain density estimates for **small mammals**. Traps will be baited with a mixture of peanut butter and grains and checked on three consecutive mornings two weeks per month during the monitoring period. All captured animals will be identified to species, weighed, sexed, and marked with an ear tag to identify individuals prior to being released.
- We will survey for **birds** using a systematic sampling approach of point transects following methods described in Leukering et al. (2001) and Buckland et al (1993). All survey points will follow the small mammal trapping web plot, with survey points placed every 200 meters along the trapping web. Using a GPS unit, an observer will locate the survey point, remain silent for 1 minute, and then record all birds seen or heard during the next 5 minutes. The observer will record the species, the number of birds in the group, and determine the distance to the bird with the aid of a laser rangefinder to minimize estimation errors. We will use Program DISTANCE (Thomas et al. 2006) to estimate density for species with sufficient sample sizes (n>50).
- Using a technique developed by Roughton and Sweeney (1982) (i.e., a 1m² area covered with masonry sand and baited with a synthetic attractant such as fermented egg or animal urine), we will place a series of scent stations 250 meters apart along the small mammal trapping web to sample **mammalian meso-predators**. Once a scent is applied to the center of the circle, the area should be saturated with water to preserve any animal tracks. The scent stations will be active for three consecutive days and run every 45 days (i.e., 8 sampling episodes per year). The

stations are to be checked at least twice daily, once in the morning and once just prior to sunset. This should provide insight into nocturnal and diurnal use of these areas by terrestrial mammals of many sizes. The proportion of scent stations within the "control" area at which a species is detected will be calculated and compared to the corresponding impact site using a chi-square goodness of fit test.

- We will analyze the presence, abundance values, and/or diversity indices (e.g., Shannon–Weiner Index) of species in relation to the proposed solar energy facility activities (i.e., pre- and post-construction).

Approximate Cost: $276,418 (see budget summary below). Arizona Game and Fish will contribute the use of ATV's, trapping supplies, and in-kind personnel services.

Additional Benefits

This project will contribute to baseline information needed to assess the cumulative impacts of additional solar energy development on wildlife species in the region. In addition, a secondary benefit of this project will be to provide information that can be used to understand and reduce the impacts to wildlife communities within future solar developments in other areas of the southwestern deserts.

Tentative Time Line

Time	Activity
YEAR 1	
Late Winter	Establish monitoring and trapping array survey plots
Early Spring – Summer	Survey Tortoise plots (4 visits)
Early Spring – Early Summer	Collect bird point data
Early Spring – Early Summer	Collect small mammal population data
Late Spring - Summer	Monitor reptile trap arrays
Late Winter – Early Winter	Bait and monitor meso-predator scent stations
Early Winter	Analyze data / submit progress report
YEAR 2	
Late Winter	Establish monitoring and trapping array survey plots
Early Spring – Summer	Survey Tortoise plots (4 visits)
Early Spring – Early Summer	Collect bird point data
Early Spring – Early Summer	Collect small mammal population data
Late Spring - Summer	Monitor reptile trap arrays
Late Winter – Late Winter	Bait and monitor meso-predator scent stations
YEAR 3	
Late Winter – Early Spring	Analyze data / develop final report
Early Spring – Summer	Present results and submit final draft report
Summer	Submit final report

Annual Budget Summary:

Category	Year 1 Cost	Year 2 Cost	Year 3 Cost
Personnel			
Principle Investigator ($1231/week)	3693	3693	3693
Wildlife Specialist ($948/week)	28440	28440	7584
Wildlife Technician ($827/week)	21502	21502	
Wildlife Technician ($827/week)	21502	21502	
Administrative/Secretarial (755/week)	755	755	
Sub-total	**75,892**	**75,892**	**11,277**
Overhead (16% of Personnel costs)	**12,142**	**12,142**	**1,804**
ERE (33% of Personnel costs)	**25,044**	**25,044**	**3,721**
Mileage			
AGFD vehicles ($0.55/mile)	**4,950**	**4,950**	**550**
Per diem			
Principle Investigator ($34/day x 5 days)	**170**	**170**	**170**
Other Operating Expenses			
• Snake and Lizard trap arrays ($150 ea x 20)	3000		
• Scent Station ($75 ea x 40)	3000		
• Small mammal traps ($15 ea x 200)	3000		
• Misc. field/office equipment (e.g., batteries, photocopies, binding, bait, office space, capture supplies, etc.)	2000	2000	500
Sub-total	**11,000**	**2,000**	**500**
Total	**$129,198**	**129,198**	**18,022**

Matching Dollars – The Arizona Game and Fish Department will provide a minimum of $16,000 in trapping supplies, ATV use, and in-kind services.

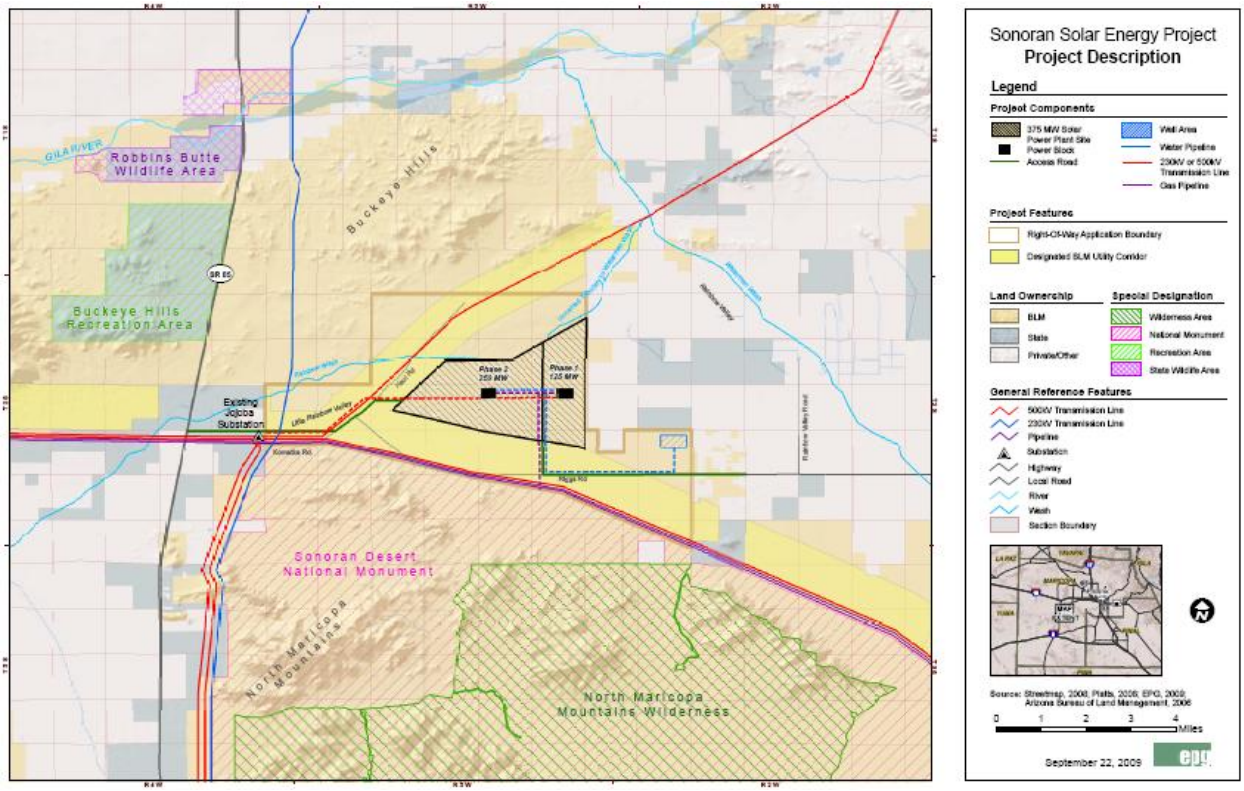

Figure 2. The potential future footprint of the Sonoran Solar Energy Project (CSP Alternative) located in Little Rainbow Valley, Arizona.

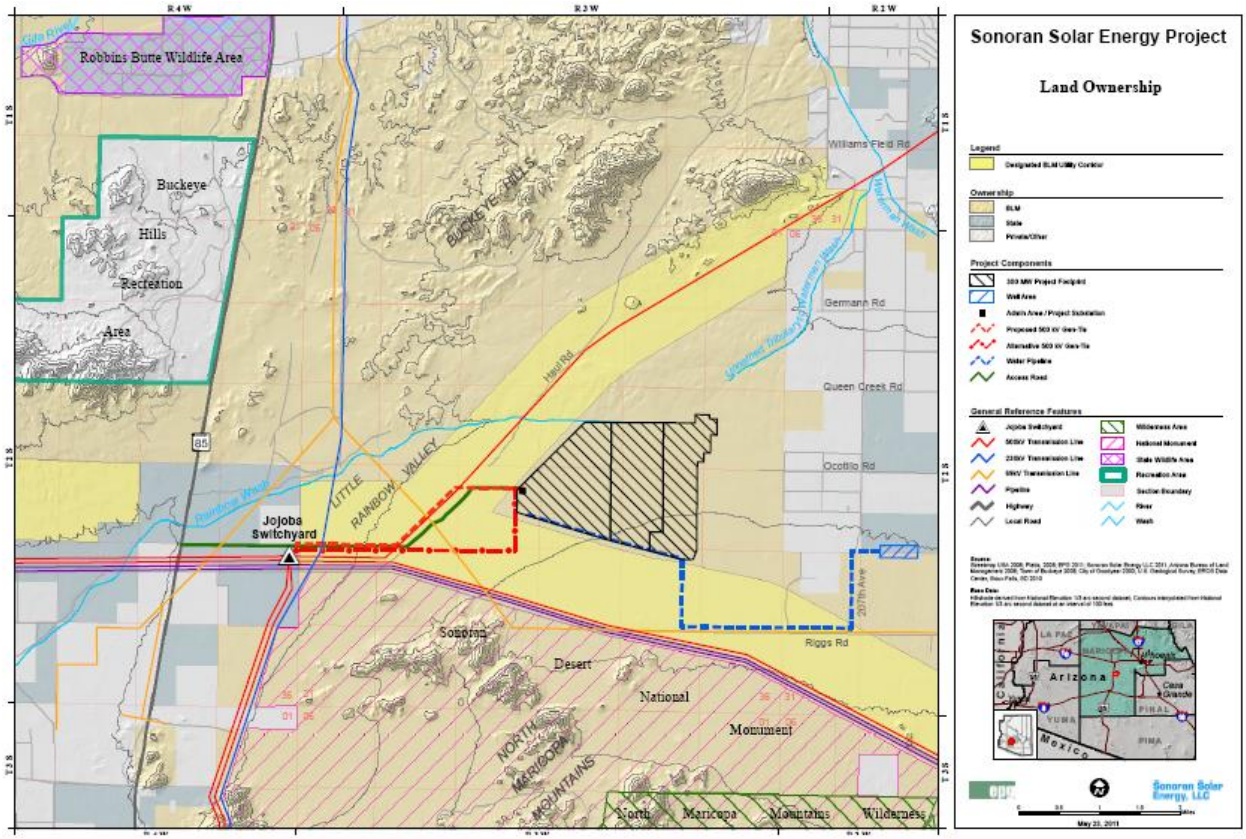

Figure 3. The potential future footprint of the Sonoran Solar Energy Project (PV Alternative) located in Little Rainbow Valley, Arizona.

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