BLYTHE SOLAR POWER PROJECT

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BLYTHE SOLAR POWER PROJECT (09-AFC-6)
SUPPLEMENTAL STAFF ASSESSMENT

State Of California

The Resources Agency of California

Memorandum

Date: July 7, 2010

Telephone: (916) 653-8236

To: Chairman Karen Douglas, Presiding Member
Commissioner Robert Weisenmiller, Associate Member
Hearing Officer Raoul Renaud

From: **California Energy Commission –** Alan Solomon, Project Manager
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Subject: BLYTHE SOLAR POWER PROJECT SUPPLEMENTAL STAFF ASSESSMENT

On June 6, 2010, Staff published the Blythe Solar Power Project Revised Staff Assessment (RSA). On July 1, 2010, Staff published the Blythe Solar Power Project Revised Staff Assessment, Part 2. This Supplemental Staff Assessment is necessary to finalize a few items that remained outstanding after publication of the RSA. Note – This Supplemental does not include the Traffic and Transportation, Appendix A - Aviation Report. The Aviation Report is being finalized and will be published under a separate cover.

This Supplemental contains the following information:

- Supplemental Air Quality Analysis Testimony with minor changes to conditions of certification
- Supplemental Biological Resources Analysis Testimony incorporating additional information received after publication of the RSA, analyzing potential impacts from a second access road, substation expansion, possible fire station, and the potential for the evaporation ponds to act as a bird attractant with possible implications to aviation safety. This section also contains additional responses to comments and a final witness list for hearings
- Supplemental Soil and Water Analysis Testimony including supplemental analysis of the tamarisk removal program staff proposed as an option for mitigation in the RSA and changes to conditions of certification the applicant proposed and staff has accepted
- Supplemental Soil and Water Appendix B, C, and D reflecting changes to the waste discharge requirements proposed by the applicant and accepted by staff
- Supplemental Thermal Plume Testimony addressing modeling conducted by the applicant
- Transmission System Engineering, Appendix A - Colorado River Substation Expansion and BSPP Interconnection Actions Impact Analysis
- Response to Public and Agency Comments
- Comments Regarding A Possible Energy Commission Finding Of Overriding Considerations
- Updated Exhibit List, with 3 addition Exhibits in the area of Biological Resources
- Resumes for witnesses not identified in the RSA and declarations for all witnesses submitting testimony in this Supplemental Staff Assessment.

SUPPLEMENTAL STAFF ASSESSMENT
AIR QUALITY

Supplemental Testimony of William Walters, P.E.

INTRODUCTION

This Supplemental Staff Assessment (SSA) presents minor changes to the staff Conditions of Certification (CoCs) proposed for the Blythe Solar Power Project, which do not impact the staff's findings as presented in the Revised Staff Assessment. The substantive requirements under the conditions have not changed. The minor revisions to the proposed staff conditions are shown in underline/strikeout.

The format revisions in staff's conditions are completed to address consistency issues between the current projects being licensed by the Energy Commission. The applicant provided comments (Galati & Blek 2010f) on the Conditions of Certification that have been addressed, in some cases with minor modifications, as considered acceptable by staff.

The Mojave Desert Air Quality Management District (District) has not yet completed its Final Determination of Compliance (FDOC), which will be addressing consistency issues with the conditions for the Heat Transfer Fluid piping system among other issues. The District intends to publish the FDOC on July 7th and staff will provide the revised District conditions in a second supplement shortly thereafter.

REVISED PROPOSED CONDITIONS OF CERTIFICATION

The staff recommended CoCs with proposed revisions are provided below. The other proposed staff conditions remain as provided in the Revised Staff Assessment.

STAFF CONDITIONS OF CERTIFICATION

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report that demonstrates compliance with the Air Quality Construction Mitigation Plan (AQCMP) mitigation measures for the purposes of minimizing fugitive dust emission creation from construction activities and preventing all fugitive dust plumes that would not comply with the performance standards identified in **AQ-SC4** from leaving the project site. <u>The following fugitive dust mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**, and a</u>~~A~~ny deviation from the AQCMP mitigation measures shall require prior ~~BLM Authorized Officer and~~ CPM notification and approval.

~~The following fugitive dust mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**.~~

a. The main access roads through the facility to the power block areas will be either paved or stabilized using soil binders, or equivalent methods, to provide a stabilized surface that is similar for the purposes of dust control to paving, that may or may not include a crushed rock (gravel or similar material with fines removed) top layer, prior to initiating construction in the main power block area, and delivery areas for operations materials (chemicals, replacement parts, etc.) will be paved or treated prior to taking initial deliveries.

b. All unpaved construction roads and unpaved operation and maintenance site roads, as they are being constructed, shall be stabilized with a non-toxic soil stabilizer or soil weighting agent that can be determined to be both as efficient ~~as~~ or more efficient for fugitive dust control as~~than~~ ARB approved soil stabilizers, and ~~that~~ shall not increase any other environmental impacts including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control. All other disturbed areas in the project and linear construction sites shall be watered as frequently as necessary during grading (consistent with **BIO-7**); and after active construction activities shall be stabilized with a non-toxic soil stabilizer or soil weighting agent, or alternative approved soil stabilizing methods, in order to comply with the dust mitigation objectives of Condition of Certification **AQ-SC4**. The frequency of watering can be reduced or eliminated during periods of precipitation.

c. No vehicle shall exceed 10 miles per hour on unpaved areas within the construction site, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

d. Visible speed limit signs shall be posted at the construction site entrances.

e. All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.

f. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

g. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.

h. All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM ~~and BLM Authorized Officer~~.

i. Construction areas adjacent to any paved roadway below the grade of the surrounding construction area or otherwise directly impacted by sediment from site drainage shall be provided with sandbags or other equivalently effective measures to prevent run-off to roadways, or other similar run-off control measures as specified in the Storm Water Pollution Prevention Plan (SWPPP), only when such SWPPP measures are necessary so that this condition does not conflict with the requirements of the SWPPP.

j. All paved roads within the construction site shall be swept daily or as needed (less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

k. At least the first 500 feet of any paved public roadway exiting the construction site or exiting other unpaved roads en route from the construction site or construction staging areas shall be swept as needed (less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff resulting from the construction site activities is visible on the public paved roadways.

l. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.

m. All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.

n. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

<u>Verification:</u> The AQCMM shall provide the CPM a Monthly Compliance Report to include the following to demonstrate control of fugitive dust emissions:

A. A summary of all actions taken to maintain compliance with this condition;

B. Copies of any complaints filed with the District in relation to project construction; and

C. <u>Any other documentation deemed necessary by the CPM or AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.</u>

AQ-SC4 Dust Plume Response Requirement: The AQCMM or an AQCMM Delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (A) off the project site and within 400 feet upwind of any regularly occupied structures not owned by the project owner or (B) 200 feet beyond the centerline of the construction of linear facilities~~,~~ indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMP shall include a section detailing <u>how the additional mitigation measures will be accomplished within the time limits specified. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:</u>~~the additional mitigation measures described in the verification below and how they will be implemented to meet~~

~~these fugitive dust control performance standards. The AQCMP shall include the following additional mitigation measure implementation procedures that will be used to ensure that the performance standards of this condition are met:~~

~~The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that visible dust plumes as defined above are observed:~~

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if Step 1, specified above, fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if Step 2, specified above, fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the CPM any directive from the AQCMM or Delegate to shut down an activity, if the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM before that time.

<u>**Verification:**</u> The AQCMM shall provide the CPM a Monthly Compliance Report to include:

A. A summary of all actions taken to maintain compliance with this condition;

B. Copies of any complaints filed with the District in relation to project construction; and

C. <u>Any other documentation deemed necessary by the CPM or AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.</u>

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the Monthly Compliance Report, a construction mitigation report that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction-related emissions. <u>The following off-road diesel construction equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**, and a</u>~~A~~ny deviation from the AQCMP mitigation measures shall require prior and CPM notification and approval.

~~The following off-road diesel construction equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**.~~

a. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCM showing that the engine meets the conditions set forth herein.

b. All construction diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort to the satisfaction of the CPM that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. In the event that a Tier 3 engine is not available for any off-road equipment larger than 50~~100~~ hp, that equipment shall be equipped with a Tier 2 engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2 levels unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is “not practical” for the following, as well as other, reasons.

   1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier 2 equivalent emission levels and the highest level of available control using retrofit or Tier 1 engines is being used for the engine in question; or

   2. The construction equipment is intended to be on site for 10 days or less.

   3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not practical.

c. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and that a replacement for the equipment item in question meeting the controls required in item “b” occurs within 10 days of termination of the use, if the equipment would be needed to continue working at this site for more than 15 days after the use of the retrofit control device is terminated, if one of the following conditions exists :

   1. The use of the retrofit control device is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.

   2. The retrofit control device is causing or is reasonably expected to cause engine damage.

   3. The retrofit control device is causing or is reasonably expected to

cause a substantial risk to workers or the public.

4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.

d. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

e. All diesel heavy construction equipment shall not idle for more than ten minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement.

f. Construction equipment will employ electric motors when feasible.

Verification: The AQCMM shall include in the Monthly Compliance Report the following to demonstrate control of diesel construction-related emissions:

A. A summary of all actions taken to control diesel construction related emissions;

B. A list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained; and

C. Any other documentation deemed necessary by the CPM or AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC7 The project owner shall provide a site Operations Dust Control Plan, including all applicable fugitive dust control measures identified in the verification of **AQ-SC3** that would be applicable to minimizing fugitive dust emission creation from operation and maintenance activities and preventing all fugitive dust plumes that would not comply with the performance standards identified in **AQ-SC4** from leaving the project site; that:

A. describes the active operations and wind erosion control techniques such as windbreaks and chemical dust suppressants, including their ongoing maintenance procedures, that shall be used on areas that could be disturbed by vehicles or wind anywhere within the project boundaries; and

B. identifies the location of signs throughout the facility that will limit traveling on unpaved portion of roadways to solar equipment maintenance vehicles only. In addition, vehicle speed shall be limited to no more than 10 miles per hour on these unpaved roadways, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

The site operations fugitive dust control plan shall include the use of durable non-toxic soil stabilizers on all regularly used unpaved roads and disturbed off-road areas, or alternative methods for stabilizing disturbed off-road areas, within the project boundaries, and shall include the inspection and maintenance procedures that will be undertaken to ensure that the unpaved roads remain stabilized. The soil stabilizer used shall be a non-toxic soil stabilizer or soil weighting agent that can be determined to be as efficient as or more efficient for fugitive dust control than ARB approved soil stabilizers, and that shall not increase any other environmental impacts including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control.

The performance and application of the fugitive dust controls shall also be measured against and meet the performance requirements of condition **AQ-SC4**. The measures and performance requirements of **AQ-SC4** shall also be included in the operations dust control plan.

Verification: At least 30 days prior to start of commercial operation, the project owner shall submit to the CPM for review and approval a copy of the site Operations Dust Control Plan that identifies the dust and erosion control procedures, including effectiveness and environmental data for the proposed soil stabilizer, that will be used during operation of the project and that identifies all locations of the speed limit signs. Within 60 days after commercial operation, the project owner shall provide to the CPM a report identifying the locations of all speed limit signs, and a copy of the project employee and contractor training manual that clearly identifies that project employees and contractors are required to comply with the dust and erosion control procedures and on-site speed limits.

AQ-SC8 The project owner shall provide the CPM copies of all District issued Authority-to-Construct (ATC) and Permit-to-Operate (PTO) documents for the facility.

The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project federal ~~or local~~ air permit. The project owner shall submit to the CPM any modification to any federal ~~or local~~ air permit proposed by the District or U.S. Environmental Protection Agency (U.S. EPA), and any revised federal ~~or local~~ air permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any ATC, PTO, and proposed federal ~~or local~~ air permit modifications to the CPM within 5 working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified ATC/PTO documents and all federal ~~or local~~ air permits to the CPM within 15 days of receipt.

REFERENCES

Galati & Blek 2010f (Galati & Blek LLP) (tn: 56302). Palo Verde Solar 1's Initial Comments on the SA, DEIS, dated 4/19/2010.

BIOLOGICAL RESOURCES

Supplemental Testimony of Carolyn Chainey-Davis, Amy Golden, Sara Keeler, and Susan Sanders

Several minor biological resource issues were left unresolved in the June 4, 2010 Revised Staff Assessment (RSA) prepared for the Blythe Solar Power Project (BSPP) because certain information was unavailable at the time of publication. In addition, some Project components were added between publication of the Staff Assessment/Draft Environmental Impact Statement (SA/DEIS) and the RSA (Galati & Blek 2010) for which staff had insufficient information to do more than a qualitative assessment of impacts. Other information missing from the RSA included the golden eagle Spring 2010 survey results and a discussion of biological resource impacts resulting from construction of a secondary emergency access road. Since publication of the RSA the Applicant has supplied the 2010 golden eagle survey results (AECOM 2010g) and other spring survey data, and updated calculations on the anticipated impacts of new project features to biological resources (Solar Millennium 2010s,Solar Millennium 2010t).

The following is a description of the new information provided by the Applicant and a discussion of whether this information resulted in any changes to staff's analysis of Project impacts to biological resources or to proposed conditions of certification in the RSA. At the end of this subsection staff has provided a table summarizing the impacts to habitat types and biological resources with updated information. In addition, this Supplemental Staff Assessment describes the impacts to biological resources resulting from Southern California Edison's expansion of the Colorado River Substations and the Blythe Project's gen-tie line connection and telecommunications facilities, as well as the potential impacts from construction of a second fire station that might be required. Finally, responses to comment letters from Defenders of Wildlife and The Wilderness Society/Natural Resources Defense Council that were inadvertently omitted from the RSA are included here.

GOLDEN EAGLE SURVEY RESULTS

Wildlife Research Institute (WRI) conducted golden eagle surveys by helicopter in accordance with USFWS protocols (Pagel et al. 2010) and prepared the *Golden Eagle Risk Assessment for the Genesis Solar Energy Project*, dated June 2010 (AECOM 2010g). The initial helicopter surveys were performed on March 25-26 and April 2-3, 2010 and three golden eagle nests were found within the 10-mile survey buffer of the Genesis Project area (AECOM 2010g). No active GOEA nests were found within 10 miles of the BSPP. One inactive golden eagle nest was located approximately 3 miles west of the Blythe project site. This nest was in poor condition and showed signs of weathering and was in the process of deteriorating. One active golden eagle nest was located in the Big Maria Mountains northeast of the site; however, this nest was not occupied (no fledglings or eggs) during spring 2010 and is outside the 10-mile buffer surrounding the BSPP.

Per the USFWS protocol (Pagel et al. 2010), a follow-up survey was performed on May 14, 2010 to revisit active or possibly active territories and no new eagle nesting activity was observed (AECOM 2010g). No eagles were observed during any March, April, or May 2010 helicopter surveys in either mountain range. The Applicant concluded that disturbance to nesting golden eagles was unlikely due to the distance of the solar facility from nests and that a three mile buffer of the eagle nest from the Project site is a sufficient buffer to prevent agitation behavior such as displacement, avoidance, or defense; and lack of existing eagle nests and nesting habitat within one mile from the Project site.

Conclusions: Staff has no changes to the RSA's golden eagle analysis or mitigation recommendations after reviewing the 2010 golden eagle survey results (AECOM 2010g). Staff's proposed Condition of Certification **BIO-24** (Golden Eagle Inventory and Monitoring) is still applicable despite the fact that no occupied nests were found within 10 miles of the Project boundaries. This condition requires the Project owner to develop a monitoring and adaptive management plan if occupied nests are present within 10 miles of the Project, or to submit a determination from USFWS documenting that no monitoring is warranted if surveys do not reveal nests within 10 miles. The 2010 survey results do not change staff's recommendation; staff considers this an appropriate requirement because it provides an opportunity for the USFWS to review golden eagle survey results and provide guidance on implementation of any golden eagle minimization or avoidance measures they deem necessary.

SECONDARY FIRE ACCESS ROAD/TEMPORARY CONSTRUCTION POWER LINE ROAD

Staff's proposed Condition of Certification **WORKER SAFETY-6** requires the project owner to provide a second access road for emergency personnel to enter the site. Staff has assumed that the same road that would be improved to provide power to the site during construction would also serve as the secondary fire access road. The temporary construction power line would be developed on an existing dirt road extending from the corner of Sixth Avenue and Davis Street (sometimes labeled Seventh Avenue and Dave Street) to the Blythe Project site (Solar Millennium 2010s). **SSA Biological Resources Figure 1** at the end of this subsection shows the location of this proposed temporary construction power line/secondary access road. The Applicant has indicated that the improvements to the road would consist of blading the existing dirt road and installing wooden poles (Galati & Blek 2010). Staff has conservatively based its impact assessment on the assumption that improvements could consist of a 20-foot wide paved road with a maximum of 8 feet of disturbance on each shoulder, for a total road prism (width of disturbance) of 36 feet. Based on typical requirements for emergency access roads it would more likely be a12-foot wide single-lane gravel road with 4 feet of disturbance on each side, for a total road prism of 20 feet.

The southern edge of the existing dirt road that would be improved for the temporary construction power line/secondary access road abuts fallow agricultural field for the entire 1 mile length. The eastern one-half mile of the road on the north side is adjacent to an active agricultural field (row crops), and the western half of the road borders undisturbed Sonoran creosote bush scrub. The Applicant has indicated that 3.27 acres of impacts would occur to agricultural lands and 0.83 acre of impacts to Sonoran creosote bush scrub from the temporary power construction line (AECOM 2010t Table 1).

Staff verified the Applicant's calculations for construction impacts of the secondary access road using the assumptions described above for a 36-foot wide road prism. The calculations for the emergency access road were done in Google Earth Pro, using kmz files for the Project boundary (converted to Arc View from the Applicant's shape files). Staff confirmed the Applicant's impact analysis for upland cover types (agriculture and Sonoran creosote scrub), but staff's analysis differed from the Applicant's with respect to state waters. The Applicant had indicated that no direct or indirect impacts to state waters would occur from the temporary construction power line (AECOM 2010t, Tables 2 and 3). Staff's analysis indicated that several small ephemeral washes terminate at the northwestern boundary of the road, near the entrance to the proposed Project (Galati & Blek 2009a, Revised Jurisdictional Delineation Report) and calculated impacts of 0.03 acres to vegetated ephemeral wash (mapped as 'swale' in Galati & Blek 2009a).

Rare plant surveys conducted in 2009 and 2010 indicated that Harwood's milk-vetch occurs within or near the alignment of the proposed secondary access road (Figure 4, Botanical Survey Report, Special-Status Plant Species Observations, Solar Millennium 2010s). Construction of the secondary access road could directly or indirectly impact populations of Harwood's milk-vetch, which occur in the immediate vicinity of the proposed road. Road construction could increase the opportunities for non-native invasive plant species, with adverse effects to native plant and wildlife communities. Direct and indirect impacts to special-status plants associated with construction of the secondary access road would be reduced to less than significant levels with implementation of **BIO-19** (Special-Status Plant Mitigation). Avoidance of impacts to Harwood's milk-vetch may be possible by limiting the disturbance area associated with construction and making minor adjustments to the location of pole placement, as described in **BIO-19**. Implementation of **BIO-14**, (Weed Management Plan) would minimize the potential for indirect impacts to special-status plants due to construction-related weed invasions.

Special-status wildlife surveys conducted in 2009 and 2010 surveys indicated the presence of a kit fox burrow complex along the western portion of the road, and loggerhead shrike and Swainson's hawks were also observed there (Figure 12, Proposed Project Special-Status Wildlife, Solar Millennium 2010s). No signs of desert tortoise or burrowing owl were detected during the 2009 and 2010 surveys in the vicinity of the proposed secondary access road, but habitat is present for these species in the Sonoran creosote bush scrub habitat along the proposed route. Migratory birds nesting in Sonoran creosote scrub could also be directly or indirectly impacted by road construction. Implementation of staff's proposed conditions of certification **BIO-9** through **BIO-12** would reduce potential impacts to desert tortoise to less than significant levels. Nesting birds, badger and kit fox, and burrowing owls could all be directly or indirectly affected by construction activities. These impacts would be reduced to less than significant levels with implementation of **BIO-15** (Pre-construction Nest Surveys), **BIO-17** (Badger and Kit Fox Avoidance and Minimization Measures) and **BIO-18** (Burrowing Owl Avoidance and Minimization Measures).

> **Conclusion**: Implementation of staff's proposed conditions of certification (including **BIO-9– BIO-12**, **BIO-14 – BIO-19**) would mitigate potential impacts of construction of the temporary construction power line /secondary emergency access road to less than significant levels. Staff has revised the compensatory

mitigation requirement in **BIO-12** to reflect the minor increases to Sonoran creosote scrub impacts (see **Revised Biological Resources RSA Table 1** and revised **BIO-12** the end of this subsection).

GEN-TIE LINE MODIFICATIONS

The Riverside County Airport Land Use Commission (ALUC) has expressed concerns about the proximity of the proposed BSPP and its associated linear facilities as a hazard to aircraft operations at the Blythe Municipal Airport approximately one mile east of the Blythe Project (Solar Millennium 2010r). The ALUC indicated their preference that the portion of the current gen-tie route that is west and perpendicular to one of the main runway approaches be moved further west to preclude the potential for any effect on airport operations (Solar Millennium 2010r). In response to ALUC's concern Solar Millennium adjusted this portion of the gen-tie approximately 0.35 miles west of the original alignment, as shown on **Biological Resources Figure 1**. The total length of this re-route is approximately 2.3 miles thereby adding an additional 1,600 feet to the original linear circuit length (Solar Millennium 2010r). The new alignment is within Sonoran creosote scrub habitat. The Applicant conducted protocol-level surveys and the results are described in the Biological Resources Technical Report (Solar Millennium 2010s). Sensitive species detected in the vicinity of the new gen-tie alignment include Harwood's milk-vetch at the southern portion of the new alignment, and Utah milkvine at the northern portion of the alignment ((Figure 4, Botanical Survey Report, Special Status Plant Species Observations, Solar Millennium 2010s). No sign of desert tortoise or burrowing owls were noted during the 2009 or 2010 surveys along the new gen-tie alignment, but kit fox burrows were detected at the northern end of the realigned gen-tie (Figure 12, Proposed Project Special Status Wildlife, Solar Millennium 2010s).

Additional gen-tie impacts that were not described in the RSA are those associated with the BSSP connection to Southern California Edison's Colorado River Substation (Solar Millennium 2010v). Construction of this gen-tie connection would result in an additional 58.17 acres of impacts to stabilized and partially stabilized sand dunes (Solar Millennium 2010t). These impacts were not included in the RSA impact analysis or compensatory mitigation recommendations in staff's proposed Condition of Certification **BIO-20** (Sand Dune/Mojave Fringe-toed Lizard Mitigation).

Construction of the gen-tie connection north of the Colorado River Substation could directly and indirectly impact Mojave fringe-toed lizards and a number of other sensitive sand dune-dependent species. Many Mojave fringe-toed lizards were detected north of the proposed Colorado River Substation, as well as numerous rare plants, including Harwood's eriastrum, Harwood's milk-vetch, winged cryptantha and ribbed cryptantha (Solar Millennium 2010s).

Harwood's eriastrum, a California endemic and BLM Sensitive species, has a global distribution restricted to the southeast corner of California, and it is known from only 14 documented locations. As described in the RSA, direct or indirect impacts to Harwood's eriastrum or Harwood's milk-vetch would be significant. Even if the substation expansion avoided direct impacts to these sensitive sand dune species, indirect impacts are also likely to occur. Alterations in drainages could adversely affect special-status plant populations that occur downstream of the Project area. Other indirect effects include the spread of the non-native Sahara mustard and other non-native invasive species, which degrade sand dune habitat by prematurely stabilizing dunes. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could also adversely affect sand dune-dependent plant and animal species.

No desert tortoise were detected in or within the one-mile buffer around the proposed substation during the 2010 surveys (Solar Millennium 2010s), but given the proximity of suitable habitat in the immediate vicinity of the proposed substation desert tortoise could occur in or near the proposed substation expansion and could be directly or indirectly impacted. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could result in increased disturbance from human intrusions and increased risk of mortality from vehicle strikes and crushing of burrows. Construction activities and addition of new perching structures such as transmission poles and lines could result in increased raven numbers, and hence an increase in desert tortoise predation. Road construction could also increase the opportunities for non-native invasive plant species, with adverse effects to native plant and wildlife communities. Nesting birds, badger, kit fox, and burrowing owls could also be directly or indirectly affected by construction and operation of the expanded substation.

Conclusion: Construction of the gen-tie line connection east and north of the Colorado River Substation has potential for significant impacts to rare plants and other sensitive biological resources. With implementation of the conditions of certification described in the RSA, including Condition of Certification **BIO-19** (Special-Status Plant Impact Avoidance, Minimization and Compensation), these impacts would be reduced to less than significant levels. Implementation of staff's proposed conditions of certification **BIO-9** through **BIO-12** would reduce potential impacts to desert tortoise to less than significant levels. Staff's proposed condition of certification **BIO-13** (Raven Management Plan) would minimize the potential for an increase in raven subsidies from the Project. The potential for impacts to nesting birds, badger and kit fox, and burrowing owls would be reduced to less than significant levels with implementation of **BIO-15** (Pre-construction Nest Surveys), **BIO-16** (Avian Protection Plan), **BIO-17** (Badger and Kit Fox Avoidance and Minimization Measures) and **BIO-18** (Burrowing Owl Avoidance and Minimization Measures).

Staff revised the compensatory mitigation requirements in proposed Condition of Certification **BIO-20** (Sand Dunes/Mojave Fringe-toed Lizard Mitigation) to reflect direct impacts to 58 acres of sand dune habitat rather than 4 acres. At a 3:1 mitigation ratio for impacts to sand dunes and playa with sand drifts, these additional impacts would increase the mitigation for direct and indirect impacts to Mojave fringe-toed lizard habitat to 174 acres rather than 12 acres (see **Revised Biological Resources RSA Table 1** and the revised **BIO-20** the end of this subsection). Condition of Certification **BIO-12** (Desert Tortoise Compensation) has also been revised to incorporate changes in impact acreage for Sonoran creosote scrub.

EVAPORATION PONDS AND BIRD COLLISION-AVIATION HAZARDS

One of the late changes to the Blythe project description was the addition of two, 4-acre evaporation ponds in each power block for a total of eight new ponds (Galati & Blek 2010). The RSA evaluated the effects of the Blythe Project's proposed evaporation ponds to birds and other wildlife species, assessing the potential adverse effects of long-term exposure of hyper-saline and selenium conditions on waterfowl, shorebirds and other species that might use the ponds for resting and foraging. However, the RSA did not analyze the hazard to aviation safety at the nearby Blythe Airport that might result if the evaporation ponds attracted birds to the vicinity.

Bird air-craft collisions are a major problem world-wide because they pose a serious threat to human and air traffic safety and also result in costly repairs and lost revenue to commercial airliners (Linnell et al 1996). Most air craft bird strikes occur with larger species of birds, particularly Canada goose (*Branta canadensis*), American white pelican (*Pelecanus occidentalis*), turkey vulture (*Cathartes aura*), and other large species of raptors (Dolbeer 2006); however flocks of smaller birds such as European starlings (*Sturnus vulgaris*) which occur in large flocks can often have the same impact upon collision with an aircraft engine as large bird species (Air Safety Week 1998).

The Blythe Project site does not currently support habitat for waterfowl or shorebirds. However, the addition of eight evaporation ponds could serve as a wildlife attractant to waterfowl and shorebirds that might pass through during migration or in winter months from nearby agricultural fields and irrigated farmlands. Upon reviewing aerial photographs, staff noted that approximately five ponds (either evaporation or stock ponds) occur east of the Blythe Project site and in close proximity to the Blythe Airport suggesting that habitat is available for waterfowl and shorebirds in the area. Other local habitats that might attract waterfowl or shorebirds include agricultural fields, especially irrigated croplands, and the Colorado River approximately 25 miles to the east.

Despite the presence of habitats in the vicinity of the Project that might attract waterfowl and shorebirds, these species were not detected during intensive bird surveys conducted in 2009 and 2010. The Applicant conducted avian point count surveys for four consecutive weeks between April 12 and May 8, 2009, with a total of 88 point count stations established along eleven transect lines. Based on the results of these avian point counts and on field observations made throughout the year at the Project site, the most commonly observed species at the Blythe Project site are songbirds such as loggerhead shrike (*Lanius ludovicianus*), black-tailed gnatcatcher (*Polioptila melanura*), ash-throated flycatcher (*Myiarchus cinerascens*), black-throated sparrow (*Amphispiza bilineata*), horned lark (*Eremophila alpestris*), lesser nighthawk (*Chordeiles acutipennis*), and verdin (*Auriparus flaviceps*) (Solar Millennium 2010s).

While water is a powerful attractant for birds in a desert environment, staff has concluded that the proposed evaporation ponds at the Blythe Project site would not result in an increase in numbers of waterfowl, shorebirds or other birds, and that the Project would likely result in a net decrease in the number of birds at the Project site. Staff's proposed Condition of Certification **BIO-25** requires all ponds to be netted to exclude birds and other wildlife, and also requires additional visual bird deterrents and a rigorous monitoring program to verify that the netting is effective in excluding birds and other wildlife. Condition of Certification **BIO-25** requires monitoring of the ponds to continue for the life of the Project, and requires adaptive management and remedial action to discourage wildlife use if monitoring detects bird use at the ponds. Even if resident or migratory birds were initially attracted to the ponds, the netting would preclude use of the ponds for drinking, foraging, resting or nesting, and birds would be unlikely to linger in an area that provides no habitat or foraging opportunities. The lands in the immediate vicinity of the evaporation ponds would consist of solar fields that would be inhospitable to birds and other wildlife because they would be barren of vegetation that would otherwise provide cover and foraging habitat. Staff therefore anticipates no increases in numbers of birds in the vicinity of the Blythe Airport as a result of the Blythe Project.

> **Conclusion**: With implementation of staff's proposed Condition of Certification **BIO-25** (Evaporation Pond Netting and Monitoring) the Blythe Project would not attract or support large flocks of waterfowl, shorebirds or other species that might otherwise pose a collision hazard to aircraft.

REASONABLY FORESEEABLE DEVELOPMENTS

Southern California Edison Colorado River Substation Expansion

This subsection provides an overview of potential impacts to biological resources from construction of Southern California Edison's (SCE's) proposed 230 kV expansion of the already-permitted (but not yet constructed) 500 kV Colorado River Substation. Unlike the transmission line that would go from the Project power plant to the Colorado River Substation (the "gen-tie") SCE's Colorado River Substation is not part of the Blythe project description. Rather, SCE would acquire a permit from the California Public Utilities Commission, and would construct, own and operate the Colorado River Substation to serve several projects in the area. SCE would provide an analysis of impacts to biological resources and mitigation for those impacts resulting from construction of the Colorado River Substation. However, because the proposed expansion of the Colorado River Substation is a reasonably foreseeable development, a description of the expansion and potential impacts to biological resources is included here. The purpose of the discussion in this subsection is to inform all interested parties of the potential for impacts to biological resources that may result from other actions related to the Blythe Project.

Southern California Edison (SCE) proposes to construct the Colorado River Substation Expansion to interconnect solar development projects in the Blythe area to SCE's previously approved Colorado River Substation. The substation site was one of three sites analyzed in the Devers – Palo Verde No. 2 500 kV Transmission Line Final Environmental Impact Statement /Environmental Impact Report, which was approved by the California Public Utilities Commission in January 2007 (Solar Millennium 2010v). The Colorado River Substation would be located on an approximately 140-acre parcel of land with the substation generally located in the eastern portion of the parcel (Solar Millennium 2010v).

The Colorado River Substation Expansion Project involves expanding the already approved 500 kV switchyard, which would occupy approximately 45 acres, into a full 500/220 kV substation on approximately 90 acres of land (Solar Millennium 2010v). The expansion project would involve site preparation by clearing existing vegetation and grading, and may involve redirecting surface flows around one side of the substation (Solar Millennium 2010v). No final drainage or grading plans have yet been prepared, but it may be necessary to redirect surface water flow around one side of the substation (Solar Millennium 2010v). These drainage alterations would potentially disturb an area approximately 80 feet wide around three sides of the fenced in substation, resulting in a total permanent disturbance area of approximately 20 acres (Solar Millennium 2010v). Internal surface runoff would be directed towards an approximately 120-foot by 200-foot detention basin located at the south end of the substation. An approximately 10-acre staging area adjacent to the expansion site may be necessary for construction (Solar Millennium 2010v). Although detailed engineering, grading and drainage plans are not yet available, it is estimated that the total area subject to permanent disturbance from construction of the substation expansion would be approximately 65 acres (45 acres for substation grading, 20 acres for drainage/side slopes), plus temporary disturbance resulting from a 10-acre staging area (Solar Millennium 2010v, Table 2).

The Applicant has indicated that the Colorado River Substation is being installed with a security barrier that would surround the facility, consisting of either a fence or wall depending on final substation design; the Applicant is responsible for building the gen-tie line and redundant telecommunication lines from the Blythe Project site up to and terminating just outside the northern boundary with the substation security barrier. Likewise, SCE is providing the fiber optic buried conduit from the substation to an interconnection point directly outside the substation security barrier and SCE is also responsible for building the final transmission line generator tie span from the last pole that crosses the security wall and terminates in the substation (AECOM 2010u).

The Colorado River Substation expansion would be constructed within sand dune habitat. Based on the information from the 2010 surveys (Solar Millennium 2010s) staff has concluded that Mojave fringe-toed lizards and a number of other sensitive sand dune-dependent species are likely to be directly impacted by expansion of the Colorado River Substation. Many Mojave fringe-toed lizards were detected in and near the proposed Colorado River Substation, as well as numerous rare plants, including Harwood’s eriastrum, Harwood’s milk-vetch, winged cryptantha and ribbed cryptantha.

Harwood’s eriastrum, a California endemic and BLM Sensitive species, has a global distribution restricted to the southeast corner of California, and it is known from only 14 documented locations. As described above in the subsection on impacts to special-status plants, direct or indirect impacts to Harwood’s eriastrum or Harwood’s milk-vetch would be significant. Late summer/fall botanical surveys might also reveal the presence of additional sensitive plant species in the vicinity of the proposed substation expansion.

Even if the substation expansion avoided direct impacts to these sensitive sand dune species, indirect impacts are also likely to occur. Alterations in drainages could adversely affect special-status plant populations that occur downstream of the project area. Other indirect effects include the spread of the non-native Sahara mustard and other non-native invasive species, which degrade sand dune habitat by prematurely stabilizing dunes. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could also adversely affect sand dune dependent plant and animal species.

No desert tortoise were detected in or within the one-mile buffer around the proposed substation during the 2010 surveys (Solar Millennium 2010s), but given the proximity of good habitat in the immediate vicinity of the proposed substation desert tortoise could occur in or near the proposed substation expansion and could be directly or indirectly impacted. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could result in increased disturbance from human intrusions and increased risk of mortality from vehicle strikes and crushing of burrows. Construction activities and addition of new perching structures such as transmission poles and lines could result in increased raven numbers, and hence an increase in desert tortoise predation. Road construction could also increase the opportunities for non-native invasive plant species, with adverse effects to native plant and wildlife communities. Nesting birds, badger, kit fox, and burrowing owls could also be directly or indirectly affected by construction and operation of the expanded substation. Staff does not have information about the presence of ephemeral washes, desert dry wash woodland and other waters of the state in the proposed substation expansion area. The proposed expansion and associated drainage modifications could result in direct and indirect impacts to state waters.

Staff has concluded that SCE's proposed expansion of the Colorado River Substation has the potential to result in significant direct, indirect and cumulative impacts to biological resources, in particular for sensitive dune-dependent plant species such as Harwood's eriastrum. Avoidance, minimization and compensation measures such as those described in staff's proposed Conditions of Certification **BIO-19** could potentially reduce these impacts to less than significant levels. However, implementation of the avoidance measures described in these conditions of certification would require site-specific information about the location of proposed project features in relation to sensitive plant species. Staff does not currently have that project-specific information and therefore cannot address the feasibility of implementing effective avoidance measures as a means of reducing significant impacts.

An updated and detailed description of impacts to biological resources is also provided in Transmission Systems Engineering Appendix A – Colorado River Substation Expansion and BSPP Interconnection Impact Analysis.

Fire Station

As described in the Worker Safety & Fire Protection section of the RSA, the construction and operation of the Blythe Project and other proposed solar projects along the I-10 corridor might require the construction of a new fire station. It is anticipated that such a station might be located along the I-10 near the Ford Dry Lake Road interchange. The exact location, however, is speculative at this time and, therefore, its environmental impacts cannot be analyzed here. If such a station is constructed, it would first have to undergo environmental review from the County of Riverside, which would have jurisdiction over the station's approval. Staff recommends that the County require mitigation for any impacts to biological resources that are identified pursuant to the environmental review, similar to those described in the biological resources section of the RSA.

REVISED IMPACT ACREAGES AND CONDITIONS OF CERTIFICATION

Staff has summarized the revised impact acreages to habitat types reflecting the minor project changes described above that are summarized in Biological Resources Table 1. Sources for these revised acreages include: Solar Millennium 2010s; Solar Millennium 2010t; Solar Millennium 2010u. Acreage figures from the RSA are shown in strikeout and the new acreage calculations are in bold italics.

Biological Resources Table 1
Direct and Indirect Impacts to Biological Resources and Recommended Mitigation

Resource	Acres Impacted	Mitigation Ratio	Recommended Mitigation Acreage
Desert Tortoise Habitat – Direct Impacts	***6,958*** ~~7,044~~	1:1	***6,958*** ~~7,044~~
Stabilized and Partially Stabilized Sand Dunes – Direct Impacts	***58*** 4	3:1	***174*** ~~12~~
State Waters - Direct Impacts			
Desert Dry Wash Woodland	***213*** ~~175~~	3:1	**639** ~~525~~.
Vegetated Ephemeral Swales (creosote bush-big galleta grass association)	***371*** ~~367~~	1.5:1	***557*** ~~551~~
Unvegetated Desert Dry Wash	***9*** ~~7~~	1:1	***9*** ~~7~~
Total direct impacts to state waters	**593** ~~549~~		***1,205*** ~~1,085~~
State Waters - Indirect Impacts from Changes in Hydrology			
Desert dry Wash Woodland	***94*** ~~138~~	1.5:1	***141*** ~~207~~
Vegetated Ephemeral Swales (creosote bush-big galleta grass association)	***38*** ~~45~~	1:1	***38*** ~~45~~
Unvegetated Desert Dry Wash	***0.7*** ~~0.3~~	0.5:1	***0.3*** ~~0.15~~
Total indirect impacts to state waters	**133** ~~183~~		**179** ~~252~~

The revised impact and mitigation acreages have prompted the following changes in conditions of certification:

DESERT TORTOISE COMPENSATORY MITIGATION

BIO-12 To fully mitigate for habitat loss and potential take of desert tortoise, the Project owner shall provide compensatory mitigation at a 1:1 ratio for impacts to ***6,958*** ~~7,044~~ acres, adjusted to reflect the final Project footprint.

SAND DUNES/MOJAVE FRINGE-TOED LIZARD COMPENSATION

BIO-20 To mitigate for habitat loss and direct impacts to Mojave fringe-toed lizards the Project owner shall provide compensatory mitigation at a 3:1 ratio for impacts to ***58*** ~~4~~ acres of stabilized or partially stabilized desert dune habitat (or the acreage of sand dune/partially stabilized sand dune habitat impacted by the final Project footprint).

MITIGATION FOR IMPACTS TO STATE WATERS

BIO-22 The Project owner shall…

1. Acquire Off-Site State Waters: The Project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes at least ***1,384*** ~~1,320~~ acres of state jurisdictional waters, or the area of state waters directly or indirectly impacted by the final Project footprint. The Project footprint means all lands disturbed by construction and operation of the Blythe Project, including all linears. The parcel or parcels comprising the ***1,384*** ~~1,320~~ acres of ephemeral washes shall include at least ***780*** ~~617~~ acres of desert dry wash woodland.

RESPONSE TO COMMENTS:

In the RSA staff inadvertently omitted responses to public comments letters from The Wilderness Society and the Natural Resources Defense Council (December 23, 2009) and Defenders of Wildlife (December 23, 2009). A summary of the comments and staff's responses are provided below.

THE WILDERNESS SOCIETY (TWS) AND THE NATURAL RESOURCES DEFENSE COUNCIL (NRDC) LETTER DATED DECEMBER 23, 2009

TWS & NRDC Comment #1: The commenter states that the resource agencies should consider alternative configurations of the Blythe Project site that avoid impacts to the western portion of the site where areas of dry desert wash woodland occurs.

> Staff Response: Staff requested that the Applicant develop alternatives that reduced impacts to valuable desert dry wash woodland habitat. Subsection C.2.5 through C.2.7 provided an analysis of the Reconfigured and Reduced Acreage Alternatives with the intent of finding project alternatives that reduced impacts to desert wash woodland and other sensitive habitats.

TWS & NRDC Comment #2: The commenter states that the agencies should look at the impact of the Blythe Project on desert tortoise dispersal and the regional movement of other wildlife species.

> Staff Response: Staff considered the impacts of the project on desert tortoise dispersal and regional movement on other wildlife species in subsections C.2.4.2 and C.2.8, and concluded that desert tortoise connectivity could be affected by the Project. Staff has developed mitigation for this impact in proposed Condition of Certification **BIO-12.**

DEFENDERS OF WILDLIFE (DOW) LETTER DATED December 23, 2009

DOW Comment #1: The commenter states that the BLM should take a closer look at the impacts of the Blythe Project's impacts to desert tortoise and provide more information on this species than the AFC does. Based on the amount of sign detected during field surveys, it appears the western portion of the site potentially has a higher viable desert tortoise population and the presence of several caliche cavities in ephemeral drainages could provide habitat for other undetected individuals.

Staff Response: Staff agrees that the western portion of the site provides better desert tortoise habitat, as evidenced by the 2010 survey results which detected numerous sign of desert tortoise there (Solar Millennium 2010s). Staff analyzed the effects of the Project on desert tortoise in subsections C.2.4.2.

DOW Comment #2: The commenter states that the BLM must provide additional information on burrowing owl, bighorn sheep, and American badger and the use of the Blythe site for foraging and movement. The suitability of the site for burrowing owl and American badger should be re-evaluated given the amount of burrowing owl sign and burrow digs that were found.

Staff Response: Staff analyzed the impact of the Project to burrowing owl, bighorn sheep, and American badger in subsection C.2.4.2, and also assessed the cumulative impact of the Blythe Project combined with other foreseeable projects on foraging habitat and movement.

DOW Comment #4: The commenter states the applicant has provided no avoidance measures to eliminate or reduce loss of habitat that supports special-status species. Direct mortality for some species of concern will be avoided through capture and release or other measures carried out under wildlife agency permit, but permanent loss of the lands that currently support these species is the most significant impact to biological resources. The BLM must use the NEPA process, to identify measures to avoid and mitigate impacts to special-status species occurring primarily on the western half of the project area including looking at alternate locations and a smaller project footprint.

Staff Response: Staff's proposed conditions of certification provide avoidance, minimization and compensation measures for special status species that would be impacted by the Project, including **BIO-9** through **BIO-12** (Desert Tortoise), **BIO-17** (Badger and Kit Fox); **BIO-19** (Special-Status Plants); **BIO-20** (Mojave Fringe-Toed Lizard); **BIO-21** (Bighorn Sheep); **BIO-24** (Golden Eagle) and **BIO-26** (Couch's Spadefoot Toad). Staff considered the impacts of alternative locations for the project (see the Alternatives Section) and in subsection C.2.5 through C.2.7, which provided an analysis of the Reconfigured and Reduced Acreage Alternatives.

FINAL LIST OF WITNESSES FOR EVIDENTIARY HEARINGS

The witnesses who will be sponsoring staff's testimony in Biological Resources include the following: Susan Sanders, Carolyn Chainey-Davis, and Mark Massar. The resume and declaration of Mark Massar was inadvertently left out of the Revised Staff Assessment and is included in this supplemental filing. In addition, Magdalena Rodriguez, California Department of Fish and Game Environmental Scientist, will be available to answer questions as part of staff's panel of experts. Her resume is attached as well. Staff is also hopeful that Tannika Engelhard, U.S. Fish and Wildlife Service Fish and Wildlife Biologist or another representative might also attend the hearings and be available to answer any questions the Committee may have regarding federal requirements for the protection of biological resources. Staff experts Amy Golden and

Sara Keeler will also attend the hearings in the event they are needed to testify – though they will only be called if the impaneled witnesses are unable to respond to particular question in their areas of expertise.

REFERENCES

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Solar Millennium 2010r. (tn:57094). Blythe Solar Power Project Notification of Revision Memo. Submitted to California Energy Commission Docket Unit on May 28, 2010.

Solar Millennium 2010s (tn: 57200). Blythe Solar Power Project Biological Resources Technical Report, Riverside County, California. Submitted to California Energy Commission Docket Unit on June 15, 2010.

Solar Millennium 2010t (tn: 57357). Tables Summarizing Anticipated Direct and Indirect Impacts to Vegetation Communities, Waters of the State, Submitted to California Energy Commission Docket Unit on June 28, 2010.

Solar Millennium 2010u (tn:57233). Applicant’s Response to CEC Blythe Information Request (emailed questions dated 6/11/2010). Docketed 6/11/10.

Solar Millennium 2010v (tn:56753). Southern California Edison Colorado River Substation Project Description. Docketed 5/14/2010.

SOIL AND WATER RESOURCES

Supplemental Testimony of Michael Donovan

ADDENDUM TO IMPACTS ON GROUNDWATER BASIN BALANCE C.9.3.4.2

Condition of Certification **SOIL&WATER-2** requires development of a Water Supply Plan that includes water conservation projects such as payment for irrigation improvements in Palo Verde Irrigation District, purchase of water entitlements within the Colorado River Basin that will be held in reserve, and/or participation in BLM's Tamarisk Removal Program. Staff provides the following analysis to support staff's conclusion that a tamarisk removal program can be effective in offsetting the project's water use.

The purpose of a Tamarisk Removal Program is to provide for an additional mechanism to mitigate for potential impacts to groundwater supply as a result of water use by the Project. This component not only provides benefits to the groundwater system (and replacement of Colorado River water), but also provides a substantial biological benefit by the removal of an invasive species that out-competes native vegetation and alters the natural desert ecosystem functions and values by converting the habitats into monocultures void of the diversity that supports native flora and fauna populations.

Tamarisk (salt cedar) is native to southwestern Asia and was introduced to the United States in the early 1800's for wind breaks. In the western United States, tamarisk is a highly invasive weed that has taken hold in semi-arid and arid watersheds in recent decades (de Gouvenain, 1996). Tamarisk can consume up to 250 gallons of ground water per day per mature tree (Department of Ecology, 2009).

A Tamarisk Removal Program has the potential to conserve a substantial amount of groundwater consumption within the Lower Colorado River area by removing a high water demand habitat that also monopolizes resources and negatively impacts native habitats in the area. A summary of water consumption estimates based on two scenarios is provided in **Soil and Water Tables-16a** and **-16b**.

Soil and Water Table 16a
Water Savings Assuming Mature Trees

VARIABLE		CALCULATIONS	
10	acres		
250	gallons/tree/day	Trees/Acre	217.8
200	sf/tree	Trees Removed	2,178
43560	sf/acre	Gallons/Day	544,500
365	days/year	Gallons/Year	198,742,500
325,851	gal/acre-foot	**Acre-feet/Year Savings**	**610**

Soil and Water Table 16b
Water Savings Assuming a Mixture of Mature and Immature Trees

VARIABLES		CALCULATIONS	
13	acres		
100	gallons/tree/day	Trees/Acre	435.6
100	sf/tree	Trees Removed	5,663
43560	sf/acre	Gallons/Day	566,280
365	days/year	Gallons/Year	206,692,200
325,851	gal/acre-	**Acre-feet/Year Savings**	**634**

According to the Lower Colorado River Multi-Species Conservation Program – Final Biological Assessment (2004), the extent of land cover associated with salt cedar (Tamarisk) is over 26,000 acres in the area surrounding the Palo Verde Valley (referred to as Reach 4 of the Lower Colorado River). A Tamarisk Removal Program would only be required to remove 10 acres of mature trees or 13 acres of a mixture of mature/immature trees to achieve a water savings of over 600 acre-feet per year. Correspondingly, there is more than sufficient salt cedar land cover type for the Project owner to implement a water conservation mitigation program using tamarisk removal.

In its opening testimony, the applicant proposed some changes to staff's soil and water conditions of certification. In staff's Prehearing Conference Statement, we indicated we accepted in whole the applicant's proposed changes to Soil and Water-16. The conditions included below reflect staff's partial acceptance of changes proposed to the other soil and water conditions. These changes, along with changes necessitated for other reasons, are reflected in underline/strikeout.

CONDITIONS OF CERTIFICATION

DRAINAGE EROSION AND SEDIMENTATION CONTROL PLAN (DESCP)

SOIL&WATER-1: Prior to site mobilization, the project owner shall obtain ~~both the BLM's Authorized Officer (AO) and~~the Compliance Project Manager (CPM) approval of the Drainage Erosion and Sedimentation Control Plan (DESCP) for managing stormwater during Project construction and operations as normally administered by the County of Riverside. The DESCP must ensure proper protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, include provisions for sediment and stormwater retention from both the power block, solar fields and transmission right of way to meet any Riverside County requirements, address exposed soil treatments in the solar fields for both road and non-road surfaces, and identify all monitoring and maintenance activities. The DESCP shall contain, at minimum, the elements presented below that outline site management activities and erosion and sediment-control Best Management Practices (BMP) to be implemented during site mobilization, excavation, construction, and post construction (operating) activities.

A. **Vicinity Map** – A map(s), at a minimum scale 1 inch to 500 feet, shall be provided indicating the location of all Project elements (construction sites, laydown area, pipelines) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

B. **Site Delineation** – All areas subject to soil disturbance for the proposed Project (Project phases, laydown area, all linear facilities, landscaping areas, and any other Project elements) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.

C. **Watercourses and Critical Areas** – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. It shall indicate the proximity of those features to the proposed Project construction, laydown, and landscape areas and all transmission and pipeline construction corridors.

D. **Drainage Map** – The DESCP shall provide a topographic site map(s), at a minimum scale of 1 inch to 200 feet, showing existing, interim, and proposed drainage swales and drainage systems and drainage-area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet.

E. **Drainage of Project Site Narrative** – The DESCP shall include a narrative of the drainage measures necessary to protect the site and potentially affected soil and water resources within the drainage downstream of the site. The narrative shall include the summary pages from the hydraulic analysis prepared by a professional engineer and erosion control specialist. The narrative shall state the watershed size(s) in acres that was used in the calculation of drainage features.

F. **Clearing and Grading Plans** – The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections, or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography shall be illustrated by tying in proposed contours with existing topography.

G. **Clearing and Grading Narrative** – The DESCP shall include a table with the estimated quantities of material excavated or filled for the site and all Project elements (Project site, laydown area, transmission and pipeline corridors, roadways, and bridges) whether such excavation or fill is temporary or permanent, and the amount of such material to be imported or exported.

H. **Soil Wind and Water Erosion Control -** The plan shall address exposed soil treatments to be used during construction and operation of the proposed Project for both road and non-road surfaces including specifically identifying all chemical based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed Project site that would not cause adverse effects to vegetation. BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. All dust palliatives, soil binders, and weighting agents shall be approved by ~~both~~ the ~~AO and~~ CPM prior to use.

I. **Best Management Practices Plan –** The DESCP shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading, Project element excavation and construction, and final grading/stabilization). BMPs shall include measures designed to control dust, stabilize construction access roads and entrances, and control storm water runoff and sediment transport.

J. **Best Management Practices Narrative –** The DESCP shall show the location (as identified in (I) above), timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during all Project element (site, pipelines) excavations and construction, final grading/stabilization, and operation. Separate BMP implementation schedules shall be provided for each Project element for each phase of construction. The maintenance schedule shall include post-construction maintenance of structural-control BMPs, or a statement provided about when such information would be available.

K. **Project Schedule –** The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, Project element construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each Project element for each phase of construction.

L. **Erosion Control Drawings –** The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion control specialist.

M. **Agency Comments –** The DESCP shall include copies of recommendations, conditions, and provisions from the California Department of Fish and Game (CDFG) and Colorado River Basin Regional Water Quality Control Board (CRBWQCB).

N. **Monitoring Plan:** Monitoring activities shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches, and storm water diversions. The monitoring plan shall be part of the Channel Maintenance Program, **SOIL&WATER-15.**

Verification: No later than thirty (30) days prior to start of site mobilization, the project owner shall submit a copy of the final DESCP to the ~~AO and~~ CPM for review and comment and to the County of Riverside and the CRBWQCB if required. ~~Both the AO and~~The CPM shall consider comments if received by the county and CRBRWQCB before approval of the DESCP.

The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and relevant portions of the DESCP shall clearly show approval by the chief building official. The DESCP shall be a separate plan from the SWPPP developed in conjunction with any National Pollution Discharge Elimination System (NPDES) permit for Construction Activity. The project owner shall provide in the monthly compliance report with a narrative on the effectiveness of the drainage, erosion, and sediment-control measures and the results of monitoring and maintenance activities. Once operational, the project owner shall update and maintain the DESCP for the life of the Project and shall provide in the annual compliance report information on the results of monitoring and maintenance activities.

MITIGATION OF COLORADO RIVER IMPACTS

SOIL&WATER-2: The project owner shall undertake one or more of the activities identified below to mitigate project impacts to flows in the Colorado River. These activities shall result in replacement of up to 22,100 af (4,100 af during the construction period and 600 afy during 30 years of operation) or, if the Project owner chooses to implement **SOIL&WATER-16**, 4,100 af during the construction period and the afy determined in Soil&Water-16 for 30 years of operation in the Colorado River Basin over the life of the project. The activities shall include water conservation projects such as payment for irrigation improvements in Palo Verde Irrigation District, purchase of water rights within the Colorado River Basin that will be held in reserve, and/or BLM's Tamarisk Removal Program or other proposed mitigation activities acceptable to the CPM. The project owner shall also provide an additional 600 afy water offsets for every year that the project operates beyond its expected 30 lifespan.

The activities proposed for mitigation shall be outlined in a Water Supply Plan that shall be provided to the CPM for review and approval and which shall include the following at a minimum:

A. Identification of the activities and water source that will replace up to 22,100 af or other quantity as determined in **SOIL&WATER-16** diverted from the Colorado River over the life of the project;

B. Demonstration of the Project owner's legal right to the water or ability to conduct the activity;

C. Discuss whether any governmental approval of the identified activities will be needed, and if so, whether additional approval will require compliance with CEQA or NEPA;

D. Demonstration of how much Colorado River water each of the chosen activities replaces;

E. An estimated schedule for completion of the activities;

F. Performance measures that would be used to evaluate the amount of water replaced by the activities;

G. Monitoring and Reporting Plan outlining the steps necessary and proposed frequency of reporting to show the activities are achieving the intended benefits and replacing Colorado River diversions; and

H. If the application for allocation from the Colorado River is accepted by the USBR, the project owner shall submit to ~~both AO and~~ the CPM for their approval, a copy of a water allocation from the Colorado River issued by the CRB for the Project's diversion of Colorado River water.

The project owner can choose to further evaluate the quantity of water attributed to flow from the Colorado River by implementing **SOIL&WATER-16** and determining what volume of water shall be mitigated consistent with this Condition of Certification.

<u>Verification:</u> The project Owner shall submit a Water Supply Plan to the CPM for review and approval thirty (30) days before the start of extraction of groundwater for construction or operation.

The Project owner shall implement the activities reviewed and approved in the Water Supply Plan in accordance with the agreed upon schedule in the Water Supply Plan. If agreement on identification or implementation of mitigation activities cannot be achieved the Project owner shall immediately halt construction or operation until assurance that the agreed upon activities can be identified and implemented.

PROJECT GROUNDWATER WELLS, PRE-WELL INSTALLATION

SOIL&WATER-3: The project owner proposes to construct and operate up to ten (10) onsite groundwater supply wells that produce water from the Palo Verde Mesa Groundwater Basin (PVMGB). The project owner shall ensure that the wells are completed in accordance with all applicable state and local water well construction permits and requirements. Prior to initiation of well construction activities, the project owner shall submit for review and comment a well construction packet to the County of Riverside and fees normally required for the county's well permit, with copies to ~~both the AO and~~the CPM. The Project shall not construct a well or extract and use groundwater until an approval has been issued by the ~~AO and~~ CPM to construct and operate the well. Wells permitted and installed as part of pre-construction field investigations that subsequently are planned for use as project water supply wells require ~~AO and~~ CPM approval prior to their use to supply water to the project.

Post-Well Installation. The project owner shall provide documentation as required under County permit conditions to ~~both the AO and~~the CPM that the well has been properly completed. In accordance with California's Water Code section 13754, the driller of the well shall submit to the DWR a Well Completion Report for each well installed. The project owner shall ensure the Well Completion reports are submitted. The project owner shall ensure compliance with all county water well standards and County requirements for the life of the wells and shall provide the ~~AO and~~ CPM with two (2) copies each of all monitoring or other reports required for compliance with the County of Riverside water well standards and operation requirements, as well as any changes made to the operation of the well.

Verification: The project owner shall do all of the following:

a. No later than sixty (60) days prior to the construction of the onsite groundwater production wells, the project owner shall submit to ~~both the AO and~~the CPM a copy of the water well construction packet submitted to the County of Riverside.

b. No later than thirty (30) days prior to the construction of the onsite groundwater production wells, the project owner shall submit a copy of written concurrence received from the County of Riverside that the proposed well construction activities comply with all county well requirements and meet the requirements established by the county's water well permit program. The ~~AO and~~ CPM shall provide approval to the project owner of the well location and operation within ten (10) days of receipt of the County of Riverside's concurrence with the proposed well construction activities

c. No later than sixty (60) days after installation of each well at the Project site, the project owner shall ensure that the well driller submits a Well Completion Report to the DWR with a copy provided to ~~both the AO and~~the CPM. The project owner shall submit to ~~both the AO and~~the CPM together with the Well Completion Report a copy of well drilling logs, water quality analyses, and any inspection reports. Additionally no later than sixty (60) days after installation of each well the Project owner shall submit documentation to the ~~AO,~~ CPM~~,~~ and the CRBRWQCB that well drilling activities were conducted in compliance with Title 23, California Code of Regulations, Chapter 15, Discharges of Hazardous Wastes to Land, (23 CCR, sections 2510 et seq.) and that any onsite drilling sumps used for Project drilling activities were removed in compliance with 23 CCR section 2511(c)

d. During well construction and for the operational life of the well, the project owner shall submit two copies ~~each to the AO and~~the CPM of any proposed well construction or operation changes.

CONSTRUCTION AND OPERATION WATER USE

SOIL&WATER-4: The proposed Project's use of groundwater during construction shall not exceed 4,100 af during the 69 months of construction and an annual average of 600 afy during operation). Water quality used for project construction and operation will be reported in accordance with Condition of Certification **SOIL&WATER-~~17~~ 9** and **18** to ensure compliance with this condition.

Prior to the use of groundwater for construction, the project owner shall install and maintain metering devices as part of the water supply and distribution system to document Project water use and to monitor and record, in gallons per day, the total volume(s) of water supplied to the Project from this water source. The metering devices shall be operational for the life of the Project.

Verification: At least ~~sixty~~ thirty (3~~6~~0) days prior to the start of groundwater pumping for construction of the proposed Project, the Project owner shall submit to ~~both the AO and~~the CPM a copy of evidence that metering devices have been installed and are operational.

Beginning six months after the start of construction, the project owner shall prepare a semi-annual summary of amount of water used for construction purposes. The summary shall include the monthly range and monthly average of daily water usage in gallons per day.

The project owner shall prepare an annual summary, which shall include daily usage, monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet. For years subsequent to the initial year of operation, the annual summary shall also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal.

GROUNDWATER LEVEL MONITORING, MITIGATION, AND REPORTING PLAN

SOIL&WATER-5: The project owner shall submit a Groundwater Level Monitoring, Mitigation, and Reporting Plan to both the ~~AO and~~ CPM for review and approval in advance of using onsite wells to supply groundwater for construction activities ~~and prior to the operation of onsite groundwater supply wells~~. The Groundwater Level Monitoring, Mitigation, and Reporting Plan shall provide detailed methodology for monitoring background and site groundwater levels. Monitoring shall include pre-construction, construction, and ~~Project~~ operational water use. The plan shall establish pre-construction ~~and Project related~~ groundwater level trends from available data that can be quantitatively used as a baseline to establish pre-Project water level trends and to subsequently compare to operational Project pumping water level data~~compared against observed trends near the Project pumping wells and near potentially impacted existing wells~~.

A. Prior to Project Construction

1. A well reconnaissance shall be conducted to investigate and document the condition of existing water supply wells ~~located within 5 miles of the~~ as established by the groundwater model and condition A.2.~~project site~~, provided that access is granted by the well owners. The reconnaissance shall include sending notices by registered mail to all property owners ~~within a 5 mile radius of the project area.~~for wells identified under condition A.2.

2. Monitor to establish preconstruction conditions. The ~~monitoring plan and~~ network of monitoring wells shall make use of existing wells in the basin that are accessible and would satisfy the requirements for the monitoring program. The monitoring network for offsite wells shall be defined by the groundwater model developed for the AFC, using the lower transmissivity value derived from aquifer testing on the site, so as to provide a conservative estimate of the potential impact, and to identify the area ~~as the area~~ predicted to show a water level change of 1 feet or more at the end of construction and at the end of operation. The monitoring network shall also include ~~and~~ any monitoring wells that are installed to comply with Waste Discharge Requirements (see **SOIL&WATER-7**) ~~issued by the Energy Commission for the evaporation ponds and land treatment unit associated with the Project~~. Provided access is granted,~~Identified~~ additional wells located outside of the area defined by the model and condition A.2 above will be located ~~outside of this area~~ to serve as background monitoring wells. Abandoned wells, or wells no longer in use, that are accessible and provide reliable water level data within the potentially impacted area may also be included as part of the monitoring network. A site reconnaissance will be performed to identify wells that could be accessible for monitoring. As access to these wells is available, historic water level, water quality, well construction and well performance information shall be obtained for both pumping and non-pumping conditions.

3. As access allows, ~~measure~~ in advance of using onsite wells to supply groundwater for construction activities, groundwater levels will be measured from the off-site and on-site wells within the network and background wells to provide initial groundwater levels for pre-project trend analysis. The installation and monitoring of water levels using pressure transducers shall be done in selected wells to provide an assessment of seasonal trends.

4. Construct water level maps within the PVMGB within ~~5 miles of~~ the area encompassed by all monitoring wells in A.1, 2, and 3 above~~the site from the groundwater data collected~~ prior to construction. As data is available, the Project owner shall prepare trend plots, perform statistical analyses using the Mann-Kendall test (or other CEC-approved statistical analysis method) for trend to assess pre-project water level trends~~Update trend plots and statistical analyses, as data is available~~.

B. During Construction:

1. Collect water levels ~~within the monitoring network~~ on a quarterly basis throughout the construction period and at the end of the construction period. Perform statistical trend analysis for water levels using the Mann-Kendall test (or other CEC-approved statistical analysis method). Assess the significance of an apparent trend and estimate the magnitude of that trend.

C. During Operation:

1. On a quarterly basis for the first year of operation and semi-annually thereafter for the following four years, collect water level measurements from any wells identified in the groundwater monitoring program to evaluate operational influence from the Project. Quarterly operational parameters (i.e., pumping rate) of the water supply wells shall be monitored as access allows for those wells within the monitoring network. Wells outside the network and their influence on pumping within the network shall be evaluated on a quarterly basis to understand well interference from sources of pumping outside the Project area.~~Additionally, quarterly groundwater-use in the PVMGB shall be estimated based on available data.~~

2. On an annual basis, perform statistical trend analysis for water levels data and comparison to predicted water level declines due to project pumping. Analysis of the significance of an apparent trend shall be determined and the magnitude of that trend estimated. Pressure transducer data from groundwater level measuring devices will be used to assess seasonality and diurnal trends in the water level date. Based on the results of the statistical trend analyses and comparison to predicted water level declines due to Project pumping, the project owner shall determine the area where the Project pumping has induced a drawdown in the water supply at a level of 5 feet or more below the baseline trend.

3. If water levels have been lowered more than 5 feet below pre-site operational trends, and monitoring data provided by the project owner show these water level changes are different from background trends or other groundwater pumping and are caused by Project pumping, then the project owner shall provide mitigation to the impacted well owner(s). Mitigation shall be provided to the impacted well owners that experience 5 feet or more of Project-induced drawdown if the ~~both the AO and~~ CPM's inspection of the well monitoring data confirms changes to water levels and water level trends relative to measured pre-project water levels, and the well (private owners well in question) yield or performance has been significantly affected by Project pumping. The type and extent of mitigation shall be determined by the amount of water level decline induced by the Project, the type of impact, and site specific well construction and water use characteristics. If an impact is determined to be caused by drawdown from more than one source, the

level of mitigation provided shall be proportional to the amount of drawdown induced by the Project relative to other sources. In order to be eligible, a well owner must provide documentation of the well location and construction, including pump intake depth, and that the well was constructed and usable before Project pumping was initiated. The mitigation of impacts shall be determined as follows:

a. If Project pumping has lowered water levels by 5 feet or more and increased pumping lifts, increased energy costs shall be calculated. Payment or reimbursement for the increased costs shall be provided ~~at the option of the affected well owner~~ on an annual basis. In the absence of specific electrical use data supplied by the well owner, the project owner shall use **SOIL&WATER-6** to calculate increased energy costs.

b. If groundwater monitoring data indicate Project pumping has lowered water levels below the top of the well screen, and the well yield is shown to have decreased by 10 percent or more of the pre-Project average seasonal yield, compensation shall be provided for the diagnosis and maintenance to treat and remove encrustation from the well screen. Reimbursement shall be provided at an amount equal to the customary local cost of performing the necessary diagnosis and maintenance for well screen encrustation. Should the well yield reductions be recurring, the project owner shall provide payment or reimbursement for periodic maintenance throughout the life of the Project. If with treatment the well yield is incapable of meeting 110 percent of the well owner's maximum daily demand, dry season demand, or annual demand the well owner should be compensated by reimbursement or well replacement as described under Condition 3.c.

c. If Project pumping has lowered water levels to significantly impact well yield so that it can no longer meet its intended purpose, causes the well to go dry, or cause casing collapse, payment or reimbursement of an amount equal to the cost of deepening or replacing the well shall be provided to accommodate these effects. Payment or reimbursement shall be at an amount equal to the customary local cost of deepening the existing well or constructing a new well of comparable design and yield (only deeper). The demand for water, which determines the required well yield, shall be determined on a per well basis using well owner interviews and field verification of property conditions and water requirements compiled as part of the pre-project well reconnaissance. Well yield shall be considered significantly impacted if it is incapable of meeting 110 percent of the well owner's maximum daily demand, dry-season demand, or annual demand – assuming the pre-project well yield documented by the initial well reconnaissance met or exceeded these yield levels. For already low-yielding wells identified prior to Project construction, a reduction due solely to Project pumping of 10 percent or more below the pre-project yield shall be considered a significant impact. The contribution of Project pumping to observed decreases in observed well yield shall be determined using the groundwater monitoring data collected.

d. The project owner shall notify any owners of the impacted wells within one month of ~~both the AO and~~the CPM approval of the compensation analysis for increased energy costs.

e. Pump lowering – In the event that groundwater is lowered as a result of Project pumping to an extent where pumps are exposed but well screens remain submerged the pumps shall be lowered to maintain production in the well. The Project shall reimburse the impacted well owner for the costs associated with lowering pumping in proportion to the Project contribution to the impact.~~The Project shall reimburse the impacted well owner for the costs associated with lowering pumps.~~

f. Deepening of wells – If the groundwater is lowered enough as a result of Project pumping that well screens and/or pump intakes are exposed, and pump lowering is not an option, such affected wells shall be deepened or new wells constructed. The Project shall reimburse the impacted well owner for all costs associated with deepening existing wells or construction of a new well in proportion to the Project contribution to the impact.~~The Project owner shall reimburse the impacted well owner for all costs associated with deepening existing wells or constructing new wells shall be borne by the Project owner.~~

4. After the first five-year operational and monitoring period ~~both the AO and~~the CPM shall evaluate the data and determine if the monitoring program for water level measurements should be revised or eliminated. Revision or elimination of any monitoring program elements shall be based on the statistically verifiable datasets and trend analysis~~consistency of the data collected~~. The determination of whether the monitoring program should be revised or eliminated shall be made by the ~~both the AO and~~ CPM.

5. If mitigation includes monetary compensation, the project owner shall provide documentation to the ~~both the AO and~~ CPM that compensation payments have been made by March 31 of each year of Project operation~~ or, if lump-sum payment are made, payment is made by March 31 following the first year of operation only~~. Within thirty (30) days after compensation is paid, the project owner shall submit to the ~~both the AO and~~ CPM a compliance report describing compensation for increased energy costs necessary to comply with the provisions of this condition.

6. At the end of every subsequent five-year monitoring period, the collected data shall be evaluated by the ~~both the AO and~~ CPM and

they shall determine if the sampling frequency should be revised or eliminated.

7. During the life of the Project, the project owner shall provide to the ~~both the AO and~~ CPM all monitoring reports, complaints, studies and other relevant data within ten (10) days of being received by the Project owner.

Verification: The project owner shall do all of the following:

a. At least thirty (30) days in advance of using onsite wells to supply groundwater for Project construction, a Groundwater Monitoring and Reporting Plan shall be submitted to the CPM for review and approval before completion of Condition of Certification SOIL&WATER-3 (Well Installation). The Groundwater Monitoring and Reporting Plan shall provide the methodology for monitoring background and site groundwater levels.

~~a.~~b. At least thirty (30) days in advance of using onsite wells to supply groundwater for ~~prior to~~ Project construction, the project owner shall submit to the ~~both the AO and~~ CPM, a comprehensive report presenting all the data and information required in item A above. The ~~AO and~~ CPM will provide comments to the plan following submittal. ~~AO and~~ CPM approval of the plan is required prior to operation of the site groundwater supply wells. The project owner shall also submit to the ~~both the AO and~~ CPM all calculations and assumptions made in development of the report data and interpretations.

~~b.~~c. During Project construction, the project owner shall submit to the ~~both the AO and~~ CPM quarterly reports presenting all the data and information required in item B above. The quarterly reports shall be provided thirty (30) days following the end of the quarter. The project owner shall also submit to the ~~both the AO and~~ CPM all calculations and assumptions made in development of the report data and interpretations.

~~c.~~d. No later than March 31 of each year of construction or sixty (60) days prior to Project operation, the project owner shall provide to the ~~both the AO and~~ CPM for review and approval, documentation showing that any mitigation to private well owners during Project construction was satisfied, based on the requirements of the property owner as determined by the ~~both the AO and~~ CPM.

~~d.~~e. During Project operation, the project owner shall submit to the ~~both the AO and~~ CPM, applicable quarterly, semi-annual and annual reports presenting all the data and information required in item C above. Quarterly reports shall be submitted to the ~~AO and~~ CPM thirty (30) days following the end of the quarter. The fourth quarter report shall serve as the annual report and will be provided on January 31 in the following year.

~~e.~~f. The project owner shall submit to the ~~both the AO and~~ CPM all calculations and assumptions made in development of report data and interpretations, calculations, and assumptions used in development of any reports.

~~f.~~g. After the first five year operational and monitoring period, the project owner shall submit a 5-year monitoring report to ~~both the AO and~~the CPM that includes all monitoring data collected and a summary of the findings. ~~Both the AO and~~The CPM will determine if the water level measurements and water quality sampling frequencies should be revised or eliminated.

SOIL&WATER-6: Where it is determined that the project owner shall reimburse a private well owner for increased energy costs identified as a result of analysis performed in Condition of Certification **SOIL&WATER-5,** the project owner shall calculate the compensation owed to any owner of an impacted well as described below.

Increased cost for energy	=	change in lift/total system head x total energy consumption x costs/unit of energy
Where:		
change in lift (ft)	=	calculated change in water level in the well resulting from project
total system head (ft)	=	elevation head + discharge pressure head
elevation head (ft)	=	difference in elevation between wellhead discharge pressure gauge and water level in well during pumping.
discharge pressure head (ft)	=	pressure at wellhead discharge gauge (psi) X 2.31

The project owner shall submit to the CPM for review and approval the documentation showing which well owners must be compensated for increased energy costs and that the proposed amount is sufficient compensation to comply with the provisions of this condition.

- Any reimbursements ~~(either lump sum or annual)~~ to impacted well owners shall be only to those well owners whose wells were in service within six months of the Energy Commission decision and within ~~a 5-mile radius of the project site~~the monitoring area predicted by the groundwater modeling condition A.2.
- The project owner shall notify all owners of the impacted wells within one month of the CPM approval of the compensation analysis for increase energy costs.
- Compensation shall be provided on ~~either a one-time lump-sum basis, or on~~ an annual basis, as described below.

~~**Annual Compensation**:~~ Compensation provided on an annual basis shall be calculated prospectively for each year by estimating energy costs that will be incurred to provide the additional lift required as a result of the project. With the permission of the impacted well owner, the project owner shall provide energy meters for each well or well field affected by the project. The impacted well owner to receive compensation must provide documentation of energy consumption in the form of meter readings or other verification of fuel consumption. For each year after the first year of operation, the project owner shall include an adjustment for any deviations between projected and actual energy costs for the previous calendar year.

~~**One-Time Lump-Sum Compensation**: Compensation provided on a one-time lump-sum basis shall be based on a well-interference analysis, assuming the maximum project-pumping rate of 600 afy. Compensation associated with increased pumping lift for the life of the project shall be estimated as a lump sum payment as follows:~~

- ~~The current cost of energy to the affected party considering time of use or tiers of energy cost applicable to the party's billing of electricity from the utility providing electric service, or a reasonable equivalent if the party independently generates their electricity;~~
- ~~An annual inflation factor for energy cost of 3 percent; and~~
- ~~A net present value determination assuming a term of 30 years and a discount rate of 9 percent;~~

Verification: The Project owner shall do all of the following:

a. No later than thirty (30) days after CPM approval of the well drawdown analysis, the project owner shall submit to the CPM for review and approval all documentation and calculations describing necessary compensation for energy costs associated with additional lift requirements.

b. The project owner shall submit to the CPM all calculations, along with any letters signed by the well owners indicating agreement with the calculations, and the name and phone numbers of those well owners that do not agree with the calculations.

Compensation payments shall be made by March 31 of each year of project operation ~~or, if lump-sum payment is selected, payment shall be made by March 31 of the first year of operation only~~. Within thirty (30) days after compensation is paid, the project owner shall submit to the CPM a compliance report describing compensation for increased energy costs necessary to comply with the provisions of this condition.

WASTE DISCHARGE REQUIREMENTS

SOIL&WATER-7: The project owner shall comply with the requirements specified in Appendix B, C, and D. These requirements relate to discharges, or potential discharges, of waste that could affect the quality of waters of the state, and were developed in consultation with staff of the State Water Resources Control Board and/or the applicable California Regional Water Quality Control Board (hereafter "Water Boards"). It is the Commission's intent that these requirements be enforceable by both the Commission and the Water Boards. In furtherance of that objective, the Commission hereby delegates the enforcement of these requirements, and associated monitoring, inspection and annual fee collection authority, to the Water Boards. Accordingly, the Commission and the Water Board shall confer with each other and coordinate, as needed, in the enforcement of the requirements. The project owner shall pay the annual waste discharge permit fee associated with this facility to the Water Boards. In addition, the Water Boards may "prescribe" these requirements as waste discharge requirements pursuant to Water Code Section 13263 solely for the purposes of enforcement, monitoring, inspection, and the assessment of annual fees, consistent with Public Resources Code Section 25531, subdivision (c)

Verification: No later than sixty (60) days prior to any wastewater or storm water discharge or use of land treatment units, the project owner shall provide documentation to the CPM, with copies to the CRBRWQCB, demonstrating compliance with the WDRs established in Appendices C, D, and E. Any changes to the design, construction, or operation of the evaporation basins,, treatment units, or storm water system shall be requested in writing to the CPM, with copies to the CRBRWQCB, and approved by the CPM, in consultation with the CRBRWQCB, prior to initiation of any changes. The project owner shall provide to the CPM, with copies to the CRBRWQCB, all monitoring reports required by the WDRs, and fully explain any violations, exceedances, enforcement actions, or corrective actions related to construction or operation of the evaporation basins, treatment units, or storm water system.

SEPTIC SYSTEM AND LEACH FIELD REQUIREMENTS

SOIL&WATER-8: The project owner shall comply with the requirements of the County of Riverside Ordinance Code Title 8, Chapter 8.124 and the California Plumbing Code (California Code of Regulations Title 24, Part 5) regarding sanitary waste disposal facilities such as septic systems and leach fields. The septic system and leach fields shall be designed, operated, and maintained in a manner that ensures no deleterious impact to groundwater or surface water. Compliance shall include an engineering report on the septic system and leach field design, operation, maintenance, and loading impact to groundwater.

Verification: The project owner shall submit all necessary information and the appropriate fee to the County of Riverside and the CRBRWQCB to ensure that the project has complied with county and state sanitary waste disposal facilities requirements. Written assessments prepared by the County of Riverside and the CRBRWQCB regarding the project's compliance with these requirements must be submitted to the ~~AO and~~ CPM for review and approval thirty (30) days prior to the start of power plant operation.

GROUNDWATER PRODUCTION REPORTING

SOIL&WATER-9: The Project is subject to the requirement of Water Code Sections 4999 et. seq. for reporting of groundwater production in excess of 25 acre feet per year.

Verification: The project owner shall file an annual "Notice of Extraction and Diversion of Water" with the SWRCB in accordance with Water Code Sections 4999 et. seq. The Project Owner shall include a copy of the filing in the annual compliance report.

CLOSURE AND DECOMMISSIONING PLAN

SOIL&WATER-10: ~~The project owner shall prepare a decommissioning plan that will meet the requirements of the BLM and the AO and CPM.~~ The project owner shall identify likely decommissioning scenarios and develop specific decommissioning plans for each scenario that will identify actions to be taken to avoid or mitigate long-term impacts related to water and wind erosion after decommissioning. Actions may include such measures as a decommissioning SWPPP, revegetation and restoration of disturbed areas, post-decommissioning maintenance, collection and disposal of project materials and chemicals, and access restrictions.

Verification: At least sixty (60) days prior to the start of site mobilization or alternate date as agreed to with BLM, the project owner shall submit decommissioning plans to the ~~AO and~~ CPM for review and approval. The project owner shall amend these documents as necessary, with approval from the ~~AO and~~ CPM, should the decommissioning scenario change in the future.

REVISED PROJECT DRAINAGE REPORT AND PLANS

SOIL&WATER-11 The project owner shall provide a revised Drainage Report which includes the following additional information:

A. A detailed explanation of the large differences in pre- and post-project peak discharges and flood volumes along the downstream (east) Project boundary as currently indicated by the HEC-HMS results.

B. Pre- and post development drainage maps which include the following information:

   1. All topographic data used to establish the overall watershed boundaries as well as the sub-basin boundaries.
   2. A delineation of all onsite watersheds with basin areas, points of concentration, and peak discharge values where the smaller onsite channels discharge into the larger collector and conveyance channels.
   3. Calculations and summarized results for all onsite swales and onsite channels showing adequate depth and non-erosive velocities.
   4. A specific discussion of how the proposed onsite drainage design will protect the facility from erosion and the possible failure of the facilities resulting in a release of HTF.
   5. Peak flow values at all downstream points of discharge from the Project.
   6. Any other information needed to allow a correlation between the HEC-HMS model and the proposed drainage design.

C. Detailed scour calculations to justify toe-down depths for all soil cement segments, drop structures and any other features where scour is an issue.

D. Hydraulic analysis of all onsite and offsite channel confluences and a justification of whether or not soil cement or other suitable protection is required.

Verification: The project owner shall submit a Revised Project Drainage Report with the 30 percent Grading and Drainage Plans to ~~both the AO and~~the CPM for their review and comments sixty (60) days before project mobilization. The project owner shall address comments provided by ~~both the AO and~~the CPM until approval of the report is issued. All comments and concepts presented in the approved Revised Project Drainage Report with the 30 percent Grading and Drainage Plans shall be included in the final Grading and Drainage Plans. The Revised Project Drainage Report and 30 percent Grading and Drainage Plans shall be approved by ~~both the AO and~~the CPM.

DETAILED FLO-2D ANALYSIS

SOIL&WATER-12: The project owner shall provide a detailed hydraulic analysis utilizing FLO-2D which models pre- and post-development flood conditions for the 10-, 25- and 100-year storm events. The post-development model must include all proposed collector channels, end diffuser structures and berms. The methods and results of the analysis shall be fully documented in a Technical Memorandum or in the revised Project Drainage Report. Graphical output must include depth and velocity mapping as well as mapping which graphically shows the changes in both of these parameters between the pre- and post development conditions. Color shading schemes used for the mapping must be consistent between all maps as well as clear and easily differentiated between designated intervals for hydraulic parameters. Intervals to be used in the mapping are as follows:

- Flow Depth: at 0.20 ft intervals up to 1 ft, and 0.40 ft intervals thereafter.
- Velocity: 0.5 ft/s intervals

A set of figures shall be provided at a scale of no less than 1 in to 200 ft which show the extents and depths of flows entering the North, South and West channels for the 100-year event. A figure at the same scale shall also be provided for depth, velocity and the relative change in these parameters at and downstream of the four end diffuser structures for the 10-, 25- and 100-year events. Digital input and output files associated with the FLO-2D analysis must be included with all submittals. The results of this analysis shall be used for design of the 30 percent project grading and drainage plans.

Verification: The project owner shall submit a detailed FLO-2D analysis to ~~both the AO and~~the CPM for their review and comments with the 30 percent plan Grading and Drainage Plans and revised Project Drainage Report required in **SOIL&WATER-11**. The project owner shall address comments provided by the ~~both the AO and~~ CPM until approval of the analysis is issued.

DRAINAGE CHANNEL DESIGN

SOIL&WATER-13: All collector and conveyance channels shall be constructed consistent with Riverside County Flood Control and Water Conservation District (RCFCWCD) guidelines where applicable. Grade control structures shall be utilized where needed to meet channel velocity and Froude number requirements. Channels shall be sized along discreet sections based on the results of the detailed FLO-2D analysis described in **SOIL&WATER-12**. All grade control and drop structures shall have adequate toe-down to account for the design drop plus two additional feet to account for potential downcutting of the channel over time.

Channel confluence design must be given special consideration, especially as the preliminary Grading and Drainage Plans show 90 degree angles of confluence at nearly all locations. The issues of confluence hydraulics and potential scour shall be specifically addressed in the revised Drainage Report.

Offsite flows shall discharge directly into collector channels following the natural drainage patterns. The possible exception to this design approach is discussed in **SOIL&WATER-14** (F).

The proposed collector channel design must be fully documented in the Grading and Drainage plans and must include the following information:

A. Detailed and accurate cut/fill lines demonstrating in plan view how the channel would tie into existing grade and the solar facility.

B. Channel cross-sections at 200-foot intervals (or less as required to show all structures/configurations) showing the channel geometry, existing grade, proposed grade at the facility and how the channel would tie in at on both sides.

C. Detailed channel profiles showing existing and finished grades at channel flow line and left and right banks. All drop structures as well as the toe-of soil cement profile must also be shown and fully annotated. The 100-year water surface elevation will be provided on all profiles.

D. Typical sections and design details for all discreet channel sections, drop structures, channel confluences, flow dispersion structures and other relevant drainage features.

E. Consistent nomenclature and stationing on all plans, sections, profiles and details.

Verification: The project owner shall prepare preliminary, 30 percent channel design drawings and submit two copies for ~~both the AO and~~the CPM review and comment. The preliminary design drawings shall be submitted at the same time as the **Revised Project Drainage Report**, **SOIL&WATER-11** and FLO 2D Analysis in **SOIL&WATER-12**. The project owner will update and modify as necessary to obtain ~~both the AO and~~the CPM approval.

CHANNEL EROSION PROTECTION

SOIL&WATER–14: The project owner must provide revised preliminary Grading and Drainage Plans which incorporate the items and information as listed below for the channels designated as North, West, South, Southeast and Central on the existing plans (AECOM2010a).

A. Soil cement bank protection must be provided such that the channels are adequately protected from bank erosion and lateral headcutting. The extents of the proposed bank protection must be shown on the revised Grading and Drainage Plans. Typical sections for these channels must show the layout of the bank protection including thickness, width and toe-down location and depth consistent with the scour calculation provided in the revised Drainage Report.

B. Soil cement bank protection shall be provided on both channel banks wherever 10-year channel flow velocity exceeds 5 ft/s. It shall be provided on the outer channel bank wherever offsite topography and a detailed FLO-2D analysis indicate surface flow would enter the collector channels.

C. Soil cement bank protection shall be provided at all channel confluences of otherwise unlined channels where the result of the detailed hydraulic analysis presented in the revised Drainage Report indicate the increased potential for erosion due to adverse angles of confluence. Detailed plans for each confluence showing the extents of the soil cement based on specific hydraulic conditions shall be provided in the formal Grading and Drainage Plans.

D. Other methods of channel stabilization, such as dumped riprap or gabions, will not be permitted. Bio-stabilization measures are not permitted.

E. Earthen berms used on the outside of collector channels to guide flow to discreet points of discharge into a channel shall not be utilized in lieu of soil cement on the outside bank of collector channels. Offsite flows shall discharge directly into collector channels.

F. The possible exception to the requirements of **SOIL&WATER-13**(E) would be along the North Channel for a total distance of approximately 14,000 feet. Along this reach, earthen berms and channel drop inlets might be utilized as opposed to soil along the upstream face of the collector channels. The berms would start at a point approximately 4,825 feet east of the western property boundary (just east of the natural wash) and extend to a point approximately 18,710 feet east of the west property boundary (where the north collector channel bottom width transitions from 100 feet to 150 feet wide). The use of berms and channel drop inlets may be justified along this reach as available topography indicates that the predominate flow pattern is roughly parallel to the channel and that inflows would be minimal. This condition as well as the actual extents of where berms may be utilized will be based on the results of the post-development FLO-2D analysis.

   The use of unlined berms will require that the post-development FLO-2D analysis for the 100-year flow event demonstrate non-erosive flow velocities based on site specific soils characteristics. Lining of the outside of the berm with gunite or other approved material will be required along reaches where the 100-year flow velocities are shown to be erosive. In the absence of more specific data, 100-year flow velocities in excess of 5.0 ft/s will be considered erosive. Drop inlets must be fully protected from erosion, sized appropriately for the anticipated 100-year flow, and be designed for complete interception of the upstream flows to eliminate the potential for bypass flow to the subsequent downstream drop inlet structure. These structures must also to be fully protected from erosion and failure related to the 100-year discharge within the north collector channel.

G. The height of the proposed berms must be at least three feet and must provide a minimum of 1 foot of freeboard based on the flow depths determined in the post-development FLO-2D analysis. The maximum discharge to be collected at any single channel drop inlet should not be greater than 50 cfs based on the results of the post- development FLO-2D analysis.

H. Design and construction criteria for the use of soil cement on the site shall be prepared by the Owner/Developer's engineer in conjunction with the design methodology established by the Geotechnical Engineer of Record. The design and construction criteria shall be based on local and/or regional requirements and specifications. The design and construction criteria, the geotechnical design for the soil cement, the site specific specifications for the soil cement, the method of installation for the soil cement, and the local or regional standards being used for the design criteria shall be provided to the CPM for review and approval consistent with the verification requirements for this Condition of Certification. The slope requirements that are proposed for use (3:1 or 4:1), and the associated method of installation (i.e., 8 inch lift versus slope application) shall be fully documented for review and approval by the CPM prior to any field installation of soil cement.

I. A soils report indicating the suitability of the Project soils for use in the production of soil cement to the Project specifications shall be submitted with the revised Grading and Drainage Plans.

J. The bottom of engineered collector channels may be left earthen or fully lined at the discretion of the engineer. Fully lined channels will have higher allowable velocities and Froude numbers assuming hydraulic jumps are modeled and considered in the channel design.

K. If modifications to the existing drainages to allow construction of and future access to linear facilities require stabilization of the channel in the vicinity of those modifications, location of disturbance to the existing drainages shall be stabilized consistent with best engineering practice to eliminate future negative impacts to those drainages upstream and downstream of the linear facility in the form of downcutting, erosion and headcutting. The use of "non-engineered" culvert crossings shall not be allowed. All structures to be utilized in existing drainages along linear facilities shall be documented in the project drainage report and reflected in the project improvement plans. Channel erosion mitigation measures along linear facilities shall be subject to all the requirements of this Condition of Certification where applicable.

Verification: The required information and criteria shall be incorporated into the Grading and Drainage Plans and with all subsequent submittals as required in

SOIL&WATER-11 and **SOIL&WATER-12**. The project owner shall address all comments by the ~~AO and~~ CPM related to the channel erosion protection design through final plan approval.

CHANNEL MAINTENANCE PROGRAM

SOIL&WATER-15: The project owner shall develop and implement a Channel Maintenance Program that provides long-term guidance to implement routine channel maintenance projects and comply with conditions of certification in a feasible and environmentally-sensitive manner. The Channel Maintenance Program will be a process and policy document prepared by the Project owner, reviewed and approved by the ~~both the AO and~~ CPM. The Channel Maintenance Program shall include the following:

A. **Purpose and Objectives** – Establishes the main goals of the Program, of indefinite length, to maintain the diversion channel to meet its original design to provide flood protection, support Project mitigation, protect wildlife habitat and movement/ migration, and maintain groundwater recharge.

B. **Application and Use** - The channel maintenance work area is defined as the BSPP engineered channel, typically extending to the top of bank, include access roads, and any adjacent property that the Project owns or holds an easement for access and maintenance. The Program shall include all channel maintenance as needed to protect the Project facilities and downstream property owners.

C. **Channel Maintenance Activities**

1. **Sediment Removal** - sediment is removed when it: (1) reduces the diversion channel effective flood capacity, to less than the design discharge, (2) prevents appurtenant hydraulic structures from functioning as intended, and (3) becomes a permanent, non-erodible barrier to instream flows.

2. **Vegetation Management** - Vegetation management shall include control of invasive or nonnative vegetation as prescribed in Condition of Certification **BIO-14**.

3. **Bank Protection and Grade Control Repairs** – Bank protection and grade control structure repairs involve any action by the Project owner to repair eroding banks, incising toes, scoured channel beds, as well as preventative erosion protection. The Project owner shall implement instream repairs when the problem: (1) causes or could cause significant damage to the Project; adjacent property, or the structural elements of the diversion channel; (2) is a public safety concern; (3) negatively affects groundwater recharge; or (4) negatively affects the mitigation vegetation, habitat, or species of concern.

4. **Routine Channel Maintenance** - trash removal and associated debris to maintain channel design capacity; repair and installation of fences, gates and signs; grading and other repairs to restore the original

contour of access roads and levees (if applicable); and removal of flow obstructions at Project storm drain outfalls.

5. **Channel Maintenance Program –** Exclusions including: emergency repair and CIP.

D. **Related Programmatic Documentation** – ~~both the AO and~~the CPM will review and approve the Channel Maintenance Program programmatic documentation. Maintenance activities shall comply with the streambed alteration agreement provisions and requirements for channel maintenance activities consistent with California's endangered species protection regulations and other applicable regulations.

E. **Channel Maintenance Process Overview**

1. **Program Development and Documentation** – This documentation provides the permitting requirements for channel maintenance work in accordance with the conditions of certification for individual routine maintenance of the engineered channel without having to perform separate CEQA/NEPA review or obtain permits.
2. **Maintenance Guidelines** - based on two concepts: (1) the maintenance standard and (2) the acceptable maintenance condition, and applies to sediment removal, vegetation management, trash and debris collection, blockage removal, fence repairs, and access road maintenance.
3. **Implementation** – Sets Maintenance Guidelines for vegetation and sediment management. The Project's vegetation management activities are established in Condition of Certification **BIO-14**. Maintenance Guidelines for sediment removal provide information on the allowable depth of sediment for the engineered channel that would continue to provide design discharge protection.
4. **Reporting** – ~~both the AO and~~the CPM requires the following reports to be submitted each year as part of the Annual Compliance Report:
    a. Channel Maintenance Work Plan - Describes the planned "major" maintenance activities and extent of work to be accomplished; and
    b. Channel Maintenance Program Annual Report – Specifies which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).
    c. A report describing "Lessons Learned" to evaluate the effectiveness of both resource protection and maintenance methods used throughout the year.

F. **Resource Protection Policies** - establishes policies to ensure that **resources** would be protected to the fullest extent feasible during routine channel maintenance activities. Policies shall be developed to guide decision-making for channel maintenance activities. BMPs shall be developed to implement these policies.

Verification: At least sixty (60) days prior to the start of any project-related site disturbance activities (excluding linear construction), the project owner shall coordinate with ~~both the AO and~~the CPM to develop the Channel Maintenance Program. The project owner shall submit two copies of the programmatic documentation, describing the proposed Channel Maintenance Program, to ~~both the AO and~~the CPM (for review and approval). The project owner shall provide written notification that they plan to adopt and implement the measures identified in the approved Channel Maintenance Program. The project owner shall:

a. Supervise the implementation of a Channel Maintenance Program in accordance with conditions of certification;

b. Ensure the Project Construction and Operation Managers receive training on the Channel Maintenance Program; and

c. As part of the Project Annual Compliance Report to the ~~both the AO and~~ CPM, submit a Channel Maintenance Program Annual Report specifying which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).

ESTIMATION OF COLORADO RIVER IMPACTS

SOIL&WATER-16: The project owner may choose to further evaluate and estimate the increase in the amount of ~~subsurface water flowing~~recharge from the Colorado River to the regional aquifer that is attributable ~~due~~ to P~~p~~roject pumping. This estimate may be used for determining the appropriate replacement volume of Colorado River water for mitigation in accordance with **SOIL&WATER-2**. The project owner shall do the following to provide an estimate for review and approval by the ~~AO and~~ CPM:

1. The project owner shall conduct a detailed analysis of the contribution of Colorado River water to the PVMGB from the Project's groundwater extraction activities at the end of the 30 year operational period. The detailed analysis shall include:

   a. The conceptual model developed in the AFC and the Staff Assessment, and any changes resultant from further analysis in support of numerical modeling;

   b. ~~The use of a numerical model. The model shall utilize the U.S. Geological Survey (USGS) numerical model developed by Leake et al. (2008).~~The use of an appropriately calibrated and constructed groundwater flow model of the Palo Verde Mesa Groundwater Basin, inclusive of the Mesa and floodplain and the Colorado River that ~~The model~~ shall include:

      i. ~~Any additional h~~Horizontal and vertical geometry information gained through on- and offsite investigations conducted as part of the hydrogeological field investigations for the AFC, and any subsequently documented investigation performed as part of the model development ;

ii. Aquifer properties developed as part of the AFC and any subsequently documented investigations performed as part of the model development, and an assessment of aquifer properties available from other published sources. The properties used shall be representative of the available data, and will be used in calibration of the flow model under ASTM standards and methods.~~The properties used must be the most conservative numbers that would result in the largest impact or flux from the Colorado River~~; and

iii. ~~The modeling effort shall include an estimation of the relative error of the estimates derive~~The modeling effort shall include a sensitivity analysis where in the most sensitive variables will be identified and varied within a reasonable range outside of the calibration value to provide an assessment of the range of potential impacts to the Colorado River~~d~~.

c. Reporting of the results of the modeling effort

d. Estimation of the increased contribution of Colorado River water ~~and groundwater from the adjacent Palo Verde Valley Groundwater Basin to the PVMGB as a result of~~ attributable to Project groundwater extraction

2. The analysis shall include the following elements:

a. The change in groundwater flux to the regional aquifer attributable to the inflow from the Colorado River as a result of Project pumping in afy for the life of the Project (30 years);

b. ~~Relative error or confidence interval of the calculated change in groundwater flux attributable to the inflow from the Colorado River~~ A sensitivity analysis that would provide a range in the potential changes in flux from the Colorado River relative to variation in the key model variables as a result of Project pumping for life of the Project;

3. The project owner shall present the results of the conceptual model, numerical model, transient runs and sensitivity analysis in a report for review and approval by ~~AO and~~the CPM. The report shall include all pertinent information regarding the development of the numerical models. The report shall include:

a. Introduction

b. Previous Investigations

c. Conceptual Model

d. Numerical Model and Input Parameters

e. Sensitivity Analysis

f. Transient Modeling Runs

g. Conclusions

Verification: Within thirty (30) days following certification of the proposed Project, the project owner shall submit to ~~both AO and~~ the CPM for their review and approval a report detailing the results of the modeling effort. The report shall include the estimated amount of subsurface water flowing from the Colorado River due to project pumping. This estimate shall be used for determining the appropriate volume of water for mitigation in accordance with **SOIL&WATER-2**.

GROUNDWATER QUALITY MONITORING AND REPORTING PLAN

SOIL&WATER-17: The project owner shall submit a Groundwater Quality Monitoring and Reporting Plan to the ~~AO and~~ CPM for review and approval. The Groundwater Quality Monitoring and Reporting Plan shall provide a description of the methodology for monitoring background and site groundwater levels and quality. The sampling required for the water quality monitoring program shall be implemented during groundwater level monitoring events in accordance with **SOIL&WATER-5**. Prior to project construction, monitoring shall commence to establish pre-construction groundwater quality conditions in the well proposed for the program and shall include pre-construction, construction, and project operation water use. The water quality monitoring program shall identify potential changes in the existing water quality of the proposed water supply resulting from project pumping, if any, in concert with Condition of Certification **SOIL&WATER-5**, establish pre-construction and project related groundwater quality that can be quantitatively compared against observed and simulated levels near the project pumping well and near potentially impacted existing wells, and to avoid, minimize, or mitigate significant impacts to sensitive receptors (springs and groundwater-dependent vegetation, and groundwater supply users).

A. A Groundwater Quality Monitoring and Reporting Plan shall be submitted to the ~~AO and~~ CPM for review and approval before completion of Condition of Certification **SOIL&WATER-3**. The Plan shall include a scaled map showing the site and vicinity, existing well locations, and proposed monitoring locations (both existing wells and new monitoring wells proposed for construction). Additional monitoring wells that shall be installed include wells required in accordance with Condition of Certification **SOIL&WATER-7**, for the evaporation ponds and land treatment unit proposed for the project. The map shall also include relevant natural and man-made features (existing and proposed as part of this project). The plan also shall provide: (1) well construction information and borehole lithology for each existing well proposed for use as a monitoring well; (2) description of proposed drilling and well installation methods; (3) proposed monitoring well design; and, (4) schedule for completion of the work.

B. A Well Monitoring Installation and Groundwater Level Network Report shall be submitted to the ~~AO and~~ CPM for review and approval in conjunction with Condition of Certification **SOIL&WATER-5**. The report shall include a scaled map showing the final monitoring well network. It shall document the drilling methods employed, provide individual well construction as-builds, borehole lithology recorded from the drill cuttings, well development, and well survey results. The well survey shall measure the location and elevation of the top of the well casing and reference point for all water level measurements, and shall include the coordinate system and datum for the survey measurements. Additionally, the report shall describe the water level monitoring equipment employed in the wells and document their deployment and use.

C. As part of the monitoring well network development, all newly constructed monitoring wells shall be constructed consistent with State and Riverside County specifications.

D. Prior to use of any groundwater for construction, all groundwater quality and groundwater level monitoring data shall be reported to the ~~AO and~~ CPM. The report shall include the following:

   1. An assessment of pre-project groundwater levels, a summary of available climatic information (monthly average temperature and rainfall records from the nearest weather station), and a comparison and assessment of water level data relative to the assumptions and spatial trends simulated by the applicant's groundwater model.

   2. An assessment of pre-project groundwater quality with groundwater samples analyzed for total dissolved solids (TDS), chloride, nitrates, major cations and anions, oxygen-18 and deuterium isotopes, and any other constituents required by the ~~AO and/or~~ CPM to protecting existing water supply quality.

   3. The data shall be tabulated, summarized, and submitted to the ~~AO and~~ CPM. The data summary shall include the estimated range (minimum and maximum values), average, and median for each constituent analyzed. If a sufficient number of data points are available, the data shall also be analyzed using the Mann-Kendall test for trend at 90 percent confidence to assess whether pre-project water quality trends, if any, are statistically significant.

E. During project construction and during the first five years of project operations, the project owner shall semi-annually monitor the quality of groundwater and changes in groundwater elevation and submit data semi-annually to the ~~AO and~~ CPM. After five years of project operations, the frequency and scope of the monitoring program shall be reassessed by the ~~AO and~~ CPM. The summary report shall document water level monitoring methods, the water level data, water level plots, and a comparison between pre- and post-project start-up water level trends as itemized below. The report shall also include a summary of actual water use conditions, monthly climatic information (temperature and rainfall) from the nearest meteorological monitoring station, and a comparison and assessment of water level data relative to the assumptions and simulated spatial trends predicted by the applicant's groundwater model.

1. Groundwater samples from all wells in the monitoring well network shall be analyzed and reported semi-annually for TDS, chloride, nitrates, cations and anions, oxygen-18 and deuterium isotopes. These analyses, and particularly the stable isotope data, can be useful for identifying water sources and assessing their contributions to the quality of water produced by wells.

2. For analysis purposes, pre-project water quality shall be defined by samples collected prior to project construction as specified above, and compliance data shall be defined by samples collected after the construction start date. The compliance data shall be analyzed for both trends and for contrast with the pre-project data.

3. Trends shall be analyzed using the Mann-Kendall test for trend at the 90 percent confidence. Trends in the compliance data shall be compared and contrasted to pre-project trends, if any.

4. The contrast between pre-project and compliance mean or median concentrations shall be compared using an Analysis of Variance (ANOVA) or other appropriate statistical method approved by the CRBRWQCB for evaluation of water quality impacts. A parametric ANOVA (for example, an F-test) can be conducted on the two data sets if the residuals between observed and expected values are normally distributed and have equal variance, or the data can be transformed to an approximately normal distribution. If the data cannot be represented by a normal distribution, then a nonparametric ANOVA shall be conducted (for example, the Kruskal-Wallis test). If a statistically significant difference is identified at 90 percent confidence between the two data sets, the monitoring data are inconsistent with random differences between the pre-project and baseline data indicating a significant water quality impact from project pumping may be occurring.

5. If compliance data indicate that the water supply quality has deteriorated (exceeds pre-project constituent concentrations in TDS, sodium, chloride, or other constituents identified as part of the monitoring plan and applicable Water Quality Objectives are exceeded for the applicable beneficial uses of the water supply) for three consecutive years, the project owner shall provide treatment or a new water supply to either meet or exceed pre-project water quality conditions to any impacted water supply wells.

<u>Verification</u>: The project owner shall complete the following:

At least forty-five (45) days prior to construction, a Groundwater Quality Monitoring and Reporting Plan shall be submitted to the ~~AO and~~ CPM for review and approval before completion of Condition of Certification **SOIL&WATER-3**. At least thirty (30) days prior to construction, a Well Monitoring Installation and Groundwater Level Network Report shall be submitted to the ~~AO and~~ CPM for review and approval. At least thirty (30) days prior to use of any groundwater for construction, all groundwater quality and groundwater level monitoring data shall be reported to the ~~AO and~~ CPM.

NON-TRANSIENT, NON-COMMUNITY WATER SYSTEM

SOIL&WATER-18: The Project is subject to the requirement of Title 22, Article 3, Sections 64400.80 through 64445 for a non-transient, non-community water system (serving 25 people or more for more than six months). In addition, the system shall require periodic monitoring for various bacteriological, inorganic and organic constituents.

Verification: The project owner shall submit the equivalent County of Riverside requirements to operate a non-transient, non-community water system at least sixty (60) days prior to commencement of operations at the site. The requirements will be in accordance with the County of Riverside requirements for a non-transient, non-community water system. In addition, the Project Owner shall submit to the ~~AO and~~ CPM a monitoring and reporting plan for production wells operated as part of the domestic water supply system prior to plant operations. The plan shall include reporting requirements including monthly, quarterly and annual submissions.

The project owner shall designate a California Certified Water Treatment Plant Operator as well as the technical, managerial and financial requirements as prescribed by State law. The project owner shall supply updates on an annual basis of monitoring requirements, any required submittals equivalent to the County of Riverside requirements including annual renewal requirements.

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SOIL AND WATER
APPENDIX B

Waste Discharge Requirement
Facts for Waste Discharge

SOIL AND WATER RESOURCES – APPENDIX B

FACTS FOR WASTE DISCHARGE— Palo Verde Solar I, LLC, Owner/Operator, Blythe Solar Power Project, Riverside County

1. Solar Millennium, LLC, (the Discharger) is proposing to construct, own and operate a concentrated solar power (CSP) electric generating facility evaporation ponds and a land treatment unit (LTU) on land owned by the Bureau of Land Management (BLM). The solar power project is proposed by Palo Verde Solar I, LLC (PVSI) a wholly owned subsidiary of Solar Millennium, LLC. The project is located on the Palo Verde Mesa along the Interstate 10 (I-10) corridor, northwest of the City of Blythe. The facility is referred to as the Blythe Solar Power Project (BSPP). A site map (**Figure 1**), as incorporated here in and made a part of these requirements for waste discharge (Waste Discharge Requirements, or WDRs). The address for, Solar Millennium, LLC 1625 Shattuck Ave. Ste 270, Berkeley, Ca 94709-1161.

2. These WDRs regulate the Facility’s eight evaporation ponds and two LTUs. The evaporation ponds are designated as Class II Surface Impoundments Waste Management Units (WMU) and must meet the requirements of the California Code of Regulations (CCRs), Title 27, CCR §20200 et seq. The boundaries of the Blythe Solar Power Project are shown on **(Figure 2**), as incorporated here in and made a part of these WDRs.

3. The Discharger submitted two Reports of Waste Discharge (ROWD), January 6, 2010 for the LTU and May 14, 2001 for the evaporation ponds. for the Blythe Solar Power Project.

4. Definition of terms used in these WDRs:

   a. **Facility** – The entire parcel of property where the proposed Blythe Solar Power Project industrial operation or related solar industrial activities are conducted.

   b. **Waste Management Units (WMUs)** – The area of land, or the portions of the Facility where wastes are discharged. The LTU and the evaporation ponds are WMUs.

   c. **Discharger** – The term Discharger means any person who discharges waste that could affect the quality of the waters of the State, and includes any person who owns the land, WMU or who is responsible for the operation of a WMU. Specifically, the terms “discharger” or “dischargers” in these WDRs means Palo Verde Solar I, LLC.

Facility Location

5. The Project site is located approximately two miles mile north of I-10 and northwest of the City of Blythe, in an unincorporated area of eastern Riverside County,

California. The area inside the Project's security fence, the footprint within which all Project facilities will be located, will occupy approximately 5,950 acres of Federal land managed by the BLM.

Surrounding Land Use

6. The Facility site is vacant undeveloped desert located approximately one mile north of the Blythe Airport, two miles north of I-10, and eight miles west of the City of Blythe. The small rural community of Mesaville lies to the east of the Project site on the Palo Verde Mesa. North and west of the Project site are vacant desert lands. South of I-10 is undeveloped public and private desert land. Undeveloped and irrigated desert is located east of the site where several large and small parcels are actively farmed. The nearest residence is located in the southeast one-quarter of section 14, outside of the BLM- administered property and outside the 7,043 acre disturbance area within the overall ROW that will be disturbed by Project construction and operation. Another residential structure is located off-site between the southern boundary of the Project site, north of the Blythe Airport. No other residences are known to exist within the one-mile radius of the Project site.

7. The Project site is not located in a designated wilderness area; however, it is located near lands that are designated as wilderness lands or ACEC (NECO Maps 2-38 and 2-4). The nearest Federal wilderness areas are located on mountainous land to the northwest and south of the Project site and are referred to as the Palen/McCoy Wilderness Area, and the Chuckwalla Mountains Wilderness Area, respectively. Riverside County land uses in the study area include Open Space-Rural, Agricultural and Public Facility.

8. The Project site is vegetated with desert scrub throughout. Based on information in the NECO Plan, the Project site has not been leased for grazing by BLM.

Facility Description

9. The Project will have a nominal electrical output of 1,000 megawatts (MW), consisting of four adjacent, identical and independent 250-MW plants, Unit #1 through Unit #4 (**Figure 2**). Commercial operation of Unit #1 is expected to begin in mid-2013, with commercial operation of Unit #4 following by the second quarter of 2016, subject to timing of regulatory approvals and PVSI achievement of project equipment procurement and construction milestones. The solar thermal technology will provide 100 percent of the power generated by the Project; no supplementary energy source (e.g., natural gas to generate electricity at night) is proposed to be used for electric energy production. The Project will utilize an auxiliary boiler fueled by propane to reduce startup time and for HTF freeze protection. A second heater will be used on a limited basis for the HTF freeze protection heat exchanger during nighttime hours to keep the HTF in a liquid state when ambient temperatures are not sufficient to keep the temperature of the HTF above its relatively high freezing point (54 degrees Fahrenheit [°F]). The Project will also have one electric and one backup diesel-fueled fire water pump for fire protection.

10. The Project proposes to use dry cooling condenser for power plant cooling. Water for cooling tower makeup, process water makeup, and other industrial uses such as mirror washing will be supplied by up to ten onsite wells. This source will also be used to supply water for employee use (e.g., drinking, showers, sinks, and toilets). Water received from the on-site wells will be pumped directly to a reverse osmosis (RO) treatment unit to meet the requirements of the California Department of Health Services for potable water supplies. Power cycle makeup, mirror washing water, and cooling of ancillary equipment will require on-site treatment for reduction of dissolved solids, and this treatment varies according to the quality required for each of these uses.

11. The power generation cycle will not produce cooling tower blow down because the plant will be dry cooled. A small auxiliary cooling tower will generate a small amount of blow down, which will be reused on site. No off-site backup cooling water supply is planned at this time.

12. The main waste stream at the site consists of industrial wastewater generated in the various processes associated with power generation. Industrial wastewater is treated via a high pH reverse osmosis at each of the four Power Units. At each Unit, the treated water is recycled to the 1,000,000-gallon Service/Fire Water tank for reuse in the process. The concentrate from the RO system is discharged to lined evaporation ponds (two per Unit). The BSPP Facility therefore includes eight proposed evaporation ponds for waste storage and disposal. Sanitary wastewater generated at each Unit is disposed of via septic systems.

13. The project will include evaporation ponds for the evaporation of brine waste from the RO plant and other industrial wastes. There will be eight ponds, four acres in size and, two within each power block. The evaporation ponds will be designed in accordance with Colorado River Basin Regional Water Quality Control Board (Regional Board) requirements.

14. The Project will include an LTU to treat soil contaminated with HTF. Based on the release history from the NextEra LLC Kramer Junction Facility, which is parabolic trough solar power plant that employs HTF in the same fashion as proposed for the BSPP and also has a LTU for treatment of HTF-contaminated soil, the LTU has been designed in accordance with CCR Title 27 requirements and designed to receive about 3,332 cubic yards of impacted soil on an annual basis. There are two LTUs proposed for the Project Figure 2). The LTU will use indigenous bacteria and amendments to the soil to bioremediate HTF-affected soils to levels acceptable for reuse on the site. Characterization of the hazardous characteristics of HTF-affected soil will be established by the Department of Toxic Substances Control (DTSC) prior to operation and LTU use for soil remediation. Soils in excess of the criterion established by the DTSC will be removed from the site and transported to an appropriate treatment storage and disposal facility. Soil with HTF at concentrations below this criterion will be managed in the LTU and remediated to acceptable levels for reuse as fill on site. The unit will be designed in accordance with Colorado River Basin Regional Water Quality Control Board (Regional Board) requirements.

15. The estimated project life for the Project is 30 years. Personnel will staff the Project 24 hours per day/seven days per week. Even when the solar power plant is not operating, personnel will be present as necessary for maintenance, to prepare the Project for startup, and/or for site security.

16. A sanitary septic system and on-site leach field will be used to dispose of sanitary wastewater within each power block.

Climate

17. The Project is located in an arid desert climate; therefore, there are extreme daily temperature changes, low annual precipitation, strong seasonal winds and mostly clear skies. Evaporation rates are higher than precipitation rates. Based on 60 years of data from Blythe Airport, the mean maximum temperatures in June to September exceed 100°F. Winter months are more moderate with mean maximum temperatures of high 60's to low 70's °F and minimum temperatures in the low to mid 40's °F. Although there are no average minimal temperatures below freezing point (32°F), the temperature has historically dropped below freezing point between November and March.

18. Average annual evaporation in the Facility area, based on published data at the Indio Fire Station 70 miles west of the Project site, is 105 inches, of which 87 percent of that evaporation occurs between March and October. Average annual precipitation in the Project area, based on the gauging station at Blythe Airport, is 3.55 inches, with August recording the highest monthly average of 0.63 inches and June recording the lowest monthly average of 0.02 inches. Per the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 for the Southern California area, 3.51 inches of rainfall shall fall in the 100 year, 24 hour storm event.

19. Winds in the Project area are generally south to southwest with a less frequent component of northerly winds (north through northwest). Calm conditions occur approximately 16.43% of the time, with the annual average wind speed being approximately 7.62 miles per hour (mph) (3.41 m/s).

Regional Topography and Drainage

20. The Project site is located on the alluvial fan sediments derived from the McCoy Mountains, located due west of the Project site. The topography slopes gently to the east-southeast at grades of less than one percent over most of the site. . Existing topographic conditions show an average slope of about one foot in 80 feet (1.25 percent) toward the east on the west side of the BSPP, and about one foot in 200 feet (0.50 percent) toward the southeast on the east side of the site. Steeper grades of 10 to 15 percent are present along the western side of the unnamed mound in Sections 5, 6 and 7, T6S R22E. A steeper grade of 50 percent was measured along the southwestern side of an unnamed knob on the northeast side of the McCoy Wash in Section 4, T6S R22E. The McCoy Wash occurs about 2,000

feet from the northeastern corner of the Project site trending northwest to southeast and runs between the mound and knob features described above.

21. The vast majority of the time, the Facility site is dry and devoid of any surface flow. When surface flow does occur, it is in response to precipitation. The Facility site is characterized by numerous dry washes originating on the flanks of the McCoy Mountains that lie to the west of the site. These washes enter the site where they either combine (southwest corner of the site) or disperse as they enter the sandier alluvial plain (northern end of the site). The conveyance capacity of the washes is limited and runoff during moderate to large events will break out of these features and be conveyed across the terrain as shallow sheet flow. In general, the drainages appear to be stable and not experiencing significant down cutting or lateral migration. Surface water flow tends to drain to the southeast towards the Colorado River.

22. The largest of these features is the McCoy Wash, which occurs about 2,000 feet from the northeastern corner of the Facility site and trends across the Facility site from northwest to southeast. Flow in the McCoy Wash can be as high as 4,000 cubic feet per second, as measured in 1976 during historic flooding in the watershed.

23. There are no permanent bodies of water located on the Facility site. There are no perennial streams in the McCoy Mountain watershed which impact the Facility site. No springs are listed in the area of the Palo Verde Mesa Groundwater Basin where the Facility is located, according to the NWIS database of Water Resources of the United States that is maintained by the USGS.

Flood Hazard

24. According to FEMA, no flood insurance rate maps have been created for the Project site and adjacent areas. Reviews of flood zone maps generated by the Riverside County Flood Control District also did not identify any flood zone maps for this area of Riverside County.

Regional Geology

25. The Facility is located in the northwestern Colorado Desert, in the alluvial-filled basin of the Palo Verde Mesa, which is part of the greater Colorado Desert Geomorphic Province. The basin is bound by the McCoy Mountains to the west, the Little Maria Mountains to the northwest, and the Big Maria Mountains to the northeast. This area has a generally low relief until near the surrounding mountains. In the region, the Palo Verde Valley is roughly equivalent to the recent historic floodplain of the Colorado River. Surficial deposits of late Miocene to Holocene age form most of the land surface in the area. Most of these deposits are composed of Quaternary Alluvium, underlain by the Pliocene Bouse Formation, which is in turn unconformably underlain by the Miocene Fanglomerate. These deposits are all underlain by bedrock consisting of metamorphic and igneous intrusive rocks of pre-Tertiary age, including Proterozoic schist and gneiss,

Paleozoic sedimentary rocks, and Mesozoic sedimentary and metavolcanic rock sequences.

Site Specific Geology

26. The Facility is sited on the uppermost of two terraces that comprise the Palo Verde Mesa. Topography at the Facility site slopes gently away from the McCoy Mountains from the west to the southeast. Ground surface elevations at the Facility site range from 830 feet above mean sea level (msl) in the west to 410 feet msl in the east.

Seismicity

27. The Project site is located in seismically active Southern California, a region that has experienced numerous earthquakes in the past. A review of the Alquist Priolo (AP) Earthquake Fault Maps and the Riverside County AP Earthquake Hazard Zone Map indicate that there are no AP fault zones present within the Project boundaries (California Division of Mines and Geology 2000, California Geological Survey 2003, 2007).

28. According to the recent geotechnical investigation of the site (Kleinfelder 2009), several inferred faults have been mapped by several authors trending northwest-southeast through the area. These faults are speculative and based on geophysical data (Rostein et al., 1976). The Blythe Graben is mapped approximately six miles northeast of the site (Stone, 2006). The Blythe Graben offsets Quaternary alluvium dated between 6 to 31 thousand years old. The tectonic significance of the Blythe Graben is unknown. The location and elevation of alluvial deposits of the McCoy wash area that have been incised by the McCoy Wash and other drainages suggest that tectonic uplift may have affected this area since the Pliocene epoch (within the last 5 million years). This uplift could be related to faulting, or regional uplift associated with the basin and range extension. Because the speculated faults in the area are not considered active, and there is no direct evidence of active faulting on the site, the risk associated with surface rupture from active faults at the site is considered very low. Regardless of whether there are faults across the site, because the Project is located in a seismically active area, all Project structures must be designed to comply with the California Building Code (CBC) and Universal Building Code (UBC) Zone 3 requirements. The CBC and UBC are considered to be standard safeguards against major structural failures and loss of life. The goals of the codes are to provide structures that will:

    a. Resist minor earthquakes without damage;

    b. Resist moderate earthquakes without structural damage but with some non-structural damage; and

    c. Resist major earthquakes without collapse but with some structural and non-structural damage.

29. The CBC and UBC base seismic design on minimum lateral seismic forces ("ground shaking"). The CBC and UBC requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes.

Ground Rupture

30. The Project site is not located within a State of California Earthquake Fault Zone designated by the Alquist-Priolo Special Studies Zone Act of 1972 (formerly known as a Special Studies Zone), an area where the potential for fault rupture is considered probable (Riverside County, 2008). In addition, no Quaternary, Sufficiently Active, or Well Defined Faults are located under or near the Site. Based on this information and engineering judgment, earthquake-induced ground rupture is not considered to be a significant hazard at the Site.

Slope Stability

31. The Site is not considered to be an area with the potential for permanent ground displacement due to earthquake-induced landslides because surface topography at and near the site is relatively flat (Riverside County, 2008). A review of the Riverside County General Plan, Safety Element, did indicate areas considered susceptible to earthquake induced landslides and rock falls in the McCoy Mountains; however, these areas are several miles from the Site and are not expected to impact the Project. Based on this information and engineering judgment, slope instability is not considered to be a significant hazard at the Site.

Erosion

32. Erosion is the displacement of solids (soil, mud, rock, and other particles) by wind, water, or ice and by downward or down-slope movement in response to gravity. Due to generally flat terrain, the Project site is not prone to significant mass wasting (gravity-driven erosion and non-fluvial sediment transport) at present. The Riverside County General Plan, Safety Element (Riverside County, 2008), indicates the Site is in an area with moderate potential for wind erosion, the off-site linears are in areas with moderate to high potential for wind erosion. Soil characteristics at the Project site allow for the potential for wind and water erosion, and significant sediment transport currently occurs across the valley axial drainage that crosses the majority of the proposed plant site. As indicated above, these valley axial deposits are characterized by subdued bar and swale topography and ongoing deposition from sheet floods. Limited sand and aeolian erosion also occurs between depositional episodes.

33. To address the management of sediment transport, erosion and sedimentation during operation, the project design will incorporate diversion berms, channels, and dispersion structures. The final design for these features will be developed during detailed design, and will include industry-standard calculations and modeling to reduce the potential for erosion or sedimentation, and to reduce the need for

ongoing maintenance. Dirt roads and exposed surfaces will be periodically treated with dust palliatives as needed to reduce wind erosion. Construction and maintenance of the proposed drainage and sediment management system at the Site is expected to reduce water and wind erosion at and downstream of the Site to less than significant levels.

Liquefaction

34. Liquefaction is a soil condition in which seismically induced ground motion causes an increase in soil water pressure in saturated, loose, uniformly-graded sands, resulting in loss of soil shear strength. As a result, the effects of liquefaction can include loss of bearing strength, differential settlement, ground oscillations, lateral spreading, and flow failures or slumping. Liquefaction occurs primarily in areas where the groundwater table is within approximately 50 feet of the surface (Riverside County, 2008). The depth to water beneath the Site is estimated to be approximately 195 feet bgs. In addition, the sandy soils encountered in the upper 100 feet beneath the Project site during geotechnical drilling are generally dense and well graded. Dense, well-graded sands are not generally considered susceptible to liquefaction. Based on this information and engineering judgment, the potential for liquefaction hazard at the Project site is considered to be low. The potential for liquefaction will be further evaluated as part of the Final Geotechnical Investigation for the Project, and if necessary, design parameters to address identified conditions will be incorporated into the detailed project design.

Differential Settlement

35. Seismically induced settlement can occur during moderate and large earthquakes in soft or loose, natural or fill soils that are located above the ground water table, resulting in differential settlement. The settlement can cause damage to surface and near-surface structures. The most susceptible soils are clean loose granular soils. Due to the expected dense to very dense nature of the near surface soils, the potential for damage due to seismically induced settlement is considered to be low at the Project site. The potential for seismically-induced settlement will be further evaluated as part of the Final Geotechnical Investigation for the Project, and if necessary, design parameters to address identified conditions will be incorporated into the detailed project design.

Collapsible Soil Conditions

36. Alluvial soils in arid and semi-arid environments can have characteristics that make them prone to collapse with increase in moisture content and without increase in external loads. Soils that are especially susceptible to collapse or hydrocompaction in a desert environment are loose dry sands and silts, and soils that contain a significant fraction of water soluble salts. Overall soil gradation observed at the Facility site trended from coarser- to finer-grained alluvial deposits as distance from the McCoy Mountains increased. The ground surface in the western portion of the Project site is dominated by areas of desert pavement with layers of flat-lying gravel overlying finer-grained sandy materials. East toward Black Creek road, the

surface becomes less dominated by desert pavement and becomes sandier. Soils observed at the Facility site have a low permeability and high runoff potential. Based on this data and engineering judgment, the site soils do not have a significant potential for hydrocompaction or collapse. The potential for hydrocompaction and soil collapse will be further evaluated as part of the Final Geotechnical Investigation for the Project, and if necessary, design parameters to address identified conditions will be incorporated into the detailed project design.

Expansive Soil

37. Expansive soil is predominantly fine grained and contains clay minerals capable of absorbing water in their crystal structure. It is often found in areas that were historically a flood plain or lake area, but can also be associated with some types of shale, volcanic ash or other deposits, and can occur in hillside areas also. Expansive soil is subject to swelling and shrinkage, varying in proportion to the amount of moisture present in the soil. As water is initially introduced into the soil (by rainfall or watering) expansion takes place. If dried out, the soil will contract, often leaving small fissures or cracks. Excessive drying and wetting of the soil can progressively deteriorate structures that are not designed to resist this effect, and can lead to differential settlement under buildings and other improvements. The surficial soils at the site generally consist of predominantly granular soils that do not contain much clay and are not subject to significant expansion hazards. The potential for expansive soils will be further evaluated as part of the Final Geotechnical Investigation for the Project, and if necessary, design parameters to address identified conditions will be incorporated into the detailed project design.

38. Based on the above information, the cut and fill slope dimensions and earthwork requirements will be adequate to address the stability of the evaporation ponds and LTU for the life of the project and no further analysis is warranted.

Regional Hydrogeology

39. The Project is located in the alluvial-filled basin of the Palo Verde Mesa. Regionally, this valley formed as a structural depression or a pull-apart basin and is composed of two broad geologic units, consolidated rocks and unconsolidated alluvium (Metzger et al 1973). The consolidated rocks consist of pre-Tertiary age igneous and metamorphic rocks, which form the basement complex, and in some locations, Tertiary-age volcanic rocks that overlie the basement complex. The consolidated rocks are nearly impermeable except for areas where fracturing or weathering has occurred. It is uncertain the extent that these rocks yield water to the alluvium. The flux of groundwater into and out of the bedrock is unknown and has not been described in the literature reviewed for this project.

Hydrostratigraphy

40. The geologic units that are important in an evaluation of the water resources in the Palo Verde Mesa area are thought to be the Miocene-age Fanglomerate, the

Pliocene-age Bouse Formation, and the fluvial deposits of the Colorado River. According to Metzger et al (1973), the Miocene-age Fanglomerate is made up chiefly of cemented gravel composed of poorly-sorted pebbles and some fine-grained material with a provenance from a nearby source. The Fanglomerate represents composite alluvial fans deposits that built up from local mountains as the fans prograded toward the valley. Because the Fanglomerate was deposited on an irregular surface having considerable local relief, it varies widely in thickness. Locally, the Fanglomerate may be absent, but at some places (e.g., Milpitas Wash area), it is at least 2,100 feet thick. Near Parker, Arizona, wells with specific capacities as much as 15 gallons per minute per foot of drawdown (gpm/ft) have been reported in the Fanglomerate (Metzger et al 1973). The Fanglomerate was not encountered during the drilling of test well TW-1, which was installed to a depth of 405 feet below ground surface (bgs) as part of the assessment of site conditions for the Application for Certification (AFC).

41. The Bouse Formation is of Pliocene age and is composed of tufa and basal limestone overlain by interbedded clay, silt, and sand (Metzger et al 1973). These sediments were deposited in an embayment of the Gulf of California. According to Metzger et al (1973), the Bouse Formation rests unconformably on the Miocene Fanglomerate and the contact between the two formations is sharp. Near Blythe, the Bouse is overlain by younger alluvium and occurs at a depth of about 600 feet beneath unit B of the alluvium. The thickness of the formation is relatively uniform throughout the area. Near the town of Parker, Arizona (about 60 miles northeast of the BSPP site), the Bouse Formation was measured at a thickness of 767 feet in well LCRP-27 that was drilled by the United States Geological Survey (USGS). In the Palo Verde Valley at well LCRP-22, the basal limestone is 5-feet thick whereas south of Cibola, Arizona, the limestone is about 100- feet thick. The interbedded sequence of clays, silt, and sand that overlie the basal limestone is by far the thickest unit in the Bouse Formation, occurring in sequences over 700 feet in the Parker-Blythe-Cibola area, according to Metzger et al (1973). With respect to water-bearing characteristics, the Bouse Formation can be divided into two zones: an upper and a lower zone (Metzger et al 1973). The upper zone is an aquifer whereas the lower zone is an aquitard. The results of pumping tests, as reported by Metzger et al (1973), indicate that specific capacities as high as 15 gpm/ft of drawdown may be obtained from the upper zone. In contrast, the best that may be expected from the lower zone is 1 to 2 gpm/ft Sediments of the Bouse Formation were not encountered during the drilling of test well TW-1 during the hydrolgeologic investigation conducted as part of the AFC.

42. The contact between the Bouse Formation and the overlying deposits of the Colorado River is erosional irregular surface. The alluviums of the Colorado River are the result of several broad periods of sediment deposition (aggradation) and erosion (degradation) by the Colorado River.

43. The fluvial deposits of the Colorado River are divided into older and younger alluvium (Metzger et al 1973). They defined the younger alluvium as the sediment deposit representing only the youngest aggradation by the Colorado River, whereas older alluviums are the deposits of several degradations and

aggradations. In well 6S/23E-32E1, located approximately 7.5 miles east of the BSPP site, the bottom of the Colorado River fluvial deposits reportedly occurs to a depth of about 506 feet bgs.

44. The older alluvium is comprised of a basal-cemented gravel overlain by inter-layered sequences of sand and pebbly sand, with lenses of cobble gravels and silt and clay. The gravels consist of quartzite, limestone, and chert clasts derived from local mountain sources. In the Blythe area, this sequence has been measured as much as 600 feet thick. The lenses of cobble-gravel beds yield copious amounts of water according to Metzger et al (1973). The contact between the older and younger alluvium is between the present floodplain of the Colorado River and the bordering terraces, alluvial slopes, or bedrock.

45. The younger alluvium is composed of a basal gravel overlain by sand. The younger alluvium is generally from 90 to 125 feet thick above its basal gravel (Metzger et al 1973). The basal gravel may be absent locally in the Palo Verde Mesa, but the alluvium is continuous throughout the flood plain

On-site Drainage

46. On-site storm water management for the completed facility will be provided through the use of source control techniques, site design and treatment control. The storm flows from the solar collector arrays will be treated through the use of swales, and ditches.

47. Locations within the power block for the potential of chemical or oil releases will be fully contained. Rainfall within the containment areas will be allowed to evaporate or will be drained through an oil water separator. Locations within the power block where “contact” storm water may occur will be contained within a system of curbs or trenches. Drains from these curbed areas or containment trenches will be directed to an oil water separator. The oil separated and captured within the oil water separator will be trucked off-site to a licensed disposal/recycling facility. Clean water discharged from the oil water separator will be used on Project site by discharging it to the cooling tower or to the raw water storage tank. The water discharge from the oil water separator will not be discharged to the storm water system.

Facility Operational Water

48. The Project will be dry cooled. The Project’s various water uses include water for solar collector mirror washing, makeup for the SSG feed water, dust control, water for cooling plant auxiliary equipment, potable water and fire protection. Water needs for the Project will be met by use of groundwater pumped from wells on the Project site. The estimated water supply need for the Project operation is approximately 600 acre-feet per year.

Evaporation Ponds (Design and Installation Sequence)

49. The containment strategy for the evaporation ponds is summarized as follows:

    a. Meet or exceed regulatory requirements for containment of waste fluids;

    b. Select materials that are compatible with the physical, chemical and thermal characteristics of the water and contaminated soils being contained;

    c. Protect against physical damage to the containment layers by including protective layers into the designs of each containment facility;

    d. Allow for occasional removal of contained media without otherwise damaging the integrity of the containment systems; and

    e. Include the ability to monitor the integrity of the containment system, to transfer fluids out of permeable layers on a continuous basis, and to transfer fluids from one evaporation pond to another.

50. Each 4.0 acre evaporation pond has a proposed design depth of five feet which incorporates:

    a. Rotating pond use every 4 months over the life of the project;

    b. 2 feet of operational depth;

    c. 1 foot of sludge build up over 30 years; and

    d. 2 feet of freeboard.

51. The containment design for the evaporation ponds, from the surface of the evaporation ponds downwards, consists of the following:

    a. A hard surface / protective layer;

    b. A primary 60 mil high density polyethylene (HDPE) liner;

    c. An interstitial leak detection system (LDS) comprising a drainage layer and piping;

    d. A secondary 40 mil HDPE liner; and

    e. A 2 foot thick compacted silty-sand base.

52. The hard surface / protective layer provides protection against accidental damage to the HDPE liners which could be caused by burrowing animals, falling objects, varying climatic conditions and worker activities. Second, the hard surface / protective layer will allow for occasional removal of the precipitated solids within the evaporation ponds. Various hard surface media such as reinforced concrete, roller compacted concrete, revetments, or combinations of these media will be assessed prior to the selection of the preferred option.

53. High density polyethylene (HDPE) was selected as the preferred fabric for the primary and secondary liners for the following reasons:

    a. It is chemically resistant to potentially high concentrations of dissolved salts;

    b. It is very durable during installation;

    c. It is strong and possesses desirable stress-strain characteristics; and

    d. It is the most common synthetic liner material and as such there is a broad base of practical experience associated with the installation of HDPE amongst construction contractors.

54. A 60 mil upper liner was selected to provide appropriate balance between strength and ductility characteristics, which is very important during liner installation. A non-woven geotextile will be installed on top of the 60 mil liner to act primarily as a protective layer. A 40 mil lower liner was selected for the lower and secondary liner to provide slightly better ductility and handling characteristics during installation, as strength is of lesser importance for the secondary liner. HDPE possesses large thermal expansion and contraction characteristics, and exhibits stress when liner temperature exceeds 122 ^{o}F. The temperature of the blowdown water is not expected to exceed 122^{o}F.

55. A 2 foot thick basal layer of compacted silty sand is included in the design profile to protect the underlying groundwater in the unlikely event that both synthetic liner materials are punctured during construction or operation of the evaporation ponds. This base layer also serves to provide a smooth, competent surface to support the overlying synthetic liners and leak detection system layers.

Leak Detection System

56. A drainage layer is included in the design profile for the evaporation ponds which consists of a granular drainage layer with perforated piping to collect and convey fluids to an extraction riser in a leak detection sump (LDS). Geocomposite drainage materials, consisting of HDPE geonet and nonwoven geotextiles heat bonded to one or both sides, may be used in conjunction with or as a substitute for the granular drainage layer on slopes.

57. The water collected in the LDS will drain by gravity to a unique monitoring well that is constructed for each of the leak collection layer. Automated pneumatic, solar-powered pumping systems are included in the design of each of these monitoring wells to automatically return water to that pond, which in turn minimizes the hydraulic pressures across the secondary liners and therefore the risk of impact to groundwater quality.

58. The base of the evaporation pond leak detection and collection layer will slope at a minimum inclination of 1 percent to a leak collection trench. The trench will contain

screened sand (with no fines) and a perforated pipe that will slope at a minimum inclination of 3/4 percent towards a leak detection and collection sump, located at the lowest point in the pond. The water in the collection sump will drain by gravity to a monitoring well that is constructed for each evaporation pond (one well per pond). Automated pneumatic pumping systems in the monitoring wells will automatically return water collected in the sump to that evaporation pond, which in turn minimizes the hydraulic pressures across the secondary liners and, therefore, minimizes the risk of leakage through the secondary liner. Leakage rates will be measured using a flow totalizer.

59. The collection sump, pipe, and monitoring well, will include prefabricated and field-fabricated HDPE components with water tight, extrusion welded and wedge-welded seams and penetrations. The liner system will be installed in accordance with current practices. Destructive and non-destructive testing procedures will be used to verify sump and penetration tightness and continuity.

60. This design is consistent with CCR Title 27, Section 20340, which requires an LDRS between the liners for the evaporation ponds.

61. The side slopes around the evaporation ponds will contain the same liner system as the base of the ponds, except that leak collection pipes will not be located on the pond side slopes.

62. The berms shall be covered with a minimum 6-inch thick road base or approved equivalent. The top of the berms will be a minimum of 2 feet above the surrounding grade to prevent potential inflow of stormwater.

63. The wastewater will come into contact with the hard surface/protective layer. The media for this layer will either be roller-compacted concrete or an approved equivalent alternate. All final media selection will be compatible with the wastewater by using quality concrete with maximum chemical resistance (specifications will be provided to the concrete manufacturer to ensure proper mix selection).

64. If there is leakage in the evaporation pond, the wastewater will come into contact with the primary/secondary liner. HDPE is chemically resistant to saline solutions and long-term contact between the wastewater in the evaporation ponds and the HDPE liner system will not compromise liner integrity.

65. The hard surface/protective layers, liner system, and base layer will have the ability to withstand the dissolved solids content of the water without degradation. These systems will not fail due to pressure gradients from physical contact with the wastewater and residue or undergo chemical reactions or degradation.

66. The containment construction process will follow these general steps:

    a. Prior to construction, the topsoil and subsoil covering the area will be stripped and stockpiled.

b. Placement and compaction of the silty sand base material;

c. Installation of the carrier pipe for the moisture detection (neutron probe) system beneath the base of the ponds;

d. Construction of finish grading to sub grade, as needed, and excavation of the leak collection trench and detection/collection sumps.

e. Scarification, moisture conditioning, compaction, proof rolling and testing of subgrade materials;

f. Installation of secondary HDPE liner;

g. Installation of leak detection layer, sump, and leak extraction risers;

h. Installation of primary HDPE liner;

i. Installation of the non-woven geomembrane liner;

j. Installation of granular fill;

k. Installation of liner protection layers; and

l. Hard surface placement.

Waste Classification

67. Wastewater from several processes within the Facility will be piped to two 4.0-acre evaporation ponds per Unit (total combined area of 8 acres per Unit) for disposal. The pond area provides sufficient evaporative capacity to dispose of the anticipated wastewater stream, and allows for one pond to be taken out of service for up to approximately three years for cleaning, potential future maintenance, and repair without impacting the operation of the plant. Raw water for the Facility is supplied from groundwater wells. Discharge into the evaporation ponds are from two sources:

    a. High pH RO (Reverse Osmosis Concentrate; and

    b. Stormwater runoff from the proposed bioremediation and land farm units used to treat soil affected spills by Heat Transfer Fluid (HTF).

Wastewater Discharge

68. The estimated concentrations of chemical constituents in the wastewater discharge to the evaporation ponds are provided in the **Table 1**, Raw Water Quality and Estimated Chemistry of Wastewater Flows. The total concentrations of chemical constituents estimated in the evaporation pond residue that will accumulate in the ponds during operation are provided in **Table 2**.

69. Classification of wastewater and evaporation pond residue is summarized in the Classification of Wastewater and Evaporation Pond Residue **Table 3** below.

70. Testing of this material will be conducted as part of the facility monitoring program to verify this characterization. The evaporation pond residue accumulated in the ponds is non hazardous; however, it does contain pollutants which could exceed water quality objectives if released, or that could be expected to affect the beneficial uses of waters of the state. Therefore, the evaporation pond residue is classified as a “designated waste.”

Evaporation Residue

71. During the 30-year operating life of the Project, it is estimated that up to 1 foot of residue may accumulate in the bottoms of the evaporation ponds that consists of precipitated solids from the evaporated wastewater. The total amount of accumulated residue is estimated to be approximately 23,000 tons. The predicted chemical makeup of the residue, based on information about the raw water chemistry and knowledge of the water use and treatment processes at the Project, is summarized in **Table 3**, Estimated Chemistry of Evaporation Pond Residue.

Land Treatment Unit

72. In compliance with Table 2.1 in CCR Title 27, Chapter 3, Subchapter 2, Article 2, Section 20210, solid designated wastes will be managed in full containment in a Class II LTU with a single liner system. The LTU will be constructed to be above the level of a 100-year storm event and designed to meet seismic hazard criteria. In addition, the base of the LTU will have a greater than 5-foot separation between it and the underlying groundwater.

73. The LTU will not incorporate a liner containment system or leak detection and removal system, but will be constructed with a prepared base consisting of two feet of compacted, low permeability, lime-treated material. This base will serve as a competent platform for land treatment activities, and will serve to slow the rate of surface water infiltration in the treatment area. The compacted lime-treated and native soil beneath the LTU is designated as a “treatment zone” to a depth of five feet. Although the LTU will be taking vehicle traffic, no hard surface will be required, as there is no liner system to protect. A staging area is allocated in the LTU for storage of HTF-impacted soils while they are being characterized. Soil characterized as hazardous will be removed from the site; therefore, no additional liner system is required in the LTU to cater for the hazardous waste.

74. The LTU will be surrounded on all sides by a 2-foot high compacted earthen berm with side slopes of approximately 3:1 (horizontal: vertical). These berms will control and prevent potential inflow (run on) of surface storm water into the LTU or runoff of storm water from the unit.

a. The Project LTU is sized based on data from an existing solar farm that uses an LTU to bioremediate HTFimpacted soil. The basis is summarized below:

b. HTF-impacted soil is generated at a rate consistent with existing solar farm experience. Kramer Junction is a 150 MW facility that generates an average of 500 cubic yards (cyd) of HTF-impacted soil per year (DTSC correspondence, 1995). This rate is ~ 3.3 cyd/year/MW

c. Applying the Kramer Junction experience to the 1000 MW Blythe facility, the Blythe facility is estimated to generate ~3,332 cyd/year of HTF-impacted soil.

d. HTF-impacted soil is treated in 6-inches thicknesses, so, on average, 180,000 square feet or 4.1 acres is needed for HTF-impacted generated per year

e. The LTU will be used for either placement of HTF-impacted soil or treatment of HTF-impacted soil. That is at any one time the LTU is used to place material to be treated as it is generated or being used for soil treatment. HTF-impacted soil treatment is estimate to take 1 to 4 months to complete bio remediation; however the design of the LTU will allow soil placed at the beginning of the year to have up to twelve months to complete bioremediation and removal.

75. To address above average spill events, Kramer Junction has additional capacity in the LTU or a factor of safety for HTF-impacted soil treatment. Kramer Junction has a capacity to treat 1,944 cyd/year and generates an average of 500 cyd/year of HTF-impacted soil, so the facility has ~ a 3.9 factor of safety. Applying this factor of safety to Blythe, the total area estimated for LTU is ~700,000 square feet or 16 acres.

76. Treatment of HTF-impacted soil in the LTU will involve moisture conditioning and may involve addition of nitrogen and phosphorous nutrients (i.e., fertilizers) as needed to stimulate consumption of HTF by the indigenous bacteria. The HTF-impacted soil will be moisture conditioned and turned periodically as needed to enhance aeration, promote breakdown of HTF by the indigenous bacteria and/or to control dust emissions. Permanent or portable irrigation sprinklers will supply water to the area for dust control and to assist in treatment.

77. Treatment piles may be covered by plastic sheeting as needed to enhance temperature and moisture retention characteristics, and as needed to control storm water contact, odors and dust emissions.

78. The base layer construction process will follow these general steps:

a. Prior to construction, the LTU will be stripped, grubbed and cleared of topsoil;

b. General excavation and grading to sub grade will take place as needed;

c. Scarification and moisture conditioning of sub grade materials will take place; and

d. Placement, moisture conditioning, lime treatment, and compaction of native clayey silt material to form the base and perimeter berms will be completed before proof rolling after finish grading.

79. The LTU pad and berm construction will use standard cut and fill techniques. Native clayey silt material will be used to construct the pad and berms. The clayey silt material will be moisture conditioned and treated with at least 2 percent quicklime to achieve an R-Value of at least 40 to 50. Treatment and compaction of the material will be conducted using standard commercial lime treatment methods and equipment and compacted in lifts using a sheeps foot roller. The lime treated layer will be compacted to a minimum of 95 percent of the maximum dry density as determined by American Standard for Testing and Materials (ASTM) D1557. Field testing of the density of the soil will be performed at regular intervals. Compaction results will be recorded. After finish grading, the surface of the LTU pad and berms will be proof rolled.

Waste Classification

80. The HTF-affected soils will be characterized as hazardous or non hazardous waste prior to determination of whether the material can be treated at the LTU or must be removed for off-site disposal. Therefore, HTF affected soils will be relocated to a temporary staging area in the LTU and characterized consistent with U.S. Environmental Protection Agency (EPA) protocols. Soil sample of excavated HTF-affected soil will be collected in accordance with the EPA's current version of the manual "Test Methods for Evaluating Solid Waste" (SW-846) and the waste material will be characterized in accordance with State and Federal requirements. Soil samples will be analyzed for HTF constituents (Biphenyl and Diphenyl Ether) using modified EPA Method Modified 8015.

81. Prior to operation of the LTU and initiation of any on-site remediation of HTF, the waste stream will be characterized and a waste classification determination rendered by the DTSC. Initially, in addition to sampling for HTF, soil samples will also be analyzed for ignitability and toxicity using appropriate State and Federal methods to characterize the waste as hazardous or non-hazardous. Once a sufficient data set has been accumulated to allow characterization of the material as hazardous or non-hazardous waste based on HTF content and generator knowledge, the DTSC will be petitioned for a determination of waste classification for HTF-affected soils generated at the facility. Following this determination, subsequent samples will only be analyzed for HTF to determine disposition of the waste either for remediation or for transportation and disposal off site. If the soil is characterized as a hazardous waste, the impacted soils will be transported from the site by a licensed hazardous waste hauler for disposal at a licensed hazardous waste landfill or treatment storage and disposal facility (TSDF).

82. Based on the classification practice and management of similar waste stream at the Kramer Junction Solar Electric Generating System (SEGS) facility in Kern County, it is anticipated that soil containing 10,000 mg/kg HTF or more will be

managed as hazardous waste, and that soil containing less than 10,000 mg/kg HTF will be non-hazardous waste and can be managed at the site. At the Kramer Junction facility, the DTSC issued a letter dated April 4, 1995, stating that soil contaminated with HTF "poses an insignificant hazard" and classifies the waste as non-hazardous for soils with a concentration of less than 10,000 mg/kg HTF pursuant to CCR Title 22, Section 66260.200(f). Given that the formulation of HTF has not changed significantly since this determination, it is anticipated that future waste characterization at BSPP will yield a similar result although the DTSC has indicated that this decision will be made on a project specific basis and the Kramer Junction classification does not necessarily ensure the same classification for the BSPP.

83. All HTF-affected soil classified as a hazardous waste will be removed for the site for proper off-site disposal; therefore the material in the LTU will be managed as a non-hazardous "designated waste" as defined in CCR Title 23, Chapter 15, Section 2522. Based on waste discharge requirements for similar sites, soil containing HTF in concentrations less than 100 mg/kg will not be regulated as a waste and could be reused as fill on site.

Waste Management

84. The LTU will be used to treat HTF-affected soil at various concentrations. Spills of HTF will be cleaned up within 48 hours and affected soil will be moved to a temporary staging area in the LTU where it will be placed on 60-mil plastic and covered with plastic sheeting pending receipt of analytical results and characterization of the waste material. As possible, free liquids will be removed using a vacuum truck. The liquids will be filtered and reused to the extent possible and reintroduced into the process. Filtrate that cannot be reused will be characterized, as appropriate (though will likely be managed as hazardous waste, as the concentration in the filtrate will likely be more than 10,000 mg/kg HTF).

85. No HTF-affected soils characterized as hazardous waste will be disposed or treated on site. As stated previously, it is anticipated that soil containing 10,000 mg/kg HTF or more will be managed as hazardous waste, and that soil containing less than 10,000 mg/kg HTF will be managed at the site as non-hazardous waste. If the soil is characterized as a non-hazardous waste, it will be spread in the LTU for bioremediation treatment. In general, within the LTU, more highly contaminated soil will be covered with plastic sheeting to prevent contact with storm water and to control potential odors and emissions, as well as for moisture and temperature retention. Once the soil has been treated to a concentration of less than 100 mg/kg HTF, it will be moved from the LTU to another portion of the site until it is reused at the Project site as fill material.

86. Based on available operation data from other sites, it is anticipated that approximately 1,666 cubic yards (on average) of HTF-affected soil may be treated per year. Larger or smaller quantities could be generated during some years, depending on the frequency and size of leaks and spills.

87. A Spill Prevention, Control, and Countermeasure (SPCC) Plan will be developed for the Project (refer to Section 13.4 for details). Periodically, equipment failures in and around mirror fields are expected at the Project that may result in spills of HTF onto soil.

88. Excess wastewater or rain fall may occasionally accumulate in the LTU. The LTU has been constructed with 2-foot high berms such that storm water will not drain into or from the LTU. Based on the frequency of storms in the area, it is anticipated accumulation of rainwater within the containment would occur on a yearly basis. Water that accumulates within the LTU will be sampled for HTF and amendments as described in Section 12. If HTF is not detected above the practical quantitation limit (PQL) and amendment concentrations (i.e., nitrate, phosphate, TDS) are at or near background groundwater concentrations and below State of California primary or secondary maximum contaminant levels the water may be reused in the plant process. If HTF is detected and amendment concentrations exceed background or drinking water standards the waste will be properly disposed of at a licensed TSDF.

Hazardous Waste

71. There will be a variety of chemicals stored and used during construction and operation of the project. The storage, handling, and use of all chemicals will be conducted in accordance with applicable laws, ordinances, regulations, and standards.

72. Hazardous materials will be stored in proper containers in material yards and designated construction areas. Cleanup materials (spill kits) will also be stored in these areas. Fuel, oil, and hydraulic fluids used in on-site vehicles will be transferred directly from a service truck to construction equipment and will not otherwise be stored on site.

73. Designated, trained service personnel will perform fueling either prior to the start of the workday or at completion of the workday. Service personnel and construction contractors will follow SOPs for filling and servicing construction equipment and vehicles.

74. Any HTF impacted soil classified as hazardous will be removed from the LTU staging area after the initial characterization. The evaporation ponds will not contain hazardous wastewater or sludge as it is illegal to discharge hazardous waste into surface impoundments under the Toxic Pits Cleanup Act of 1984.

Basin Plan

75. The Water Quality Control Plan for the Colorado River Basin Region of California (Basin Plan) was adopted on November 17, 1993, and designates the beneficial uses of ground and surface water in this Region.

76. The Basin Plan designates beneficial uses for surface waters in each watershed of the Colorado River Basin region. Beneficial uses of surface waters within the Facility area and vicinity that could be impacted by the Facility include:

    a. Agricultural use

    b. Municipal use

    c. Industrial use

    d. Recreational use

    e. Groundwater recharge

    f. Wildlife habitat

    g. Preservation of Rare, Threatened, or Endangered Species

77. The beneficial uses of ground water in the Imperial Hydrological Unit are:

    a. Municipal Supply (MUN)

    b. Industrial Supply (IND)

    c. Agricultural supply

Monitoring Parameters

78. Based on the chemical characteristics of the projected discharges to the evaporation ponds from wastewater, the following list of monitoring parameters are required. These specific parameters are selected because they provide the best distinction between the wastewater and the groundwater in the Project area that can be used to differentiate a potential release that could change the chemical composition of the groundwater.

    a. <u>Cations:</u> Antimony, Arsenic, Barium, Cadmium, Calcium, Total Chromium, Cobalt, Copper, Lead, Mercury, Nickel, Selenium, Zinc;

    b. <u>Anions</u>: Chloride and Sulfate; and

    c. <u>Other</u>: HTF, Total Dissolved Solids, Specific Conductivity, and pH.

California Environmental Quality Act (CEQA)

79. The California Energy Commission (CEC) is the lead agency under the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) for all thermal power plants with power ratings of 50 MW or more. The CEC's power plant licensing process is a

CEQA-equivalent process. The CEC will coordinate reviews and approvals with the regulatory agencies to ensure that the proposed project meets CEQA requirements. This includes obtaining these WDRs from the staff of the Regional Board. The CEC will certify this project and will include these WDRs as conditions of certification in accordance with the Warren-Alquist Act.[1]

Monitoring and Reporting Program

80. The monitoring and reporting requirements in the Monitoring and Reporting Program (Appendix C), and the requirement to install groundwater monitoring wells, are necessary to determine compliance with these WDRs, and to determine the Facility's impacts, if any, on receiving water.

[1] The Warren-Alquist State Energy Resources Conservation and Development Act is the authorizing legislation for the California Energy Commission. The Act is codified at Public Resources Code (PRC) Section 25000 et seq.. PRC Section 25500 establishes the Commission's authority to certify all sites and related facilities for thermal power plants with power ratings of 50 megawatts or more. The section further declares that "the issuance of a certificate by the commission shall be in lieu of any permit, certificate, or similar document required by any state, local or regional agency, or federal agency to the extent permitted by federal law, for such use of the site and related facilities, and shall supersede any applicable statute, ordinance, or regulation of any state, local, or regional agency, or federal agency to the extent permitted by federal law."

Table 1: Raw Water Quality and Predicted Chemistry of Wastewater Streams

	Supply Water[1]	**Wastewater To Evaporation Pond**[2]	**STCL**[3]	**TCLP**[4]
24-Average Flow Rate (GPM)		8.748	---	---
Peak Operation Flow Rate		14.636	---	---
Constituent	(mg/L)	(mg/L)	(mg/	(mg/
CATIONS				
Calcium	287	369	---	---
Magnesium	60	185	---	---
Sodium	457	14818	---	---
Potassium	11	198	---	---
ANIONS				
M-Alkinity			---	---
Sulfate	970	17918	---	---
Chloride	559	10325	---	---
Nitrate	1	12	---	---
Silicon Dioxide	15	277	---	---
GENERAL WATER QUALITY				
Bicarbonate			---	---
Carbonate			---	---
OH		2	---	---
P-Alkalinity				
pH	7.2		---	---
Spec Cond	3338	61676	---	---
TDS	2,170	40089	---	---
Total Hardness (CaC03)				
Turbidity	1.6	136		
Total Phosphate	0.3		---	---
Fluoride	1.3	24	180	---
Barium	0.017	0	---	---
Iron	0.123	2	---	---
Total Suspended Solids	1	0	---	---
Biological Oxygen Demand	1	0	---	---
TRACE METALS				
Boron	1.41	26.042	--	--
Copper	0.01	0.175	25	--
Molybdenum	0.031	0.569	350	--
Vanadium	0.005	0	24	--
Zinc	0.235	0.092	250	--

NOTES:
1 - Water quality data from AFC Table Water 4, AECOM, 2009
2 - Water Quality data from Kiewit Evaporation Pond Preliminary Design, Operations and Maintenance Plan, April 2010
3 - STLC = Soluble Threshold Limit Concentration, Regulated by CCR Title 22, Division 4.5, Article 3, Section 66261.24
4 - TCLP = Toxicity Characteristics Leaching Procedure; Regulate under 40 CFR Section 261.24

Source: AECOM ROWD May 14, 2010

Table 2: Estimated Chemistry of Evaporation Pond Residue

	Concentration in Evaporation Pond	Total Residue Mass After 30 Years	Concentration in Residue		STLC	TTLC	TCLP
	ppm	lbs	% or ppm		mg/L	mg/kg	mg/L
Aluminum	0.00	0	0	ppm	-	-	-
Arsenic	0.00	0	0	ppm	5.0	500	5.0
Barium	0.305	1,401	6.81	ppm	-	-	-
Boron	26.04	119,740	582.01	ppm	-	-	-
Calcium	369	1,698,481	0.83	%	-	-	-
Chloride	10325	47,474,130	23.1	%	-	-	-
Copper	0.18	809	3.93	ppm	-	-	-
Fluoride	24	110,397	536.60	ppm	180	18000	-
Iron	2.3	10,445	50.77	ppm	-	-	-
Magnesiu	185	849,267	0.41	%	-	-	-
M-	573	2,634,625	1.28	%	-	-	-
Molybdenu	0.57	2,616	12.72	ppm	-	-	-
Nitrate	12	54,204	263.47	ppm	-	-	-
Phosphate	6	27,588	134.09	ppm	-	-	-
Potassium	198	911,395	0.44	%	-	-	-
Selenium	0	0	0.00	ppm	1.0	100	1.0
Silica	277	1,274,858	0.62	%	-	-	-
Sodium	14818	68,131,223	33.1	%	-	-	-
Sulfate	17918	82,386,733	40.0	%	-	-	-
Total	6	26,428	128.46	ppm	-	-	-
Vanadium	0.09	423	2.06	ppm	-	-	-
Zinc	4.34	19,955	96.99	ppm	250	5000	-
TDS	44,745	205,734,718	100	%	-	-	-

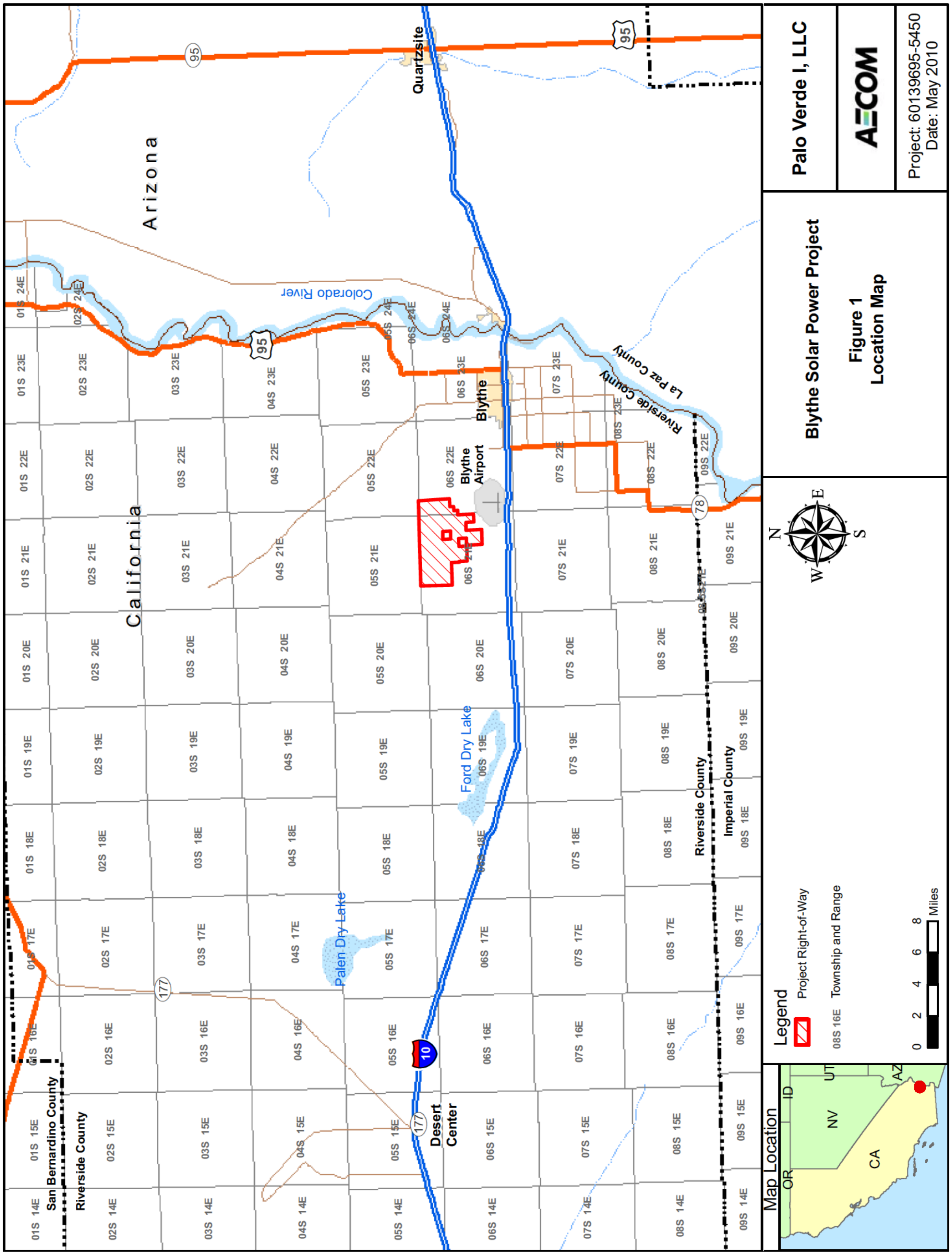
Notes: Where a constituent was reported as "ND" the amount in the supply water was assumed to be zero (0) ppm. Reporting those constituents at their lower detection limit would change the results above.

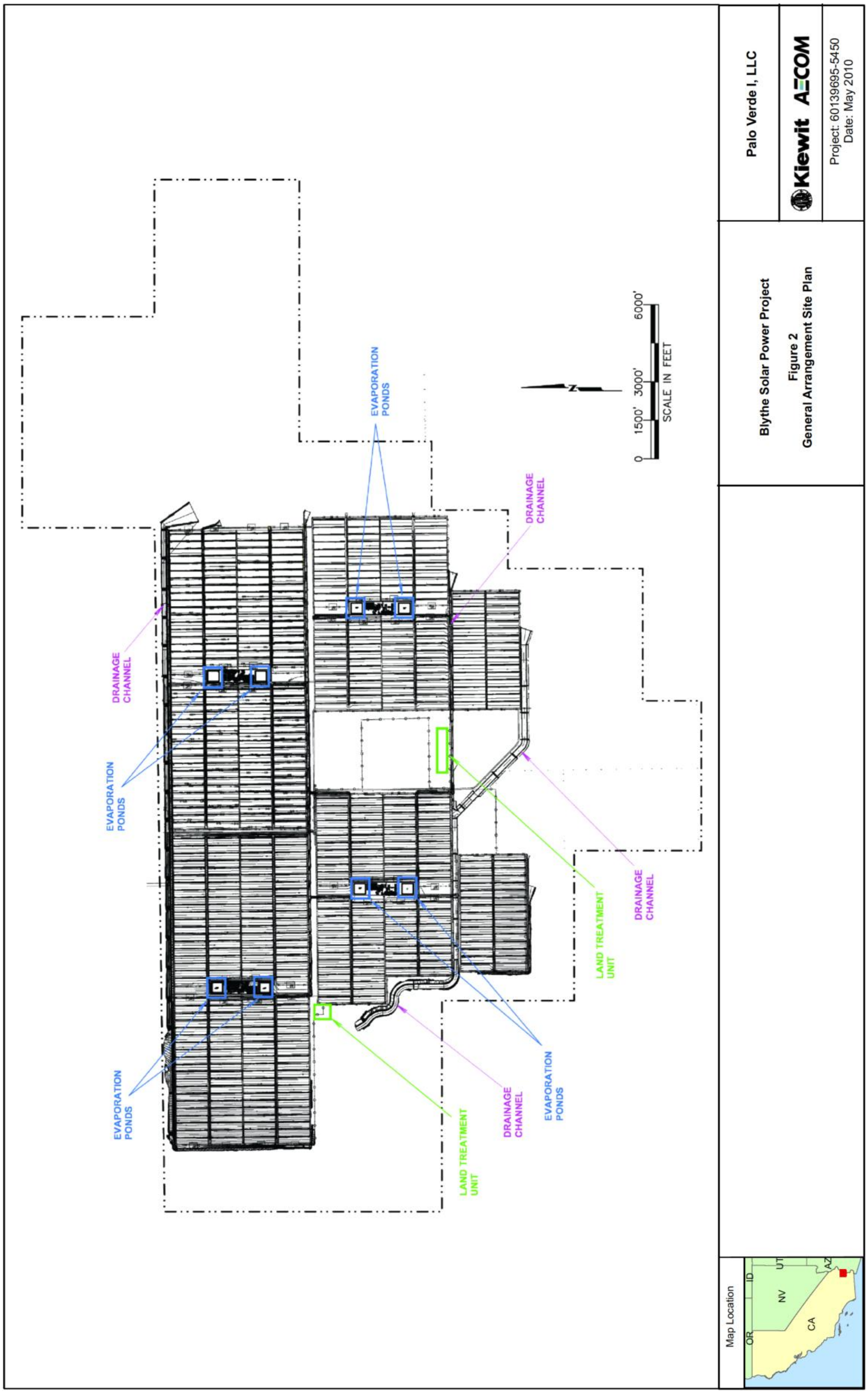
Source: AECOM ROWD May 14, 2010

Table 3 Classification of Wastewater and Evaporation Pond Residue

Waste Stream	Waste Stream Compared To	Regulation	Waste Stream Characteristic	State & Federal Classification	CWC Section 13173 Classification[1]
Wastewater	STLC	CCR Title 22, Chapter 11, Division 4.5, Article 3, Section 66261.24 "Characteristics of Toxicity"	<STLC	Non-hazardous	Designated waste
	TCLP	Code of Federal Regulations (CFR) Part 261, Section 261.24	<TCLP	Non-hazardous	Designated waste
Evaporation Pond Residue	STLC	CCR, Title 22, Chapter 11, Division 4.5, Article 3, Section 66261.24 "Characteristics of Toxicity"	<STLC	Non-hazardous	Designated waste
	TTLC	CCR, Title 22, Chapter 11, Division 4.5, Article 3, Section 66261.24 "Characteristics of Toxicity"	<TTLC	Non-hazardous	Designated waste
	TCLP	Code of Federal Regulations (CFR) Part 261, Section 261.24	<TCLP	Non-hazardous	Designated waste

Source: AECOM ROWD May 14, 2010


Palo Verde I, LLC
AECOM
Project: 60139695-5450
Date: May 2010
Blythe Solar Power Project
Figure 1
Location Map
Legend
Project Right-of-Way
08S 16E Township and Range
0 2 4 6 8 Miles
Map Location
Arizona
California
Colorado River
Quartzsite
Blythe
Blythe Airport
Desert Center
Ford Dry Lake
Palen Dry Lake
Riverside County
Imperial County
San Bernardino County
La Paz County


EVAPORATION PONDS
DRAINAGE CHANNEL
LAND TREATMENT UNIT
0 1500' 3000' 6000'
SCALE IN FEET
N
Map Location
OR
ID
NV
UT
CA
AZ
Blythe Solar Power Project
Figure 2
General Arrangement Site Plan
Palo Verde I, LLC
Kiewit AECOM
Project: 60139695-5450
Date: May 2010

SOIL AND WATER
APPENDIX C

Waste Discharge Requirement
Requirements for Waste Discharge

SOIL AND WATER RESOURCES – APPENDIX C

REQUIREMENTS FOR WASTE DISCHARGE— Palo Verde Solar I, LLC, Owner/Operator, Blythe Solar Power Project, Riverside County

A. Discharge Specifications

1. The treatment or disposal of wastes at this Facility shall not cause pollution or nuisance as defined in Sections 13050 of Division 7 of the California Water Code (CWC).

2. The Discharger will maintain the monitoring wells in good working order at all times. Well maintenance may include periodic well re-development to remove sediments.

3. Thirty days prior to introduction of a new waste stream into the evaporation ponds, the Discharger must receive approval from the Regional Board's Executive Officer.

4. Waste material shall be confined or discharged to the evaporation ponds and LTU.

5. Prior to drilling a new well or abandoning a well at the Facility, the Discharger shall notify, in writing, the Regional Board's Executive Officer of the proposed change.

6. Containment of waste shall be limited to the areas designated for such activities. Any revision or modification of the designated waste containment area, or any proposed change in operation at the Facility that changes the nature and constituents of the waste produced must be submitted in writing to the Regional Board's Executive Officer for review and approval before the proposed change in operations or modification of the designated area is implemented.

7. Any substantial increase or change in the annual average volume of material to be discharged under this order at the Facility must be submitted in writing to the Regional Board's Executive Officer for review and approval.

8. If any portions of the evaporation ponds are to be closed, the Discharger shall notify the Regional Board's Executive Officer at least 180 days prior to beginning any partial or final closure activities.

9. Fluids and/or materials discharged to and/or contained in the evaporation ponds shall not overflow the ponds.

10. Prior to the use of new chemicals for the purposes of adjustment or control of microbes, pH, scale, and corrosion of the cooling tower water and wastewater, the Discharger shall notify the Regional Board's Executive Officer in writing.

11. For the liquids in the evaporation ponds, a minimum freeboard of two (2) feet shall be maintained at all times.

12. Final disposal of residual waste from cleanup of the evaporation ponds shall be accomplished to the satisfaction of the Regional Board's Executive Officer upon abandonment or closure of operations.

13. The evaporation ponds shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods having a predicted frequency of once in 100 years.

14. Prior to removal of solid material that has accumulated in the concrete evaporation ponds, an analysis of the material must be conducted and the material must be disposed of in a manner consistent with that analysis and applicable laws and regulations.

15. Conveyance systems throughout the Facility area shall be cleaned out at least every 90 days to prevent the buildup of solids.

16. Pipe maintenance and de-scaling activities that include hydroblasting and/or sandblasting shall be performed within a designated area that minimizes the potential for release to the environment. Waste generated as a result of these activities shall be disposed of in accordance with applicable laws and regulations. Water from the hydroblasting process shall be conveyed to the evaporation ponds.

17. Public contact with wastewater shall be precluded through such means as fences, signs, or other acceptable alternatives.

18. The evaporations ponds shall be managed and maintained to ensure their effectiveness, in particular,

19. Implementation of erosion control measures shall assure that small coves and irregularities are not created.

20. The liner beneath the evaporation ponds shall be appropriately maintained to ensure its proper functioning.

21. Solid material shall be removed from the evaporation ponds in a manner that minimizes the likelihood of damage to the liner.

22. Ninety days prior to the cessation of discharge operations at the Facility, the Discharger shall submit a workplan, subject to approval of the Regional Board's Executive Officer, for assessing the extent, if any, of contamination of natural geological materials and waters of the Palo Verde Mesa Groundwater Basin by the waste. One hundred twenty days following workplan approval, the Discharger shall submit a technical report presenting results of the contamination assessment. A California Registered Civil Engineer or Certified Engineering Geologist must prepare the workplan, contamination assessment, and engineering report.

23. Upon ceasing operation at the Facility, all waste, all natural geologic material contaminated by waste, and all surplus or unprocessed material shall be removed from the site and disposed of in accordance with applicable laws and regulations.

24. The Discharger shall establish an irrevocable bond for closure in an amount acceptable to the Regional Board's Executive Officer or provide other means to ensure financial security for closure if closure is needed at the discharging site. The closure fund shall be established (or evidence of an existing closure fund shall be provided) within six (6) months of the adoption of this Order.

25. Surface drainage from tributary areas or subsurface sources, shall not contact or percolate through the waste discharged at this site.

26. The Discharger shall implement the attached Monitoring and Reporting Program, Appendix D, and revisions thereto, in order to detect, at the earliest opportunity, any unauthorized discharge of waste constituents from the Facility, or any impairment of beneficial uses associated with (caused by) discharges of waste to the brine pond.

27. The Discharger shall use the constituents listed in the attached Monitoring and Reporting Program, Appendix D, and revisions thereto, as "Monitoring Parameters".

28. The Discharger shall follow the Water Quality Protection Standard (WQPS) for detection monitoring established by the Regional Board. The following are parts of WQPS as established by the Regional Board's Executive Officer:

    a. The Discharger shall test for the monitoring parameters and the Constituents of Concern (COCs) listed in the Monitoring and Reporting R7-2010-0xxx and revisions thereto.

    b. Concentration Limits – The concentration limit for each monitoring parameter and constituents of concern for each monitoring point (as stated in the Detection Monitoring Program), shall be its background valued as obtained during that reporting period.

29. All current, revised, and/or proposed monitoring points must be approved by the Region Board's Executive Officer.

30. Water used for the process and site maintenance shall be limited to the amount necessary in the process, for dust control, and for Facility cleanup and maintenance.

31. The Discharger shall not cause or permit the release of pollutants, or waste constituents, in a manner which could cause or contribute to a condition of contamination, nuisance, or pollution to occur.

32. The Discharger must develop and implement a Hazardous Materials Business Plan (HMBP), which will include, at a minimum, procedures for:

    a. Hazardous materials handling, use, and storage;
    b. Emergency response;
    c. Spill control and prevention;
    d. Employee training; and
    e. Reporting and record keeping.

33. Hazardous materials expected to be used during construction include: unleaded gasoline, diesel fuel, oil, lubricants (i.e., motor oil, transmission fluid, and hydraulic fluid), solvents, adhesives, and paint materials. There are no feasible alternatives to these materials for construction or operation of construction vehicles and equipment, or for painting and caulking buildings and equipment.

34. The construction contractor will be responsible for assuring that the use, storage and handling of these materials will comply with applicable federal, state, and local laws, ordinances, regulations and standards (LORS), including licensing, personnel training, accumulation limits, reporting requirements, and recordkeeping.

35. During Facility operations, chemicals will be stored in chemical storage areas appropriately designed for their individual characteristics. Bulk chemicals will be stored outdoors on impervious surfaces in aboveground storage tanks with secondary containment. Secondary containment areas for bulk storage tanks will not have drains. Any chemical spills in these areas will be removed with portable equipment and reused or disposed of properly. Other chemicals will be stored and used in their delivery containers.

36. A portable storage trailer may be on site for storage of maintenance lube oils, chemicals, paints, and other construction materials, as needed. All drains and vent piping for volatile chemicals will be trapped and isolated from other drains to eliminate noxious vapors. The storage, containment, handling, and use of these chemicals will be managed in accordance with applicable laws, ordinances, regulations, and standards.

37. Small quantities of hazardous wastes will be generated over the course of construction. These may include paint, spent solvents, and spent welding materials. Some hazardous wastes will be recycled, including used oils from equipment maintenance, and oil-contaminated materials such as spent oil filters, rags, or other cleanup materials. Used oil must be recycled, and oil or heavy metal contaminated materials (e.g., filters) requiring disposal must be disposed of in a Class I waste disposal facility. Scale from pipe and equipment cleaning operations, and solids from the evaporation pond, will be disposed of in a similar manner.

38. All hazardous wastes generated during facility construction and operation must be handled and disposed of in accordance with applicable laws, ordinances, regulations, and standards. Any hazardous wastes generated during construction

must be collected in hazardous waste accumulation containers near the point of generation and moved daily to the contractor's 90-day hazardous waste storage area located on site. The accumulated waste must subsequently be delivered to an authorized waste management facility. Hazardous wastes must be either recycled or managed and disposed of properly in a licensed Class I waste disposal facility authorized to accept the waste.

39. The Discharger shall monitor the evaporation ponds in conformance with applicable CCR Title 27 requirements for Class II surface impoundment waste management units.

40. The leachate collection and removal system must be used to provide preliminary detection monitoring of leaks through the top liner of the double-lined evaporation ponds. Physical evidence of leachate beneath the upper concrete liner shall be interpreted as a warning that containment of the evaporation pond contents may be compromised.

41. Groundwater monitoring wells must be constructed adjacent to and both up gradient and down gradient of the evaporation ponds to provide background and detection monitoring for any potential release from the evaporation ponds containment. The Point of Compliance to be used for the detection monitoring must be the shallow groundwater beneath the evaporation pond. The groundwater monitoring wells must be constructed in conformance with Title 27 CCR Section 20415 requirements. The monitoring wells must be designed to meet the background and detection monitoring requirements in conformance with Title 27 CCR Section 20415(b)(1)(B) as applicable, including:

    a. Providing a sufficient number of monitoring points to yield ground water samples from the uppermost aquifer that represent the quality of ground water passing the Point of Compliance and to allow for the detection of a release from the evaporation ponds;

    b. Providing a sufficient number of monitoring points and background monitoring points installed at appropriate locations and depths to yield ground water samples from the uppermost aquifer to provide the best assurance of the earliest possible detection of a release from the evaporation ponds; and

    c. Selecting monitoring point locations and depths that include the zone(s) of highest hydraulic conductivity in the ground water body monitored.

42. The detection monitoring wells shall be constructed to meet the well performance standards set forth in Title 27 CCR Section 20415(b)(4), as applicable, including:

43. All monitoring wells shall be cased and constructed in a manner that maintains the integrity of the monitoring well bore hole and prevents the bore hole from acting as a conduit for contaminant transport.

44. The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative ground water samples.

45. For each monitoring well, the annular space (i.e., the space between the bore hole and well casing) above and below the sampling interval shall be appropriately sealed to prevent entry of contaminants from the ground surface, entry of contaminants from the unsaturated zone, cross contamination between portions of the zone of saturation, and contamination of samples.

46. All monitoring wells shall be adequately developed to enable collection of representative ground water samples.

47. The monitoring program must also meet the general requirements set forth in Title 27 CCR Section 20415(e), which require that all monitoring systems be designed and certified by a registered geologist or a registered civil engineer. The applicable general requirements set forth for boring logs, quality assurance/quality control, sampling and analytical methods used, background sampling, data analysis, and other reporting as applicable will be implemented.

48. Baseline samples of the groundwater must be collected from each of the monitoring wells and analyzed prior to discharging wastewater to the evaporation ponds. The groundwater must be initially sampled for each of the proposed monitoring parameters listed in the attached Monitoring and Reporting Program, Appendix D, and any additional Constituents of Concern (COC) identified by the Regional Board.

B. Prohibitions

1. The discharge or deposit of solid waste to the evaporation ponds as a final form of disposal is prohibited, unless authorized by the Regional Board’s Executive Officer.

2. The Discharger is prohibited from discharging, treating or composting at this site the following wastes:

   a. Municipal solid waste;

   b. Sludge (including sewage sludge, water treatment sludge, and industrial sludge);

   c. Septage;

   d. Liquid waste, unless specifically allowed by these WDRs or approved by the Regional Board’s Executive Officer;

   e. Oily and greasy liquid waste; unless specifically allowed by these WDRs or approved by the Regional Board’s Executive Officer;

f. Hot, burning waste materials or ash.

3. The Discharger shall not cause degradation of any groundwater aquifer or water supply.

4. The discharge of waste to land not owned or controlled by the Discharger is prohibited.

5. Use of wastewater or cooling tower liquids on access roads, well pads, or other developed project locations for dust control is prohibited.

6. The discharge of hazardous or designated wastes to other than a waste management unit authorized to receive such waste is prohibited.

7. Any hazardous waste generated or stored at the facility will be contained and disposed in a manner that complies with federal and state regulations.

8. Wastewater or any fluids in the evaporation ponds shall not enter any canal, drainage, or drains (including subsurface drainage systems) which could provide flow to the Waters of the State.

9. The Discharger shall appropriately dispose of any materials, including fluids and sediments removed from the evaporation ponds.

10. The Discharger shall neither cause nor contribute to the contamination or pollution of ground water via the release of waste constituents in either liquid or gaseous phase.

11. Direct or indirect discharge of any waste to any surface water or surface drainage courses is prohibited.

12. The Discharger shall not cause the concentration of any Constituent of Concern or Monitoring Parameter to exceed its respective background value in any monitored medium at any Monitoring Point assigned for Detection Monitoring pursuant to the attached Monitoring and Reporting, Appendix C, and future revisions thereto.

C. Provisions

1. The Discharger shall comply with the attached Monitoring and Reporting Program, Appendix D, and future revisions thereto, as specified by the Regional Board's Executive Officer.

2. Unless otherwise approved by Regional Board's Executive Officer, all analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health. All analyses shall be conducted in accordance with

the latest edition of “Guideline Establishing Test Procedures for Analysis of Pollutants”, promulgated by the United States Environmental Protection Agency.

3. The laboratory shall use detection limits less than or equal to Environmental Protection Agency (EPA) Action Level/Maximum Contaminate Levels (MCLs) or California Department of Public Health (CDPH) Notification Level/MCL for all samples analyzed. The lowest concentration, whether EPA or CDPH, of the two agencies must be used for the analysis.

4. Prior to any change in ownership of this operation, the Discharger shall transmit a copy of the Board Order to the succeeding owner/operator, and forward a copy of the transmittal letter to the Regional Board.

5. Prior to any modification in this facility that would result in material change in the quality or quantity of discharge, or any material change in the location of discharge, the Discharger shall report all pertinent information in writing to the Regional Board’s Executive Officer and obtain revised waste discharge requirements before any modification is implemented.

6. All permanent containment structures and erosion and drainage control systems shall be certified by a California Registered Civil Engineer or Certified Engineering Geologist as meeting the prescriptive standards and performance goals.

7. The Discharger shall ensure that all site-operating personnel are familiar with the content of these WDRs, and shall maintain a copy of these WDRs at the site.

8. These WDRs do not authorize violation of any federal, state, or local laws or regulations.

9. The Discharger shall allow the Regional Board, or an authorized representative, upon presentation of credential and other documents as may be required by law, to:

    a. Enter upon the premises regulated by these WDRs, or the place where records must be kept under the conditions of these WDRs;

    b. Have access to and copy, at reasonable times, any records that shall be kept under the condition of these WDRs;

    c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under these WDRs; and

    d. Sample or monitor at reasonable times, for the purpose of assuring compliance with these WDRs or as otherwise authorized by the CWC or California Code of Regulations, any substances or parameters at this location.

10. The Discharger shall comply with all of the conditions of these WDRs. Any noncompliance with these WDRs constitutes a violation of the Porter-Cologne Water Quality Act and may be grounds for enforcement action.

11. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with these WDRs. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.

12. These WDRs do not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

13. The Discharger shall comply with the following:

    a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

    b. The Discharger shall retain records of all monitoring information, copies of all reports required by these WDRs, and records of all data used to complete the application for these WDRs, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Board's Executive Officer at any time.

    c. Records of monitoring information shall include:

        i. The date, exact places, and time of sampling or measurements.
        ii. The individual(s) who performed the sampling or measurements.
        iii. The date(s) analyses were performed.
        iv. The individual(s) responsible for reviewing the analyses.
        v. The results of such analyses.

    d. Monitoring must be conducted according to test procedures described in the attached Monitoring and Reporting Program, Appendix D, unless other test procedures have been specified in these WDRs or approved by the Regional Board's Executive Officer.

14. All monitoring systems shall be readily accessible for sampling and inspection.

15. The Discharger is the responsible party for the WDRs, and the monitoring and reporting program for the Facility. The Discharger shall comply with all conditions of these WDRs. Violations may result in enforcement actions, requiring corrective action or imposing civil monetary liability.

16. The Discharger shall furnish, under penalty of perjury, technical monitoring program reports, and such reports shall be submitted in accordance with the

specifications prepared by the Regional Board's Executive Officer. Such specifications are subject to periodic revisions as may be warranted.

17. The Discharger may be required to submit technical reports as directed by the Regional Board's Executive Officer.

18. The procedure for preparing samples for the analyses shall be consistent with the attached Monitoring and Reporting Program, Appendix D, and any future revisions thereto. The Monitoring Reports shall be certified to be true and correct, and signed, under penalty of perjury, by an authorized official of the company. All technical reports require the signature of a California Registered Professional Engineer or Professional Geologist.

19. All monitoring shall be done as described in Title 27 of the CCRs.

SOIL AND WATER
APPENDIX D

Waste Discharge Requirement
Monitoring and Reporting Program

SOIL AND WATER RESOURCES – APPENDIX D

MONITORING AND REPORTING PROGRAM-- Palo Verde Solar I, LLC, Owner/Operator, Blythe Solar Power Project, Riverside County

PART I
GENERAL REQUIREMENTS

A. GENERAL

A Discharger who owns or operates a Class II Surface Impoundment is required to comply with the provisions of Title 27, Division 2, Chapter 3, Subchapter 3, Article 1 of the California Code of Regulations for the purpose of detecting, characterizing, and responding to releases to the groundwater. Section 13267, California Water Code (CWC) gives the Colorado River Basin Regional Water Quality Control Board (Regional Board) authority to require monitoring program reports for discharges that could affect the quality of waters within its region.

1. This Monitoring and Reporting Program (MRP) is Appendix C of the WDRs set forth in Appendices A and B, and are incorporated herein by this reference...The principal purpose of this self-monitoring program is:

   a. To document compliance with Waste Discharge Requirements (WDRs), and prohibitions established by the Regional Board;

   b. To facilitate self-policing by the Discharger in the prevention and abatement of pollution arising from waste discharge;

   c. To conduct water quality analyses.

2. The Regional Board Executive Officer may alter the monitoring parameters, monitoring locations, and/or the monitoring frequency during the course of this monitoring program.

B. DEFINITION OF TERMS

1. Affected Persons – all persons who either own or occupy land outside the boundaries of the parcel upon which a waste management unit (surface impoundment or impoundment) is located that has been or may be affected by the release of waste constituents from the unit.

2. Background Monitoring Point – a device (e.g. well) or location (e.g. a specific point along a lakeshore) that is upgradient or side gradient from the impoundment

assigned by this MRP, where water quality samples are taken that are not affected by a release from the impoundment and that are used as a basis of comparison against samples taken from downgradient Monitoring Points.

3. Constituents of Concern (COCs) – those constituents likely to be in the waste, or derived from waste constituents in the event of a release from the impoundment.

4. Matrix Effect – refers to any change in the Method Detection Limit (MDL) or Practical Quantitation Limit (PQL) for a given constituent as a result of the presence of other constituents - either of natural origin or introduced through a spill or release - that are present in the sample being analyzed.

5. Method Detection Limit (MDL) – the lowest constituent concentration that can support a non-zero analytical result with 99 percent reliability. The MDL is laboratory specific and should reflect the detection capabilities of specific procedures and equipment used by the laboratory.

6. Monitored Media – water - bearing media monitored pursuant to this Monitoring and Reporting Program. The Monitored Media may include: (1) groundwater in the uppermost aquifer, in any other portion of the zone of saturation (as defined in Title 27, Section 20164) in which it would be reasonable to anticipate that waste constituents migrating from the surface impoundment could be detected, and in any perched zones underlying the impoundment, (2) any bodies of surface water that could be measurably affected by a release, (3) soil-pore liquid beneath and/or adjacent to the surface impoundment, and (4) soil-pore gas beneath and/or adjacent to the surface impoundment.

7. Monitoring Parameters – the list of constituents and parameters used for the majority of monitoring activity.

8. Monitoring Point – a device (e.g. well) or location (e.g. a specific point along a lakeshore) that is downgradient from the surface impoundment assigned by this MRP, at which samples are collected for the purpose of detecting a release by comparison with samples collected at Background Monitoring Points.

9. Practical Quantification Limit (PQL) – the lowest constituent concentration at which a numerical concentration can be assigned with a 99 percent certainty that its value is within 10 percent of the actual concentration in the sample. The PQL is laboratory specific and should reflect the detection capabilities of specific procedures and equipment used by the laboratory.

10. Reporting Period – the duration separating the submittal of a given type of monitoring report from the time the next iteration of that report is scheduled for submittal. Unless otherwise stated, the due date for any given report shall be 30 days after the end of its Reporting Period.

11. Sample Locations -

    a. For Monitoring Points – the number of data points obtained from a given Monitoring Point during a given Reporting Period – used for carrying out the statistical or non-statistical analysis of a given analyte during a given Reporting Period.

    b. For Background Monitoring Points – the number of new and existing data points from all applicable Background Monitoring Points in a given Monitored Medium – used to collectively represent the background concentration and variability of a given analyte in carrying out a statistical or non-statistical analysis of that analyte during a given Reporting Period.

12. Uppermost Aquifer – the geologic formation nearest the natural ground surface that is an aquifer, as well as, lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary.

13. Volatile Organic Constituents (VOCs) – the suite of organic constituents having a high vapor pressure. The term includes at least the 47 organic constituents listed in Appendix I to 40 CFR Part 258.

14. VOC_{wate} – the composite monitoring parameter that includes all VOCs that are detectable in less than 10 percent of the applicable background samples. This parameter is analyzed, using the non-statistical method described in Part III.A.2. of this MRP, to identify releases of VOCs that are detected too infrequently in backgroundwater to allow for statistical analysis.

C. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analysis shall be performed according to the most recent version of Standard USEPA methods, and California ELAP rulings. Water and waste analysis shall be performed by a laboratory approved for these analyses by the California Department of Public Health. Specific methods of analysis must be identified. If methods other than USEPA-approved methods or Standard Methods are used, the exact methodology must be submitted for review and approval by the Regional Board Executive Officer prior to use. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Regional Board. All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurement. In addition, the Discharger is responsible for verifying that laboratory analysis of all samples from Monitoring Points and Background Monitoring Points meet the following restrictions:

1. Methods, analysis, and detection limits used must be appropriate for expected concentrations. For detection monitoring of any constituent or parameter found in

concentrations that produce more than 90% non-numerical determinations (i.e. "trace" or "ND") in data from Background Monitoring Points for that medium, the analytical methods having the lowest "facility-specific method detection limit (MDL)", defined in Part I.B.5., shall be selected from among those methods that provide valid results in light of any "Matrix Effects" (defined in Part I.B.4.) involved.

2. Analytical results falling between the MDL and the PQL shall be reported as “trace”, and shall be accompanied both by the estimated MDL and PQL values for that analytical run, and by an estimate of the constituent's concentration.

3. MDLs and PQLs shall be derived by the laboratory for each analytical procedure, according to State of California laboratory accreditation procedures. These MDLs and PQLs shall reflect the detection and quantitation capabilities of the specific equipment used by the lab. If the lab suspects that, due to a change in matrix or other effects, the true detection limit or quantitation limit for a particular analytical run differs significantly from the laboratory-derived MDL/PQL values, the results shall be flagged accordingly, along with an estimate of the detection limit and quantitation limit actually achieved.

4. All Quality Assurance/Quality Control (QA/QC) data shall be reported, along with the sample results to which it applies, including the method, equipment, and analytical detection limits, the recovery rates, an explanation of any recovery rate that is less than method recovery standards, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analysis, and the name and qualifications of the person(s) performing the analyses. Sample results shall be reported unadjusted for blank results or spike recovery.

5. Upon receiving written approval from the Regional Board Executive Officer, an alternative statistical or non-statistical procedure can be used for determining the significance of analytical results for a constituent that is a common laboratory contaminant (i.e., methylene chloride, acetone, diethylhexyl phthalate, and di-n-octyl phthalate) during any given Reporting Period in which QA/QC samples show evidence of laboratory contamination for that constituent. Nevertheless, analytical results involving detection of these analytes in any background or downgradient sample shall be reported and flagged for easy reference by Regional Board staff.

6. In cases where contaminants are detected in QA/QC samples (i.e. field, trip, or lab blanks), the accompanying sample results shall be appropriately flagged.

7. The MDL shall always be calculated such that it represents a concentration associated with a 99% reliability of a non-zero result.

D. RECORDS TO BE MAINTAINED

Written reports shall be maintained by the Discharger or laboratory, and shall be retained for a minimum of five (5) years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Board. Such records shall show the following for each sample:

1. Identity of sample and of the Monitoring Point or Background Monitoring Point from which it was taken, along with the identity of the individual who obtained the sample;

2. Date and time of sampling;

3. Date and time that analyses were started and completed, and the initials of the personnel performing each analysis;

4. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;

5. Calculations of results; and

6. Results of analyses, and the MDL and PQL for each analysis.

E. REPORTS TO BE FILED WITH THE REGIONAL BOARD

1. Detection Monitoring Reports – For each Monitored Medium, all Monitoring Points and Background Monitoring Points assigned to detection monitoring under Part II.A.7 of this MRP shall be monitored **semiannually** for the Monitoring Parameters (Part II.A.4). A "Detection Monitoring Report" shall be submitted to the Regional Board in accordance with the schedule contained in the Summary of Self-Monitoring and Reporting Requirements, and shall include the following:

   a. A Letter of Transmittal that summarizes the essential points in each report shall accompany each report submittal. The letter of transmittal shall be signed by a principal executive officer at the level of vice-president or above, or by his/her duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates. The letter of transmittal shall include:

      i. A discussion of any violations noted since the previous report submittal and a description of the actions taken or planned for correcting those violations. If no violations have occurred since the last submittal, that should be so stated;

      ii. If the Discharger has previously submitted a detailed time schedule or plan for correcting any violations, a progress report on the time schedule and status of the corrective actions being taken; and

iii. A statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct.

b. A Compliance Evaluation Summary shall be included in each Detection Monitoring Report. The compliance evaluation summary shall contain at least:

i. Velocity and direction of groundwater flow for each monitored groundwater body under and around the surface impoundment based upon the water level elevations taken during the collection of water quality data. A description and graphical presentation (e.g., arrow on a map) shall be submitted;

ii. Methods used for water level measurement and pre-sampling purging for each monitoring well addressed by the report including:

1. Method, time, and equipment used for water level measurement;

2. Type of pump used for purging, placement of the pump in the well, pumping rate, and well recovery rate;

3. Methods and results of field testing for pH, temperature, electrical conductivity, and turbidity, including;

a. Equipment calibration methods, and

b. Method for disposing of purge water

iii. Methods used for sampling each Monitoring Point and Background Monitoring Point, including:

1. A description of the type of pump, or other device used, and its placement for sampling;

2. A detailed description of the sampling procedure: number and description of samples, field blanks, travel blanks, and duplicate samples; types of containers and preservatives used; date and time of sampling; name and qualifications of individual collecting samples, and other relevant observations;

c. A map or aerial photograph showing the locations of Monitoring Points, and Background Monitoring Points;

d. For each Detection Monitoring Report, provide all relevant laboratory information including results of all analyses, and other information needed to demonstrate compliance with Part I.C.;

e. An evaluation of the effectiveness of the run-off/run-on control facilities;

f. A summary of reportable spills/leaks occurring during the reporting period; include estimated volume of liquids/solids discharged outside designated containment area, a description of management practices to address spills/leaks, and actions taken to prevent reoccurrence.

2. Annual Summary Report – The Discharger shall submit to the Regional Board, an "Annual Summary Report" for the period extending from January 1 through December 31. The "Annual Summary Report" is due **March 15** of each year, and shall include the following:

   a. A graphical presentation of analytical data for each Monitoring Point and Background Monitoring Point (Title 27, Section 20415(e)(14)). The Discharger shall submit, in graphical format, the laboratory analytical data for all samples taken within at least the previous five (5) calendar years. Each such graph shall plot the concentration of one (1) or more constituents over time for a given Monitoring Point and Background Monitoring Point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. For any given constituent or parameter, the scale for background plots shall be the same as that used to plot downgradient data. On the basis of any aberrations noted in the plotted data, the Regional Board Executive Officer may direct the Discharger to carry out a preliminary investigation (Title 27, Section 20080(d)(2)), the results of which will determine whether or not a release is indicated;

   b. A tabular presentation of all monitoring analytical data obtained during the previous two (2) Monitoring and Reporting Periods, submitted on hard copy within the annual report as well as digitally on electronic media in a file format acceptable to the Regional Board Executive Officer (Title 27, Section 20420(h)). The Regional Board regards the submittal of data in hard copy and on diskette CD-ROM as "...a form necessary for..." statistical analysis in that this facilitates periodic review by the Regional Board statistical consultant;

   c. A comprehensive discussion of the compliance record and any corrective actions taken or planned, which may be needed to bring the Discharger into full compliance with WDRs;

   d. A written summary of the groundwater analyses, indicating changes made since the previous annual report; and

   e. An evaluation of the effectiveness of the run on/run-off control facilities, pursuant to Title 27, Section 20365.

3. Contingency Reporting

   a. The Discharger shall report any spill of HTL or evaporation pond liquid by telephone within 48 hours of discovery. The reportable quantity for evaporation pond liquid is 150 gallons.

      After reporting a spill, a written report shall be filed with the Regional Board Executive Officer within seven (7) days, containing at a minimum the following:

      i. A map showing the location(s) of the discharge/spill;

      ii. A description of the nature of the discharge (all pertinent observations and analyses including quantity, duration, etc.); and

iii. Corrective measures underway or proposed.

b. Should the initial statistical comparison (Part III.A.1.) or non-statistical comparison (Part III.A.2.) indicate, for any Constituent of Concern or Monitoring Parameter, that a release is tentatively identified, the Discharger shall immediately notify the Regional Board verbally as to the Monitoring Point(s) and constituent(s) or parameter(s) involved, shall provide written notification by certified mail within seven (7) days of such determination (Title 27, Section 20420(j)(1)), and shall conduct a discrete retest in accordance with Part III.A.3. If the retest confirms the existence of a release, the Discharger shall carry out the requirements of Part I.E.3.d. In any case, the Discharger shall inform the Regional Board of the outcome of the retest as soon as the results are available, following up with written results submitted by certified mail within seven (7) days of completing the retest.

c. If either the Discharger or the Regional Board determines that there is significant physical evidence of a release (Title 27, Section 20385(a)(3)), the Discharger shall immediately notify the Regional Board of this fact by certified mail (or acknowledge the Regional Board's determination) and shall carry out the requirements of Part I.E.3.d. for all potentially-affected monitored media.

d. If the Discharger concludes that a release has been discovered:

   i. If this conclusion is <u>not</u> based upon “direct monitoring” of the Constituents of Concern, pursuant to Part II.A.5., then the Discharger shall, within thirty days, sample for all Constituents of Concern at all Monitoring Points and submit them for laboratory analysis. Within seven (7) days of receiving the laboratory analytical results, the Discharger shall notify the Regional Board, by certified mail, of the concentration of all Constituents of Concern at each Monitoring Point. Because this scan is not to be tested against background, only a single datum is required for each Constituent of Concern at each Monitoring Point (Title 27 Section 20420(k)(1));

   ii. The Discharger shall, within 90 days of discovering the release (Title 27, Section 20420(k)(5)), submit a Revised Report of Waste Discharge proposing an Evaluation Monitoring Program meeting the requirements of Title 27, Section 20425; and

   iii. The Discharger shall, within 180 days of discovering the release (Title 27, Section 20420(k)(6), submit a preliminary engineering feasibility study meeting the requirements of Title 27, Section 20430.

e. Any time the Discharger concludes - or the Regional Board Executive Officer directs the Discharger to conclude - that a liquid phase release from the surface impoundment has proceeded beyond the facility boundary, the Discharger shall so notify all persons who either own or reside upon the land that directly overlies any part of the plume (Affected Persons).

i. Initial notification to Affected Persons shall be accomplished within 14 days of making this conclusion and shall include a description of the Discharger's current knowledge of the nature and extent of the release; and

ii. Subsequent to initial notification, the Discharger shall provide updates to all Affected Persons, including any persons newly affected by a change in the boundary of the release, within 14 days of concluding a material change in the nature or extent of the release has occurred.

4. <u>Surface Impoundment - Leakage Detection System (LDS), and Solids Monitoring</u>

a. Sampling and reporting shall be conducted semi-annually.

b. Provide volume of solids removed from the holding pond each month for that reporting period, and transported to a waste management facility for disposal. Include name and location of waste management facility.

c. Conduct quarterly inspections of Leakage Detection System (LDS), and holding pond.

PART II

MONITORING REQUIREMENTS FOR GROUNDWATER

A. GROUNDWATER SAMPLING AND ANALYSIS FOR DETECTION MONITORING

1. Groundwater Surface Elevation and Field Parameters – Groundwater sampling and analysis shall be conducted semiannually pursuant to California ELAP rulings, and include an accurate determination of the groundwater surface elevation and field parameters (temperature, electrical conductivity, turbidity) for each Monitoring Point and Background Monitoring Point (Title 27, Section 20415(e)(13)). Groundwater elevation obtained prior to purging the well and sample collection, shall be used to fulfill the semi-annual groundwater flow rate/direction analyses required under Part I.E.1.b.i. Groundwater wells shall be gauged using an electronic sounder capable of measuring depth to groundwater within 100^{th} of an inch. Following gauging, wells shall be purged according to EPA groundwater sampling procedures until:

   a. pH, temperature, and conductivity are stabilized within 10 percent, and

   b. turbidity has been reduced to 10 NTUs or the lowest practical levels achievable.

   The above identified parameters shall be recorded in the field, and submitted in the monitoring report. Sampling equipment shall be decontaminated between wells. Purge water may be discharged to the brine pond; discharge to the ground surface is prohibited.

2. Groundwater Sample Collection - Groundwater samples shall be collected from all monitoring points and background monitoring points after wells recharge to within at least 80 percent of their original static water level. Groundwater samples shall be collected with a paristaltic pump that is decontaminated between sampling events. Samples shall be labeled, logged on chain-of-custody forms, and placed in cold storage pending delivery to a State certified analytical laboratory.

3. Five-Day Sample Procurement Limitation – To satisfy data analysis requirements for a given reporting period, samples collected from all Monitoring Points and Background Monitoring Points shall be taken within a span not exceeding five (5) days, and shall be taken in a manner that insures sample independence to the greatest extent feasible (Title 27, Section 20415(e)(12)(B)).

4. Groundwater Monitoring Parameters for Detection Monitoring – Groundwater samples collected from monitoring points and background monitoring points shall be analyzed for the following:

Parameter	Unit	Sample Type
Chloride	mg/L	Grab
Sulfate	mg/L	Grab
Total Dissolved Solids (TDS)	mg/L	Grab
pH	#	Grab
Specific Conductance	μohms/cm	Grab
HTF	mg/L	Grab
Heavy Metals (Sb, As, Ba, Cd, Ca, Cr, Co, Cu, Pb, Hg, Ni, Se, Zn)	mg/L	Grab
Oil & Grease	mg/L	Grab

All Monitoring Points and Background Monitoring Points assigned to Detection Monitoring shall be sampled semi-annually in **June** and **December** of each year in accordance with Part I of this MRP. Monitoring results shall be reported in the semi-annual Detection Monitoring Report.

5. Data Analysis – Statistical or non-statistical analysis shall be carried out as soon as the data is available, in accordance with Part III of this monitoring program.

   Monitoring Points and Background Monitoring Points – At a minimum of 90 days prior to the operation of the facility, the Discharger shall submit a proposed groundwater monitoring program, including background and detection monitoring locations, to the Executive Officer for review and approval.

6. Initial Background Determination: For the purpose of establishing an initial pool of background data for each Constituent of Concern at each Background Monitoring Point (Title 27, Section 20415(e)(6)):

   a. Whenever a new Constituent of Concern is added to the Water Quality Protection Standard, including any added by the adoption of this Board Order, the Discharger shall collect at least one (1) sample **quarterly** for at least one (1) year from each Background Monitoring Point in each monitored medium and analyze for the newly-added constituent(s); and

   b. Whenever a new Background Monitoring Point is added, including any added by this Board Order, the Discharger shall sample the new monitoring point at least **quarterly** for at least one (1) year, analyzing for all Constituents of Concern and Monitoring Parameters.

7. Semiannual Determination of Groundwater Flow Rate/Direction (Title 27, Section 20415(e)(15): The Discharger shall measure the water level in each well and determine groundwater flow rate and direction in each groundwater body described in Part II.A.1. at least semiannually. This information shall be included in the semi-annual Detection Monitoring Reports required under Part I.E.1.

PART III

STATISTICAL AND NON-STATISTICAL ANALYSES

A. STATISTICAL AND NON-STATISTICAL ANALYSIS

The Discharger shall use the most appropriate of the following methods to compare the downgradient concentration of each monitored constituent or parameter with its respective background concentration to determine if there has been a release from the surface impoundment. For any given data set, proceed sequentially down the list of statistical analysis methods listed in Part III.A.1., followed by the non-statistical method in Part III.A.2., using the first method for which the data qualifies. If that analysis tentatively indicates the detection of a release, implement the retest procedure under Part III.A.3.

1. Statistical Methods. The Discharger shall use one (1) of the following statistical methods to analyze Constituents of Concern or Monitoring Parameters that exhibit concentrations exceeding their respective MDL in at least ten percent of the background samples taken during that Reporting Period. Each of these statistical methods is more fully described in the Statistical Methods discussion below. Except for pH, which uses a two-tailed approach, the statistical analysis for all constituents and parameters shall be a one-tailed (testing only for statistically significant increase relative to background) approach:

    a. One-Way Parametric Analysis of Variance (ANOVA) followed by multiple comparisons (Title 27, Section 20415(e)(8)) – This method requires at least four (4) independent samples from each Monitoring Point and Background Monitoring Point during each sampling episode. It shall be used when the background data for the parameter or constituent obtained during a given sampling period, has not more than 15% of the data below PQL. Prior to analysis, replace all 'trace' determinations with a value halfway between the PQL and the MDL values reported for that sample run, and replace all "non-detect" determinations with a value equal to half the MDL value reported for that sample run. The ANOVA shall be carried out at the 95% confidence level. Following the ANOVA, the data from each downgradient Monitoring Point shall be tested at a 99% confidence level against the pooled background data. If these multiple comparisons cause the Null Hypothesis (i.e., that there is no release) to be rejected at any Monitoring Point, the Discharger shall conclude that a release is tentatively indicated from that parameter or constituent; or

    b. One-Way Non-Parametric ANOVA (Kruskal-Wallis Test), followed by multiple comparisons – This method requires at least nine (9) independent samples from each Monitoring Point and Background Monitoring Point; therefore, the Discharger shall anticipate the need for taking more than four (4) samples per Monitoring Point, based upon past monitoring results. This method shall be used when the pooled background data for the parameter or constituent, obtained within a given sampling period, has not more than 50% of the data below the

PQL. The ANOVA shall be carried out at the 95% confidence level. Following the ANOVA, the data from each downgradient Monitoring Point shall be tested at a 99% confidence level against the pooled background data. If these multiple comparisons cause the Null Hypothesis (i.e., that there is no release) to be rejected at any Monitoring Point, the Discharger shall conclude that a release is tentatively indicated for that parameter or constituent; or

c. Method of Proportions – This method shall be used if the "combined data set" – the data from a given Monitoring Point in combination with the data from the Background Monitoring Points – has between 50% and 90% of the data below the MDL for the constituent or parameter in question. This method; (1) requires at least nine (9) downgradient data points per Monitoring Point per Reporting Period, (2) requires at least thirty data points in the combined data set, and (3) requires that n * P > 5 (where n is the number of data points in the combined data set and P is the proportion of the combined set that exceeds the MDL); therefore, the Discharger shall anticipate the number of samples required, based upon past monitoring results. The test shall be carried out at the 99% confidence level. If the analysis results in rejection of the Null Hypothesis (i.e., that there is no release), the Discharger shall conclude that a release is tentatively indicated for that constituent or parameter; or

d. Other Statistical Methods. – These include methods pursuant to Title 27, Section 20415(e)(8)(c-e).

2. Non-Statistical Method. The Discharger shall use the following non-statistical methods for all constituents that are not amenable to statistical analysis by virtue of having been detected in less than 10% of applicable background samples. A separate variant of this test is used for the VOC_{water} Composite Monitoring Parameters. Regardless of the test variant used, the method involves a two-step process: (1) from all constituents to which the test variant applies, compile a list of those constituents which equal or exceed their respective MDL in the downgradient sample from a given Monitoring Point, then (2) evaluate whether the listed constituents meet either of the test variant's two possible triggering conditions. For each Monitoring Point, the list described above shall be compiled based on either the data from a single sample taken during the Monitoring Period for that Monitoring Point, or (where several independent samples have been analyzed for that constituent at a given Monitoring Point) from the sample that contains the largest number of detected constituents. Background shall be represented by the data from all samples taken from the appropriate Background Monitoring Points during that Reporting Period (at least one (1) sample from each Background Monitoring Point). The method shall be implemented as follows:

a. VOC_{water} Composite Monitoring Parameter – For any given Monitoring Point, the VOC_{water} Monitoring Parameter is a composite parameter addressing all detectable VOCs including at least all 47 VOCs listed in Appendix I to 40 CFR 258 and all unidentified peaks. The Discharger shall compile a list of each VOC which (1) exceeds its MDL in the Monitoring Point sample (an unidentified peak is compared to its presumed (MDL), and also (2) exceeds its MDL in less than ten percent of the samples taken during that Reporting Period from that medium's Background Monitoring Points. The Discharger shall conclude that a release is tentatively indicated for the VOC_{water} composite Monitoring Parameter if the list either (1) contains two or more constituents, or (2) contains one constituent that exceeds its PQL;

b. Constituents of Concern: As part of the COC monitoring required under Part 2.A.5 of this MRP, for each Monitoring Point, the Discharger shall compile a list of COCs that exceed their respective MDL at the Monitoring Point, yet do so in less than ten percent of the background samples taken during that Reporting Period. The Discharger shall conclude that a release is tentatively indicated if the list either (1) contains two or more constituents, or (2) contains one constituent that exceeds its PQL.

3. Discrete Retest – In the event that the Discharger concludes that a release has been tentatively indicated (under Parts III.A.1. or III.A.2.), the Discharger shall, within 30 days of that conclusion, collect two (2) new suites of samples for the indicated Constituent(s) of Concern or Monitoring Parameter(s) at each indicated Monitoring Point, collecting at least as many samples per suite as were used for the initial test. Re-sampling of Background Monitoring Points is optional. As soon as the retest data is available, the Discharger shall use the same statistical method or non-statistical comparison separately on each suite of retest data. For any indicated Monitoring Parameter or Constituent of Concern at an affected Monitoring Point, if the test results of either (or both) of the retest data suites confirms the original indication, the Discharger shall conclude that a release has been discovered. All retests shall be carried out only for the Monitoring Point(s) for which a release is tentatively indicated, and only for the Constituent of Concern or Monitoring Parameter that triggered the indication there, as follows:

a. If an ANOVA method was used in the initial test, the retest shall involve only a repeat of the multiple comparison procedure, carried out separately on each of the two (2) new suites of samples taken from the indicating Monitoring Point;

b. If the Method of Proportions statistical test was used, the retest shall consist of a full repeat of the statistical test for the indicated constituent or parameter, carried out separately on each of the two (2) new sample suites from the indicating Monitoring Point;

c. If the non-statistical comparison was used:

i. Because the VOC Composite Monitoring parameters (VOC_{water}) each address, as a single parameter, an entire family of constituents which are likely to be present in any surface impoundment release, the scope of the laboratory analysis for each retest sample shall include all VOCs detectable in that retest sample. Therefore, a confirming retest for either parameter shall have validated the original indication even if the suite of constituents in the confirming retest sample(s) differs from that in the sample that initiated the retest;

ii. Because all Constituents of Concern that are jointly addressed in the non-statistical testing under Part III.A.2. remain as individual Constituents of Concern, the scope of the laboratory analysis for the non-statistical retest samples shall be narrowed to involve only those constituents detected in the sample which initiated the retest.

SUMMARY OF SELF-MONITORING AND REPORTING REQUIREMENTS

A. GROUNDWATER MONITORING

1. Groundwater monitoring wells shall be sampled/analyzed semi-annually for the following parameters/constituents:

	Parameters & Constituent	Unit	Type of Sample	Reporting Frequency
a.	Chloride	mg/L	grab	semiannual
b.	Sulfate	mg/L	grab	semiannual
	Total Dissolved Solids (TDS)	mg/L	grab	semiannual
c.	PH	#	field measurement	semiannual
d.	Specific Conductance	μohms/cm	field measurement	semiannual
e.	HTF	mg/L	grab	semiannual
f.	Heavy Metals (Sb,As, Ba, Cd, Ca, Cr, Co, Cu, Pb, Hg, Ni, Se, Zn)	mg/L	grab	semiannual
g.	Oil & Grease	mg/L	grab	semiannual

2. The collection, preservation, and holding times of all samples shall be in accordance with the U.S. Environmental Protection Agency approved procedures. All analyses shall be conducted by a laboratory certified by the California Department of Public Health to perform the required analyses.

B. SURFACE IMPOUNDMENT: Leakage Detection System (LDS), and Solids Monitoring

		Unit	Observation or Sampling Frequency	Reporting Frequency
1.	Estimated volume of solid/liquid in holding pond	ft^3	Monthly	semiannual
2.	Measurement of freeboard	ft	Monthly	semiannual
3.	Volume of solids removed and shipped to off site waste management facility	tons	Monthly	semiannual

C. MONITORING REPORTS AND OBSERVATION SCHEDULE

"Reporting Period" means the duration separating the submittal of a given type of monitoring report from the time the next iteration of that report is scheduled for submittal. An annual report, which is a summary of all the monitoring during the previous year, shall also be submitted to the Regional Board. The submittal dates for Detection Monitoring Reports and the Annual Summary Report are as follows:

1. Detection Monitoring Reports

a. 1st Semiannual Report (January 1 through June 30) – report due by **August 1**

b. 2nd Semiannual Report (July 1 through December 31) – report due by **March 1**

2. Annual Summary Report

January 1 through December 31 – report due **March 15** of the following year.

3. The Detection Monitoring Reports and the Annual Summary Report shall include the following:

a. The Discharger shall arrange the data in tabular form so that the specified information is readily discernible. The data shall be summarized in such a manner as to clearly illustrate whether the facility is operating in compliance with WDRs.

b. Records of monitoring information shall include:

i. The date, exact place, and time of sampling or measurement;

ii. The individual performing the sampling or measurement;

iii. The date the analysis was performed;

iv. The initials of the individual performing the analysis;

v. The analytical technique or method used; and

vi. The result of the analysis.

c. Each report shall contain the following statement:

"I declare under the penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations."

d. A duly authorized representative of the Discharger may sign the documents if:

i. Authorization is made in writing by the person described in Part I.E.1.a;

ii. Authorization specifies an individual or person having responsibility for the overall operation of the regulated disposal system; and

iii. Written authorization is submitted to the Regional Board Executive Officer.

iv. Monitoring reports shall be certified under penalty of perjury to be true and correct, and shall contain the required information at the frequency designated in this monitoring report.

APPENDIX TT-1: PLUME VELOCITY ANALYSIS

Supplemental Testimony of William Walters

INTRODUCTION

The following provides staff's analysis of the applicant's Computational Fluid Dynamics (CFD) Modeling Analysis for the Blythe Solar Power Project (BSPP) air cooled condensers (ACCs) exhaust stack plume velocities.

During the Staff Assessment Workshop the use of a CFD model, as a more thorough analytical tool to predict ACC exhaust vertical velocity was discussed, and staff noted that we would accept the velocity prediction results of a CFD model, as compared to staff's calculated predictions, if an appropriate CFD model with bounding worst-case inputs and assumptions were used.

CFD MODEL METHODOLOGY COMMENTS

On June 16, 2007, the applicant provided a CFD modeling analysis that they claim shows the project's thermal plumes would not maintain the velocity that staff has concluded poses a threat to aviation safety – 4.3 meters per second – high enough above ground to be a concern for local general aviation traffic. However, the CFD modeling inputs and assumptions do not provide a bounding worst-case analysis. Use of "typical case" inputs and non-calm wind speeds will not show the potential worst-case for the vertical velocity. The purpose of performing a CFD analysis, as was discussed during the Staff Assessment Workshop, is to compare a more robust analytical method to staff's conservative calculation method, not to dispute the worst-case assumptions or turn a safety analysis which should consider worst-case conditions into a probability analysis. Calm winds for short periods of time, only a minute or two are necessary for plume to reach heights of concern, during daylight hours can and will occur. Photographic evidence of visible plumes (the ACC plume would not be visible), including photos taken by staff in the Salton Sea area show that calm winds do occur during daylight hours.

Median temperature and low wind speed values were selected by the applicant from data obtained from a site (Edwards Air Force Base - adjacent to a wind resource area) with much higher average wind speeds than the project site location. Even if use of the Edwards AFB wind data, rather than a bounding calm wind case, were appropriate in this case, staff believes that the worst-case wind data, not the median of the selected data, should have been selected. The difference between the median and worst-case data from Edwards, as shown in Figure 3-6 of the applicants CFD analysis is substantial.

Information presented to explain and describe the selected CFD model is inadequate for review. The specific transport phenomena equations that the model uses to determine vertical velocity are not provided. A review of the visual results suggest that this CFD model does not integrate the mechanical and thermal energy and performs plume rise in a manner similar to certain simplified air quality plume rise calculations where only mechanical energy is assumed during a plume jet phase, during which velocity drops linearly with height, and then the plumes thermal energy is used to determine impacts to plume rise after the jet phase, if thermal energy properties are dominant, after the jet phase. To be a valid reflection of actual physical phenomena and expected conditions, a CFD must use an integrated set of energy equations that remove the mechanical/thermal energy velocity discontinuity that appears obvious in Figure 5-2. Thermal energy/buoyancy will slow down the rapid velocity loss through the jet phase which would provide a smooth curve of the velocity loss versus height.

CFD MODEL INPUT COMMENTS

The specific model inputs are unclear. This includes the following critical information:

1. It is not clear whether the model had specific fan inputs or input the entire ACC as a whole, based on Table 2-2 it would seem to indicate that 45 fans (modules) where modeled separately. The issue here is that staff cannot determine whether the CFD model would appropriately add the thermal energy effects from the adjacent fans. If not, and it appears not, the CFD model would significantly underestimate the thermal buoyancy impacts to the vertical velocity.

2. The fan outlet conditions are not identified only some of the inlet conditions, so the outlet conditions modeled are unclear. Does the model calculate the outlet conditions? What exactly are the assumed outlet conditions, and why wasn't this critical data tabulated?

Staff also notes that several ACC data inputs are different than data provided by the applicant that were used by staff to complete its analysis of worst-case plume velocities. A comparison of the differing ACC data is provided below in **Plume Velocity Supplement Table 1**.

Plume Velocity Supplement Table 1
BSPP ACC Exhaust Parameters

	ACC Data Provided to Staff	ACC Data in CFD Analysis
ACC Width, ft (m)	252 (76.8)	242.8 (74)
Fan Diameter, ft (m)	38 (11.6), per fan	45.1 (13.75), per fan
Number of Fans	54 (6 x 9)	45 (5 x 9)
Fan Velocity, ft/s (m/s)	20.76 (6.3)	14.8 (4.5)[a]
Flow Rate (MM lbs/hour)	335	unclear
Exhaust Temperature Delta, F (K)	16.5 (9.2)	18 (10)

Source: Solar Millennium 2009a, Solar Millennium 2010d, AECOM 2010x, and staff engineering estimates.
Note: [a] – It is not clear if this data provided on page 2-4 of the applicants study (AECOM 2010x) is correct, in fact it appears that the model actually uses a value closer to 5.4 m/s, which better matches a heat balance for the ACC.

Staff was not given a basis or rationale for these revisions to the ACC design and so cannot fully evaluate the revised design parameters.

CFD MODEL ANALYSIS COMMENTS

There are also number of minor issues and questions regarding the analysis presentation including:

1. Why is the Energy Commission PIER Group ACC study described on the bottom of page 2-2 when that study in no way compares to this CFD analysis?
2. Why are unnecessary steam side data provided and outlet air side data not provided?
3. Calm winds for ASOS meteorological stations are described by NCDC as 0-2 knots, so the study's note on page 3-5 about the reporting threshold information of 3 knots is exactly accurate;
4. The mean temperature case shown on figure 3-5 is clearly not the mean temperature of the data shown in that figure.
5. The solar collector array surrounding the ACC will collect most of the solar energy so the thermal convection surrounding the ACC will be much lower than natural conditions; it is unclear if the model inputs correctly addressed this issue.

Because of the late submittal of this study, and due to the fact that the applicant did not coordinate the CFD modeling methods and inputs with staff as requested and verbally agreed to during the SA/DEIS workshop staff cannot resolve these issues and questions.

SUMMARY

Staff's approach to aircraft safety analysis is to determine the worst-case conditions that could be experienced by a pilot to determine potential safety concerns. The applicant's CFD analysis does not use bounding case conditions to compare to staff's worst-case analysis and so does not actually identify whether there is a potential that pilots could be put at risk due to the proposed project's ACCs.

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APPENDIX A

COLORADO RIVER SUBSTATION EXPANSION AND BSPP INTERCONNECTION ACTIONS IMPACT ANALYSIS

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

TABLES

FIGURES

APPENDIX TO TRANSMISSION SYSTEM ENGINEERING COLORADO RIVER SUBSTATION EXPANSION AND BSPP INTERCONNECTION ACTIONS IMPACT ANALYSIS

Testimony of Suzanne Phinney, D.Env. and Heather Blair

1.0 INTRODUCTION AND PURPOSE

The Energy Commission has the exclusive authority to certify the construction and operation of thermal electric power plants 50 megawatts (MW) or larger and associated facilities. The Energy Commission also has the licensing authority up to the first point of interconnection for transmission facilities. Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the “whole of the action,” which may include facilities not licensed by the Energy Commission.

Energy Commission staff has prepared this Transmission System Engineering (TSE) Appendix to the Revised Staff Assessment (RSA) for the Blythe Solar Power Project (BSPP) to discuss reasonably foreseeable actions needed to interconnect the 1,000 MW BSPP to Southern California Edison’s (SCE) existing Devers- Palo Verde (DPV) 500 kV transmission line. The reasonably foreseeable actions include: 1) expanding the proposed and already permitted Colorado River Substation (CRS): 2) looping the DPV 500 kV line and terminating the new Devers-Colorado River (DCR) transmission line into the CRS; 3) modifying existing 220 kV structures; 4) constructing a distribution line for CRS light and power; 5) connecting the last tower of the BSPP generation tie line (gen-tie) to the CRS; and 6) installing and connecting telecom system components between the BSPP and the CRS, including an underground telecom line which would follow the natural gas line/access road and BSPP gen-tie route.

These actions in total comprise the CRS expansion and interconnected actions project. The first four elements would allow SCE to interconnect multiple solar development projects in the Blythe area of the Mohave Desert and therefore are reasonably foreseeable actions common to all the projects. The last two elements are specific to the BSPP project.

Certain actions have already been analyzed and permitted. The CRS (original footprint), looping of the DPV kV line, and construction of the new distribution line for CRS light and power were analyzed in the Devers – Palo Verde No. 2 500 kV Transmission Line (DPV2) Final Environmental Impact Statement/Environmental Impact Report (FEIS/FEIR). The FEIS/FEIR for the permitted Desert Southwest Transmission Line Project also analyzes the CRS original footprint as does Appendix B of the Energy Commission Revised Staff Assessment / Draft Environmental Assessment (RSA/DEA) for the Blythe Energy Project Transmission Line (BEPTL).

The Bureau of Land Management (BLM) is conducting an environmental analysis of the BSPP, pursuant to the National Environmental Policy Act (NEPA). Similar to the BSPP, the CRS would be located on land under BLM’s jurisdiction. It is expected that SCE would submit a separate application to the BLM for the CRS expansion. The CRS expansion would also be subject to permitting by the California Public Utilities

Commission (CPUC) and would require a Certificate for Public Convenience and Necessity (CPCN). Therefore, the BLM and CPUC would conduct NEPA and CEQA analyses of the expansion of the CRS as part of the permitting process.

The totality of actions comprising the CRS expansion and BSPP interconnection actions are described in this Appendix. Those actions that have not already been permitted are evaluated pursuant to CEQA.

SCE proposes to design, construct and operate the CRS. SCE has provided a project description for the substation expansion and interconnection actions (Solar Millennium 2010v). This project description is a planning level description and site-specific engineering and design documents will be prepared at a later date. Therefore this CEQA analysis provides as detailed an analysis as possible with the information available for the project at this time.

The purpose of staff's analysis is to inform the Energy Commission, interested parties and the general public of the potential environmental and public health effects caused by the approval of the BSPP. The analysis draws conclusions as to the likelihood that the substation expansion and interconnection actions could be accomplished with no significant environmental impacts, and identifies mitigation measures that could be enacted to ensure substation expansion and interconnection actions would not cause significant impacts. The analysis discusses environmental issues that generally reflect the CEQA checklist (Appendix G), but does not include sections specific to power plant operations (Facility Design, Power Plant Efficiency, Power Plant Reliability, and Transmission Line Safety and Nuisance). The construction-related analysis and proposed mitigation measures in those sections of the RSA for the BSPP project provide a general understanding of the potential impacts in those areas that could possibly, but not likely, be caused by the substation expansion and BSPP interconnection actions.

2.0 DESCRIPTION OF THE CRS EXPANSION AND BSPP INTERCONNECTION ACTIONS PROJECT

This section describes the CRS expansion needed to interconnect solar development projects in the Blythe area of the Mohave Desert and the interconnection actions needed specific to the BSPP. These actions are collectively referred to as the CRS Expansion and BSPP Interconnection Actions Project (CRS/BSPP Project).

2.1 PROJECT LOCATION

The CRS/BSPP Project (Figure 1) would be located on an approximately 140 acre parcel of land located approximately 1.5 miles south of Interstate 10 and 4.75 miles east of Wiley Well Road, in the County of Riverside, California. The expanded substation would be generally located in the eastern portion of the parcel. The approximate center of the CRS/BSPP project would be at 33.59 degrees north and 114.82 degrees west. However, the specific location of the substation may shift up to 700 ft. to the west staying with the area encompassed by environmental surveys (Solar Millennium 2010v).

The BSPP gen-tie route would start at the BSPP site and proceed south approximately 3 miles and cross over the Interstate 10 (I-10) freeway. After crossing I-10, the route would continue south for another 1.0 mile before jogging to the southwest for 0.5 mile and then heading generally west for 3.25 miles to the eastern edge of the CRS. The double circuit, 230-kV line on monopole structures would enter the substation either from a breaker in the north or the south of the substation. The location of the breaker assigned to BSPP will be included in the Phase Two Study conducted by the California Independent System Operator (CAISO) and expected by July 2, 2010 (Galati & Beck 2010f).

The proposed CRS/BSPP site is on a BLM-owned parcel that would be granted for use by SCE. The proposed location for the CRS/BSPP Project is designated Open Space-Rural in the Riverside County General Plan. Portions of the County's eastern half are located within a Specific Area Plan boundary. However; the proposed CRS/BSPP site is included in the Eastern Riverside County Areas that are not located within an Area Plan. The proposed CRS/BSPP site as well as the surrounding area is zoned Open Space-Rural (OS-RUR). Single-family residential uses are permitted at a density of one dwelling unit per 20 acres.

2.2 PROJECT DESCRIPTION

SCE proposes to construct the following elements; these elements have not yet been permitted:

- **Colorado River Substation Expansion**: SCE would expand the 500 kV switchyard previously approved as part of the DPV2 CPCN, on approximately 45 acres of land, into a full 500/220 kV substation on approximately 90 acres of land. The expanded substation would be 1,500 feet by 2,400 feet surrounded by a wall with two gates.
- **Generation Tie-line Connection:** SCE would connect the BSPP 230 kV gen-tie into the CRS by installing the last span of conductor between the 220 kV switchrack and the first BSPP transmission line north of the substation. There would be a double circuit monopole structure just north of the Colorado River Substation for the connection of the BSPP gen-ties to a 220 kV position inside the Colorado River Substation.
- **Telecommunications Facilities**: Optical ground wire (OPGW) would be strung on the BSPP gen-tie poles and would terminate inside the Project substation. SCE would install the last span of fiber optics cable between the 220kV switchrack and the first BSPP transmission line structure outside the CRS. SCE would make the final terminations to associated communications equipment installed inside both SCE's CRS and the BSPP substation.

  BSPP would construct a redundant telecom line underground between the CRS and the BSPP site. The BSPP gen-tie route would start at the BSPP site and proceed south approximately 3 miles and cross over the Interstate 10 (I-10) freeway. After crossing I-10, the route would continue south for another 1.0 mile before jogging to the southwest for 0.5 mile and then heading generally west for 3.25 miles to the eastern edge of the CRS. North of Black Rock Road, the line would be routed in a common 5 inch conduit with the site telecom and data communications cabling up to the site, and following the same route as the natural gas line. Ground disturbances associated with construction of the gen-tie and the gas line have been analyzed in the BSPP RSA. If the redundant telecom line was buried at the same time as the gas line, minimal additional trenching would be required.

Already permitted actions include the following. As noted earlier, these are briefly described here but are not evaluated in this Appendix.

- **Colorado River Substation***:* SCE would construct a new 500 kV switchyard, including appropriate support facilities, on approximately 45 acres of land.
- **Transmission Lines**: SCE would loop the existing DPV 500 kV transmission line and terminate the new DCR transmission line into the CRS by adding a total of approximately 2,000 feet of new transmission lines (three lines of approximately 1,000 feet each located side-by-side within a corridor approximately 1,000 feet wide).

  SCE would modify existing 220 kV structures. The necessary crossing of the new NextEra Resources Buck-Julian Hinds 220 kV transmission lines by the proposed SCE 500 kV loop-in lines may require modifications. New tubular steel poles (details would be determined during detailed engineering phase) to modify the construction at the crossing location may be needed to replace the existing 220kV poles.

- **Distribution Line for Station Light and Power**: SCE would construct approximately 2,500 feet of 12 kV overhead distribution line and approximately 1,000 feet of underground distribution line to connect a nearby existing distribution system to the CRS to provide substation light and power.

2.3 CONSTRUCTION AND OPERATIONS

SCE has provided the following information regarding construction of the CRS/BSPP Project (Solar Millennium 2010v).

Colorado River Substation Expansion

Construction Actions

Expansion of the CRS would entail clearing existing vegetation and installing a temporary chain link fence to surround the construction site. The site would be graded in accordance with approved grading plans. The area to be enclosed by the proposed substation perimeter wall would be graded to a slope that varies between 1 and 2% and compacted to 90% of the maximum dry density.

The CRS expansion site is located east of the Chuckwalla Dunes area and shows evidence of surface storm water runoff through the proposed site. While no designated blue-line streams are located within the substation location, it may still be necessary to redirect surface water flow around one side of the substation. The combined CRS (expansion and original footprint) and the project’s northern boundary may need to be protected from surface runoff by the installation of a berm designed to direct the flow around both sides of the substation pad. These drainage improvements would potentially disturb an area approximately 80 feet wide around three sides of the fenced in substation, resulting in a total permanent disturbance area of approximately 20 acres.

Internal surface runoff would be directed towards a detention basin located at the south end of the substation. The basin would measure approximately 120 feet by 200 feet occupying approximately one-half acre and would be enclosed by an 8-foot high chain-link fence and one 20-foot wide double drive gate. The final site drainage design would be subject to the conditions of the grading permit obtained from the County of Riverside.

Table 1 provides the approximate volume and type of earth materials to be used or disposed of at the CRS/BSPP Project site (within the substation wall and the required drainage structures outside/around the substation) as a result of substation expansion. The numbers presented in **Table 1** are preliminary and subject to change as the result of detailed engineering.

Table 1. Colorado Substation Expansion Site - Ground Surface Improvement Materials and Estimated Volumes

Element	Material	Approximate Volume (yd^3) (1)
Site Cut (2) Site Fill (2)	Soil Soil	190,000 190,000
Waste Removal (export)	Soil/Vegetation	20,000
Substation Equipment Foundations	Concrete	10,000
Equipment and cable trench excavations (3)	Soil	10,000
Cable Trenches (4)	Concrete	200
Internal Driveway	Asphalt concrete Class II aggregate base	1,200 2,800
External Driveway	Asphalt concrete Class II aggregate base	0 0
Substation Rock Surfacing	Rock, nominal 1 to 1-1/2 inch per SCE Standard	15,000

Source: Solar Millennium 2010v

(1) The material volumes presented in Table 1 are for the 45 acre Project site work only. Additional material volumes needed for surface improvement of the 45 acre Colorado River Substation are included in the previously approved DPV2 FEIS/FEIR.
(2) The design concept would be intended to balance the earthwork quantities, utilizing any site cut material as site fill material, where feasible
(3) Excavation "spoils" would be placed on site during the below-ground construction phase and used to the extent possible for the required on-site grading
(4) Standard cable trench elements are factory fabricated, delivered to the site and installed by crane. Intersections are cast-in-place concrete.

Additional temporary land disturbance (up to approximately 10 acres) adjacent to the substation location may be necessary for temporary equipment storage and material staging areas associated with construction efforts.

Prior to the start of construction, SCE expects to conduct a geotechnical study of the CRS expansion site that would include an evaluation of the depth to the water table, evidence of faulting, liquefaction potential, physical properties of subsurface soils, soil resistivity, slope stability, and the presence of hazardous materials.

After the CRS expansion site is graded, below grade facilities would be installed. Below grade facilities would include a ground grid, underground conduit, trenches, and all required foundations. The design of the ground grid would be based on soil resistively measurements collected during the geotechnical investigation conducted prior to construction. Above grade installation of substation facilities associated with the substation expansion (i.e., buses, circuit breakers and steel structures) would commence after the below grade structures are in place.

Construction of the substation expansion would require the limited use of hazardous materials such as fuels, lubricants, and cleaning solvents. All hazardous materials would be stored, handled and used in accordance with applicable regulations. Material Safety Data Sheets would be made available at the construction site for all crew workers.

The Storm Water Pollution Prevention Plan (SWPPP) prepared for the CRS expansion would provide the locations for storage of hazardous materials during construction, as well as protective measures, notifications, and cleanup requirements for any incidental spills or other potential releases of hazardous materials.

Construction of the substation expansion would result in the generation of various waste materials that can be recycled and salvaged. Waste items and materials would be collected by construction crews and separated into roll off boxes at the materials staging area. All waste materials that are not recycled would be categorized by SCE in order to assure appropriate final disposal. Nonhazardous waste would be transported to local authorized waste management facilities. Soil excavated for the substation expansion would either be used as fill or disposed of off-site at an approved licensed facility.

Any damage to existing roads as a result of construction would be repaired once construction is complete, in accordance with local agency requirements. Following completion of construction activities, SCE would also restore all areas that were temporarily disturbed by construction of the substation expansion to as close to preconstruction conditions as possible, or, where applicable, to the conditions agreed upon between the BLM and SCE. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of off-site at local authorized waste management facilities. SCE would conduct a final inspection to ensure that cleanup activities were successfully completed.

Land Disturbance

Table 2 provides a preliminary estimate of temporary and permanent land disturbance related to construction of the substation expansion (outside the substation fence and the required drainage structures outside/around the substation). The numbers presented in **Table 2** are preliminary and may change as the result of detailed engineering.

Table 2. Project Construction Estimated Land Disturbance Summary[1]

Construction Activity	Acres Temporarily Disturbed	Acres Permanently Disturbed
Substation Grading	-	45.0
Drainage/Side Slopes	-	20.0
Access Road	-	-
Staging Area	10.0	-
Total Acres Disturbed	10.0	65.0

Source: Solar Millennium 2010v

[1] The land disturbance estimates presented in Table 2 are for the 45 acre Project site work only. Initial land disturbance for the 45 acre switchyard grading and access road are included as part of the DPV2 FEIS/FEIR.

Construction Labor and Equipment

The estimated elements, materials, number of personnel and equipment required for construction of the substation expansion are summarized below in **Table 3**. The numbers presented in **Table 3** are preliminary and may change as the result of additional detailed engineering.

In addition to the information provided in **Table 3**, a temporary office trailer and equipment trailer may be placed within the proposed construction area during the construction phase of the substation expansion.

Construction would be performed by either SCE construction crews or contractors, depending on the availability of SCE construction personnel at the time of construction. Contractor construction personnel would be managed by SCE construction management personnel. SCE anticipates a minimum of approximately 25 construction personnel working on any given day.

SCE anticipates that crews would work concurrently whenever possible; however, the estimated deployment and number of crew members would depend on city permitting, material availability, and construction scheduling.

Construction activities would generally be scheduled during daylight hours in accordance with applicable noise abatement ordinances. In the event construction activities need to occur on different days or hours, SCE would obtain variances as necessary from Riverside County and other entities.

Table 3. Project Equipment and Labor Estimates (Preliminary)

Activity and number of Personnel	Number of Work Days	Equipment and Quantity	Duration of Use (Hours/Day)
Survey (2 people)	10	2-Survey Trucks (Gasoline)	8
Grading (8 people)	60	1-Dozer (Diesel) 2-Loader (Diesel) 1-Scraper (Diesel) 1-Grader (Diesel) 2-Water Truck (Diesel) 2-4X4 Backhoe (Diesel) 1-4X4 Tamper (Diesel) 1-Tool Truck (Gasoline) 1-Pickup 4X4 (Gasoline)	4 4 3 3 2 2 2 2 2
Fencing (4 people)	25	1-Bobcat (Diesel) 1-Flatbed Truck (Gasoline) 1-Crewcab Truck (Gasoline)	8 2 4
Civil (8 people)	90	1-Excavator (Diesel) 1-Foundationauger (Diesel) 2-Backhoes (Diesel) 1-Dump truck (Diesel) 1-Skip Loader (Diesel) 1-Water Truck (Diesel) 2-Bobcat Skid Steer (Diesel) 1-Forklift (Propane) 1-17 Ton Crane (Diesel) 1-Tool Truck (Gasoline)	4 5 3 2 3 3 3 4 2 hours/day for 45 days 3
Mechanical-Electrical Equipment Room (6 people)	60	1-Carry-all Truck (Gasoline) 1-tool truck (Gasoline) 1-Stake Truck (Gasoline)	3 2 2
Electrical (10) people)	120	2-Scissor Lifts (Propane) 2-Manlifts (Propane) 1-Reach Manlift (Propane) 1-15 Ton Crane (Diesel) 1-Tool Trailer 3-Crew Trucks (Gasoline)	3 3 4 3 3 2
Wiring (6 people)	90	1-Manlift (Propane) 1-Tool Trailer	4 3
Maintenance Crew Equipment Check (2 people)	30	2-MaintenanceTrucks (Gasoline)	4
Testing (2 people)	90	1-Crew Truck (Gasoline)	3
Asphalting (6 people)	40	2-Paving Roller (Diesel) 1-Asphalt Paver (Diesel) 1-Stake Truck (Gasoline) 1-Tractor (Diesel) 1-Dump Truck (Diesel) 2-Crew Trucks (Gasoline) 1-Asphalt Curb Machine (Diesel)	4 4 4 3 3 2 3

Source: Solar Millennium 2010v

<u>Generation Tie Line Connection</u>

Construction Actions

Wire stringing of 220 kV conductor includes the installation of primary conductor and overhead ground wire (OHGW), vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and stringing sheaves (rollers or travelers) are typically attached during the steel erection process.

Wire-stringing activities would be conducted in accordance with SCE specifications, which is similar to process methods detailed in Institute of Electrical and Electronics Engineers Standard (IEEE) 524-2003, Guide to the Installation of Overhead Transmission Line Conductors. To ensure the safety of workers and the public, safety devices such as traveling grounds, temporary grounding grid/mats around stringing equipment, guard structures, and radio equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

The following four steps describe the wire installation activities utilized by SCE:

- **Step 1**: Sock Line, Threading: Typically, a lightweight sock line is passed from structure to structure, which would be threaded through the wire rollers in order to engage a camlock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a conductor pull.
- **Step 2**: Pulling: The sock line would be used to pull in the conductor pulling cable. The conductor pulling cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel. A piece of hardware known as a running board would be installed to properly feed the conductor into the roller; this device keeps the bundle conductor from wrapping during installation.
- **Step 3**: Splicing, Sagging, and Dead-ending: After the conductor is pulled in, the conductor would be sagged to proper tension and dead-ended to structures.
- **Step 4**: Clipping-in, Spacers: After the conductor is dead-ended, the conductors would be secured to all tangent structures; a process called clipping in. Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

SCE estimates that an area of 150 feet by 500 feet (1.72 acres) would be optimal for tensioning equipment setup sites. An area of 150 feet by 300 feet (1.03 acres) would be optimal for pulling and equipment set-up sites; however, crews can work from within slightly smaller areas when space is limited. Each stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end.

An OHGW for shielding would be installed on the transmission line. The OHGW would be installed in the same manner as the conductor and in conjunction with installation of the conductor.

Land Disturbance

Table 4 provides an estimate of temporary and permanent land disturbance areas related to connection of the BSPP gen-tie. The numbers presented in **Table 4** are preliminary and may change as the result of detailed engineering.

Table 4. BSPP Gen-Tie Connection – Land Disturbance

	Site Quantity	Disturbed Acreage Calculation	Acres Disturbed During Construction	Acres Temporarily Disturbed	Acres Permanently Disturbed
Install New 220 kV Gen-Tie Span to Switchrack (1)	1	150' x 300'	1.03	1.03	0.00
Total Estimated Disturbed Acres (2)			**1.03**	**1.03**	**0.00**

Notes to Table 4

1. Structure construction work, including foundation installation, structure assembly & erection is the responsibility of the Developer, and is therefore not described here. All disturbance herein is solely for the installation of the final SCE-owned span between the final structure and the substation 220kV switchrack. This work would require only temporary disturbance area to set up wire stringing and pulling equipment.

2. The disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described project feature, the width of the existing right-of-way, or the width of the proposed right-of-way and, they do not include any new access/spur road information; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or Contractor awarded project.

Note: All data provided in this table is based on planning level assumptions and may change following completion of more detailed engineering, identification of field conditions, availability of material, and equipment, and any environmental and/or permitting requirements.

Source: Solar Millennium 2010v

Construction Labor and Equipment

Table 5 identifies the equipment and workforce needed to connect the BSPP gen-tie to the CRS.

Table 5. Construction Equipment and Workforce Estimates by Activity to Install BSPP 220 kV Gen-Tie

Work Activity				Activity Production			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
1-Ton Crew Cab Truck, 4x4	300	Diesel	2		2	8	
Wire Truck/Trailer	350	Diesel	2		2	2	
Dump Truck (Trash)	350	Diesel	1		2	2	
Rough Terrain Crane	350	Diesel	1		2	2	
22-Ton Manitex	350	Diesel	2		2	8	0.37 Mile/Day
30-Ton Line Truck	350	Diesel	4		2	6	
Static Truck/ Tensioner	350	Diesel	1		2	6	
Sock Line Puller	300	Diesel	1		1	6	
Bull Wheel	525	Diesel	1		1	6	

Work Activity				Activity Production			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Puller							
580 Case Backhoe	120	Diesel	1		2	2	
Lowboy Truck/Trailer	500	Diesel	2		2	2	

Crew Size Assumptions: #1 Conductor & GW Installation = one 20-man crew
Source: Solar Millennium 2010v

Telecommunication System

Construction Actions

A telecommunication system would be required in order to provide monitoring and remote operation capabilities of the electrical equipment at the BSPP Substation, and transmission line protection. To provide this system, SCE would build line protection, Supervisory Control and Data Acquisition (SCADA) and telecommunications circuit from the BSPP Substation to the CRS on an optical system utilizing OPGW on the 220 kV gen-tie line and underground in a redundant line. The gen-tie route exits the BSPP and proceeds south for 4 miles, then jogs southwest for 0.5 miles, then turns west and proceeds 3.25 miles to the CRS. The gen-tie route is analyzed in the BSPP RSA.

The underground telecom line would be installed along the same route as the BSPP telecom, gas pipeline and access road to just south of I-10 at which point the underground telecom line would be installed along the gen-tie route. Environmental impacts of the gas pipeline, access road and gen-tie line are discussed in the BSPP RSA. The underground line would be in 5 inch PVC conduit. No construction details are available at this time.

Figure 1 shows the locations of the above ground and underground telecommunication lines.

SCE would construct duct banks from the CRS mechanical-electrical equipment room (MEER) to the new transmission tower of the BSPP 220 kV gen-tie. The duct banks from the MEER would each contain one 5-inch duct. The trench would be dug 36 inches deep and 18 inches wide. The conduit would be laid in and then covered with slurry. The slurry would be covered with soil that came from the excavation. The total length of each of the ducts would be approximately 1,000 feet.

The environmental analysis presented in this Appendix includes construction of the aboveground and redundant telecom lines and connection of the telecom system to the CRS

Land Disturbance

Table 6 provides a preliminary estimate of temporary and permanent land disturbance related to connection of the telecommunication system between the CRS and the BSPP Substation. The numbers presented in **Table 6** are preliminary and may change as the result of detailed engineering.

Table 6. CRS/BSPP Project Telecommunication System Connection – Estimated Land Disturbance

Construction Activity	Acres Temporarily Disturbed	Acres Permanently Disturbed
Two ducts from Colorado River Substation telecom vault to first 220kV tower outside station[1]	0.06	-
Above ground telecom line[2]	-	-
Underground telecom line[3]	1.89	-
Total Acres Disturbed	1.95	-

[1] 1,000 feet long by 1.5 feet wide trench

[2] No additional land disturbance over that associated with gen-tie construction (see BSPP RSA)

[3] 55,000 feet by 1.5 feet wide trench

Source: Adapted from Solar Millennium 2010v

Construction Labor and Equipment

Table 7 identifies the equipment and workforce needed to connect the proposed telecommunications facilities. Labor associated with the underground telecom line is assumed to be included in the RSA as part of the gas line construction. The numbers presented in **Table 7** are preliminary and subject to change as the result of detailed engineering.

Table 7. Telecommunication System Connection Construction Equipment and Workforce Estimates by Activity

Construction Activity	Number Of Personnel	Number Of Days	Equipment Requirements
Trench Construction	5	4	2-crew trucks (gas/diesel) 1-backhoe (diesel) 1-stakebed truck (diesel) 1-concrete mixer (diesel)
Underground Fiber Cable Installation	5	2	1-crew trucks (gas/diesel) 2-line trucks (diesel)
Telecommunications Installation Crew	2	10	2-vans (gas)

Source: Adapted from Solar Millennium 2010v

Best Management Practices and Design Measures

Conditions of Certification, Best Management Practices (BMPs) and design measures included in the Staff Assessment and RSA for the BSPP may be applicable to the CRS substation expansion and interconnection facilities. Staff recommends that these measures be considered by SCE when constructing the CRS expansion and interconnection facilities. The CPUC would license the CRS expansion and interconnection actions and may require additional measures beyond those identified in the following sections, pending further environmental analysis conducted by other agencies pursuant to CEQA and NEPA.

SCE would be the builder of these proposed facilities and would be expected to operate under these standard SCE BMPs[1] along with project specific mitigation.

[1] Source: Solar Millennium 2010v

Air Quality

AIR-1 The construction activities would be in compliance with AQMD requirements, as applicable to the project.

Aesthetics and Visual Resources

AES-1 LSTs and TSPs would be galvanized steel with a dulled grey finish that minimizes reflected light.

AES-2 Insulators that minimize reflection of light would be utilized.

AES-3 Substation equipment would have materials that minimize reflective light.

AES-4 If chain link fence is used, it would have a dulled-finish.

AES-5 The substation lighting would be designed to be manually operated for non-routine nighttime work.

Biological Resources

BIO-1 Preconstruction biological clearance surveys would be conducted to identify special-status plants and wildlife.

BIO-2 SCE would prepare a Worker Environmental Awareness Program (WEAP). All construction crews and contractors would be required to participate in WEAP training prior to starting work on the project.

BIO-3 All transmission and subtransmission towers and poles would be designed to be avian-safe in accordance with the suggested practices for Avian Protection on Power Lines: the State of the Art in 2006 (Avian Power Line Interaction Committee 2006).

Cultural Resources

CR-1 A cultural resource inventory of the project area would be conducted for cultural resources prior to any disturbance. All surveys would be conducted and documented as per applicable laws, regulations, and guidelines.

CR-2 To the extent feasible, all ground-disturbing activities shall be sited to avoid or minimize impacts to cultural resources listed as, or potentially-eligible for listing as, unique archaeological sites, historical resources, or historic properties.

CR-3 A protective buffer zone would be established and maintained around each recorded archaeological site within or immediately adjacent to the ROW.

Paleontology Resources

PALEO-1 A paleontologist would conduct a pre-construction field survey of the project area.

PALEO-2 Prior to construction, a certified paleontologist would supervise monitoring of construction excavations.

Geology and Soils

GEO-1 Prior to final design of substation facilities, and transmission, a combined geotechnical engineering and engineering geology study would be conducted to identify site-specific geologic conditions and potential geologic hazards in sufficient detail to support sound engineering practices.

GEO-2 For new substation construction, specific requirements for seismic design would be followed based on the Institute of Electrical and Electronic Engineers' 693 "Recommended Practices for Seismic Design of Substations."

GEO-3 New access roads, where required, would be designed to minimize ground disturbance during grading.

GEO-4 Cut and fill slopes would be minimized by a combination of benching and following natural topography where feasible.

GEO-5 Any disturbed areas associated with temporary construction would be returned to preconstruction conditions (to the extent feasible) after the completion of project construction.

Hazards and Hazardous Waste

HAZ-1 A Phase I ESA would be performed at each new or expanded substation location and along newly acquired transmission subtransmission line ROWs.

HAZ-2 SCE would implement standard fire prevention and response practices for the construction activities.

HAZ-3 As applicable, SCE would follow fire codes per Cal Fire Power Line Fire Prevention Fire Guide requirements for vegetation clearance during construction of the project to reduce the fire hazard potential.

HAZ-4 Hazardous materials and waste handling would be managed in accordance with the following SCE plans and programs:

- *Spill Prevention, Countermeasure, and Control Plan (SPCC Plan).* In accordance with Title 40 of the CFR, Part 112, SCE would prepare a SPCC for proposed and/or expanded substations, as applicable.
- *Hazardous Materials Business Plans (HMBPs).* Prior to operation of new or expanded substations, SCE would prepare or update and submit, in accordance with Chapter 6.95 of the CHSD, and Title 22 CCR, an HMBP, as applicable.
- *Storm Water Pollution Prevention Plan (SWPPP):* A project-specific construction SWPPP would be prepared and implemented prior to the start of construction of the transmission line and substation.
- *Health and Safety Program:* SCE would prepare and implement a health and safety program to address site-specific health and safety issues.
- *Hazardous Materials and Hazardous Waste Handling:* A project specific hazardous materials management and hazardous waste management program would be

developed prior to initiation of the project. Material Safety Data Sheets would be made available to all Project workers

- *Emergency Release Response Procedures:* An Emergency Response Plan detailing responses to releases of hazardous materials would be developed prior to construction activities. All construction personnel, including environmental monitors, would be aware of state and federal emergency response reporting guidelines.

HAZ-5 Hazardous materials would be used or stored and disposed of in accordance with Federal, State, and Local regulations.

HAZ-6 The substation would be grounded to limit electric shock and surges that could ignite fires.

HAZ-7 All construction and demolition waste would be removed and transported to an appropriately permitted disposal facility.

Hydrology and Water Quality

HYDRO-1 Construction equipment would be kept out of flowing stream channels as feasible.

HYDRO-2 Towers would be located to avoid active drainage channels, especially downstream of steep hill slope areas, to minimize the potential for damage.

Land Use

LAND USE-1 SCE shall provide 14 days of advance notice of the start of construction to property owners located within 300 feet of construction-related activities.

Noise

NOISE-1 SCE would comply with local noise ordinances.

Transportation and Traffic

TRANS-1 Traffic control services would be used for equipment, supply delivery, and conductor stringing, as applicable.

TRANS-2 Construction traffic would be scheduled for off-peak hours to the extent feasible and would not block emergency equipment routes.

TRANS-3 If work requires modifications or activities within local roadway and railroad ROWs, appropriate permits would be obtained prior to the commencement of construction activities.

3.0 ANALYSIS OF COLORADO RIVER SUBSTATION EXPANSION AND BSPP INTERCONNECTION ACTIONS

This section examines the potential impacts of reasonably foreseeable actions required for the operation of the BSPP. The CRS expansion, connection of BSPP gen-tie, and connection of and telecommunications facilities would be built by SCE and would be fully evaluated in a future environmental document prepared in response to an application to the BLM for a lease to construct the CRS. The BSPP applicant would build the telecom lines. Because a Form 299 (Application for Transportation and Utility Systems and Facilities on Federal Lands) has not yet been submitted to BLM and the SCE project is still in the planning stages, the level of impact analysis presented is based on available information.

The purpose of this analysis is to inform the Energy Commission and interested parties, and the general public of the potential environmental and public health effects that may result from other actions related to the BSPP.

3.1 AIR QUALITY

Environmental Setting

The air quality setting for the proposed project can be described regionally and locally. The proposed project is located within the eastern portion of Riverside County, within the Mojave Desert Air Basin (MDAB). MDAB is an assemblage of mountain ranges interspersed with long broad valleys, with a dry-hot desert climate. Air quality regulations in the MDAB are provided by the Mojave Desert Air Quality Management District (MDAQMD). The MDAQMD also provides an analysis of compliance with LORS. The affected environment resulting from the proposed CRS/BSPP Project is the same as that for the BSPP described in more detail in Section C.1.4.1 of staff's RSA for the BSPP. Laws, ordinances, regulations and standards (LORS) are also described in the RSA (CEC 2010ab).

Local air quality is based on proximity of sensitive air quality receptors to local air pollution sources (e.g., traffic-congested roadways and intersections). Sensitive air quality receptors include structures that house children, the elderly, and persons with preexisting respiratory or cardiovascular illness (i.e., schools, hospitals, and nursing homes).

Colorado River Substation Expansion

The proposed CRS/BSPP Project site is on a BLM-owned parcel that would be granted for use by SCE. The proposed substation expansion site is located east of the Chuckwalla Dunes area in the county of Riverside. A mobile home is located approximately 725 feet east and 775 feet south of the BSPP site boundary; numerous residences are located just south of I-10 and approximately 1 mile east of the proposed gen-tie where it crosses over I-10; and the Chuckwalla Valley Ironwood State Prisons are located roughly 6.5 miles southwest of the CRS expansion site.

Generation Tie Line Connection

Connection of the BSPP tie-line would take place at the CRS. The environmental setting would be the same as for the CRS (described immediately above).

Telecommunication System

BSPP would utilize OPGW on the interconnection gen-tie and SCE would terminate the fiber optics inside the Colorado River Substation. SCE would install the last span of fiber optics between the 220 kV switchrack and the first BSPP transmission line structure north of CRS.

To provide redundancy, a telecom line would also be constructed underground in a 5-inch PVC conduit from the BSPP to the CRS along the BSPP gas line and tie-line route. Starting from the BSPP, the line would be within the natural gas line and access road right of way (ROW) until it reaches the Southern California Gas Company (SoCal Gas) transmission pipeline and from that point, the line would follow the BSPP gen-tie route until reaching the CRS. Sensitive receptors may be located one mile east of the telecom line route.

Potential Impacts of Proposed Downstream Upgrades

The potential air pollutant emissions that would be generated by the project have been assessed qualitatively and quantitatively. The project emissions are estimated based on the construction information provided by SCE, the anticipated impacts of emissions have been identified, and general measures to reduce potential impacts are recommended. Subsequent environmental review pursuant to CEQA and NEPA will require a quantitative analysis for all project components and specific mitigation measures would be identified accordingly.

The proposed project components (i.e., substation, generation tie line connection, and telecommunication system) would generate air pollutant emissions, primarily from facilities construction and, to a much lesser degree, from the operation and maintenance of the constructed facilities. Construction activities would generate temporary (short-term) emissions as fugitive dust emissions (particulate matter) from earth-moving activities and as exhaust emissions from the operation of construction equipment and vehicles. Exhaust emissions may include carbon monoxide (CO); ozone (O_3) precursors; nitrogen dioxide (NO_2); sulfur dioxide (SO_2); lead (Pb); and particulate matter, which is subdivided into two classes based on particle size: fine particles (PM2.5) and inhalable particles (PM10). Operation of the proposed CRS/BSPP Project would generate minor stationary and mobile exhaust emissions from operation and maintenance of the proposed facilities (i.e., substation and fiber optic lines).

The construction emissions for the substation expansion are anticipated to be significant for PM10 if mitigation measures are not implemented. The construction emissions for the gen-tie connection and telecommunication system are not anticipated to be substantial or to exceed MDAQMD CEQA significance thresholds. Project operational emissions are anticipated to be negligible, as the emissions from the constructed substation and installed fiber optic lines would be limited to emergency generators and occasional maintenance.

Since the CRS/BSPP project facilities would be largely located away from sensitive air quality receptors, the diesel PM emissions generated from construction equipment and mobile sources are not anticipated to subject sensitive receptors to adverse levels of diesel PM or other emissions. Impacts of trenching with respect to sensitive receptors at the BSPP site are discussed in the RSA and would be less than significant.

The following describes the types of activities and emissions associated with each element of the CRS/BSPP Project, and provides the basis and the emission estimates for the conclusions presented above.

Colorado River Substation Expansion

The proposed CRS expansion project site would occupy a 45-acre parcel located approximately 1.5 miles south of Interstate 10. Air quality impacts for the BSPP Project site are included in Section 5.1 of the RSA, and were generally found to be less than significant with implementation of mitigation.

The substation and interconnection would generate air pollutant emissions primarily from facility site construction; minor emissions would be generated from the post-construction operation and maintenance of the constructed substation. The air emissions would consist of exhaust emissions from heavy-duty diesel construction equipment use, diesel and gasoline fueled on-road delivery trucks, and fugitive dust (particulate matter) emissions from construction activities and from vehicle travel on unpaved surfaces. The access road to the site would likely be Wiley's Well Road, which is approximately 4.75 miles west of the center of the project site. Five miles of unpaved road distance for each vehicle trip are assumed in the emission estimates. Construction activities would include site grading, facility installation, wiring, and paving. Project emissions from the substation expansion construction compared to the applicable thresholds are presented in **Table 8** below.

Given the number of construction days for each activity by SCE, the construction schedule is developed based on staff's review of other SCE substation/transmission projects, such as El Casco Project and Tehachapi Renewable Transmission Project. The proposed project construction would start in the fourth quarter of 2010 and would occur over 21 months. Different phases of the construction would overlap as necessary during the construction period. The construction equipment and required material provided by SCE are utilized in the Staff emission estimates.

Table 8.
CRS Expansion – Maximum Daily and Annual Construction Emissions

	NOx	SOx	CO	VOC	PM10	PM2.5
Maximum Daily Emissions (lbs/day)						
CRS Expansion Project Emissions	72.77	2.37	32.86	10.42	308.52	52.85
Significant Threshold	137	137	548	137	82	82
Threshold Exceeded?	No	No	No	No	Yes	No
Maximum Annual Emissions (ton/year)						
CRS Expansion Project Emissions	5.43	0.01	2.65	0.63	21.96	4.10
Significant Threshold	25	25	100	25	15	15
Threshold Exceeded?	No	No	No	No	Yes	No

Note: Significance of the project impacts are determined using the significance criteria/thresholds that SCE would be expected to use in the subsequent analysis for the Project, which are not the significance criteria/thresholds used by the Energy Commission for power plant significance determination.

The worst case daily emissions would occur during Month 5 for all pollutants, with an exception for SOx which would have its maximum daily emissions during Month 4. During Month 5, fencing and civil phases would overlap. The most number of off road trips generated by equipment vehicles and construction employees occur during Month 5. Also, delivery of 10,000 cubic yards of concrete would be required at the early stage of the civil phase, which would create substantial on road emissions. The worst case annual emissions represent the highest emissions during any consecutive 12 month period. The maximum annual emissions would occur during first twelve consecutive months, Month 1 – Month 12, when grading phase and civil activities dominate the annual emissions.

The worst-case particulate matter emissions would exceed the MDAQMD daily and annual significant thresholds. The long unpaved road distance from Wiley's Well Road to the site would result in this PM10 exceedance. Paving the main access road would reduce the construction emissions to less than significant and also would reduce the operating/maintenance emissions.

Generation Tie Line Connection

Connecting the gen-tie line to the CRS would include the installation of primary conductor and overhead ground wire (OHGW), vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies.

The air emissions would consist of exhaust emissions from heavy-duty diesel construction equipment use, diesel and gasoline fueled on-road delivery trucks, and fugitive dust (particulate matter) emissions from construction activities and from vehicle travel on unpaved road. The gen-tie line connection would be temporary and short-term, approximately 2 days. Due to the nature of short-term construction, the construction emissions would be minimal, lower than the significance thresholds shown in **Table 8** and, therefore would be less than significant.

Telecommunication System

In order to provide monitoring and remote operation capabilities of the electrical element at the Project substation, a telecommunication system is required, which would include line protection, installation of Supervisory Control and Data Acquisition (SCADA) and telecommunications circuit from the BSPP Substation to the CRS on an optical system utilizing OPGW on the 220 kV gen-tie line. The buried telecom line from the BSPP to the CRS would be constructed within the natural gas line/access road and gen-tie routes.

Air emissions would consist of exhaust emissions from use of a backhoe, diesel and gasoline fueled on-road trucks, and fugitive dust (particulate matter) emissions from construction activities and from vehicle travel on unpaved road. Based on the expected short construction duration and the minimal number of construction equipment, the construction emissions would be minimal, lower than the significance thresholds shown in **Table 8** and, therefore would be less than significant.

Impact Minimization Measures

The CRS Expansion Project would be required to comply with all MDAQMD rules, including portable equipment rules, which would dictate how the equipment could be operated. Mitigation measures would be implemented in compliance with the MDAQMD Ozone State Implementation Plan to reduce the emissions generated during project construction and operation.

Construction-related activities and emissions at the project site are consistent with activities and emissions encountered at any construction site. Compliance with the provisions of the following necessary construction permits: 1) grading permit; 2) SWPPP requirements (construction site provisions); 3) use permit; and 4) building permits.

Construction phase emissions are generally short-term in duration, considering the life time of the project. Effective and comprehensive control measures would be needed to reduce equipment and fugitive dust emissions to the extent feasible. Staff recommends that the following measures be implemented during construction to mitigate potential impacts to air quality:

- Implement fugitive dust control requirements, including paving the main access road to the CRS site before primary construction activities begin, watering active construction areas, implementing trackout controls, and applying other activity-specific control measures to reduce fugitive dust emissions during construction.
- Limit the potential offsite impacts from visible dust emissions, by responding to situations when the fugitive dust control measures are not working effectively to control fugitive dust from leaving the construction area.
- Mitigate the PM and NOx emissions from large diesel-fueled construction equipment by using newer cleaner engines and other various control measures such as idle time restrictions, engine maintenance, etc.

With effective and comprehensive control measures such as those recommended in this section, dust and equipment exhaust impacts would be reduced and would be less than significant.

3.2 BIOLOGICAL RESOURCES

Environmental Setting

Reconnaissance surveys of the proposed BSPP gen-tie transmission line and other proposed off-site linears were conducted in spring 2010; the survey area included the CRS expansion area, telecommunications line and gen-tie interconnection. The biological resources setting of the proposed off-site linears is described in Section C.2.4.1 of the BSPP RSA and summarized below.

Vegetation Communities

CRS Expansion and Gen-Tie Connection

Staff has little project-specific information regarding the habitat types that would be permanently or temporarily impacted by the CRS expansion and gen-tie connection, but infers that construction would occur within sand dune habitat. The basis for this inference is Figure DR-BIO-51-2 from the Data Response submitted for the Blythe Project (AECOM 2010e), which shows the approximate location of the proposed Colorado River Substation and depicts it as being entirely within stabilized and partially stabilized sand dune. Supporting staff's inference that the substation expansion would be in sand dunes is the Blythe Applicant's submittal which included the 2010 preliminary survey results from the Blythe Project (AECOM 2010u). This submittal showed numerous records for species that occur on sand dune habitat (for example Mojave fringe-toed lizard and ribbed cryptantha) in and around the proposed CRS location.

Stabilized and partially stabilized desert dunes are accumulations in the desert which are stabilized or partially stabilized by evergreen and/or deciduous shrubs and scattered, low grasses. These dunes typically occur lower than active dune systems and retain water just below the sand surface which allows deep-rooted, perennial vegetation to survive during longer drought periods. The dominant plant species associated with this community include four-wing saltbush (*Atriplex canescens*), desert croton (*Croton californicus*), and Colorado desert buckwheat (*Eriogonum deserticola*).

Staff does not have information about the presence of ephemeral washes, desert dry wash woodland and other waters of the state in the proposed substation expansion and gen-tie connection area. Although none were observed based on preliminary review of topographic maps and aerial imagery, field delineations are needed to substantiate this.

Telecommunications System

Habitat types within the telecommunications route include Sonoran creosote bush scrub, stabilized and partially stabilized desert dunes, desert dry wash woodland, and creosote bush-big galleta grass.

Sonoran creosote bush scrub occurs on well-drained, secondary soils of slopes, fans, and valleys and is the basic creosote scrub community of the Colorado Desert (Holland 1986). Within this community, soils are generally sandy-loams with scattered areas of fine gravel. The dominant plant species are creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), white ratany (*Krameria grayi*), and cheesebush (*Hymenoclea salsola*).

Desert dry wash woodland and creosote bush-big galleta grass occur within ephemeral drainages in the northern portion of the telecommunications route near the BSPP site. Desert dry wash woodland is designated as a sensitive vegetation community by the California Natural Diversity Data Base (CNDDB) and BLM, and is also designated as state waters by CDFG. This vegetation community is an open to densely covered, drought-deciduous, microphyll riparian scrub woodland. These habitat types often support braided wash channels that change patterns and flow directions following every surface flow event (Holland 1986). Within the project area, this community is dominated by an open tree layer of blue palo verde, honey mesquite, ironwood, and smoke tree with an understory of big galleta grass (*Pleuraphis rigida*), desert starvine (*Brandegea bigelovii*), and intermixed creosote scrub (*Larrea tridentata*) and Russian thistle (*Salsola tragus*). Various signs of coyote (*Canis latrans*), fox (either kit fox or gray fox) and bobcat (*Lynx rufus*) were observed within this vegetation community, which provides food, cover, dispersal, and refuge habitat to a variety of wildlife.

Vegetated ephemeral washes of the creosote bush-big galleta grass association are relatively uncommon in California deserts and is defined by CDFG as a rare natural community, with a CNDDB State (NatureServe) Rank of G3 S2.2 (CDFG considers natural communities with a State Rank 3 or less to be rare). Within the project area, the creosote bush-big galleta grass community occurs as an understory component in the washes within the desert dry wash woodland and continues along the drier reaches of ephemeral desert washes where sandy fluvium collects. Dominant and indicator plants of this community include creosote bush, big galleta grass, and cheesebush, another characteristic perennial of ephemeral desert washes. Occasional associates found within this community include brownplume wirelettuce (*Stephanomeria pauciflora* var. *pauciflora*), Utah cynanchum (*Cynanchum utahense*), Hartweg's twinevine (*Sarcostemma cynanchoides* ssp. *hartwegii*), and trailing townula (*Sarcostemma hirtellum*). This desert wash community often occurs as the only vegetated habitat in broad expanses of desert pavement, which increases its value to wildlife.

Special Status Species

Special-status species are plant and wildlife species that have been afforded special recognition by federal, state, or local resource agencies or organizations. Listed and special-status species are of relatively limited distribution and typically require unique habitat conditions. Special-status species are defined as meeting one or more of the following criteria:

- Listed as threatened or endangered or candidates for future listing as threatened or endangered under CESA or FESA;
- Protected under other regulations (e.g. Migratory Bird Treaty Act);
- Listed as species of concern by the California Department of Fish and Game (CDFG);
- BLM sensitive species;
- A plant species considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" (CNPS List 1A, 1B, and 2) as well as CNPS List 3 and 4 plant species;
- A plant listed as rare under the California Native Plant Protection Act;
- Considered a locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region or is so designated in local or regional plans, policies, or ordinances; or
- Any other species receiving consideration during environmental review under CEQA.

Table 9 lists special-status species that are known to occur or could potentially occur in the Project area and vicinity. Special-status species (or their sign) observed during field surveys of the CRS expansion area and BSPP linears (AECOM 2010u) are indicated by **bold-face type**.

Table 9.
Special-Status Species Potentially Occurring in the Project Area

PLANTS		
Common Name	**Scientific Name**	**Status State/Fed/CNPS/BLM/ Global Rank/State Rank**
Chaparral sand verbena	*Abronia villosa* var. *aurita*	__/__/1B.1/__/G5T3T4/S2.1
Angel trumpets	*Acleisanthes longiflora*	__/__/2.3/__/G5/S1.3
Desert sand parsley	*Ammoselinum giganteum*	__/__/2.3/__/G2G3/SH
Small-flowered androstephium	*Androstephium breviflorum*	__/__/2.2/__/G5/S2
Harwood's milk-vetch	***Astragalus insularis* var. *harwoodii***	**__/__/2.2/__/G5T3/S2.2?**
Coachella Valley milk-vetch	*Astragalus lentiginosus* var. *coachellae*	__/FE/1B.2./S/G5T2/S2.1
California ayenia	*Ayenia compacta*	SE/__/2.3/__/G4/S3.3
Pink fairy duster	*Calliandra eriophylla*	__/__/2.3/__/G5/S2.3
Sand evening-primrose	*Camissonia arenaria*	__/__/2.2/__/G4?/S2
Crucifixion thorn	*Castela emoryi*	__/__/2.3/__/G3/S2.2
Abram's spurge	*Chamaesyce abramsiana*	__/__/2.2/__/G4/S1.2
Arizona spurge	*Chamaesyce arizonica*	SR/__/2.3/__/G5/S1.3
Flat-seeded spurge	*Chamaesyce platysperma*	__/__/1B.2/S/G3/S1.2?
Las Animas colubrina	*Colubrina californica*	__/__/2.3/__/G4/S2S3.3
Spiny abrojo/Bitter snakeweed	*Condalia globosa* var. *pubescens*	__/__/4.2/__/G5T3T4/S3.2
Foxtail cactus	*Coryphantha alversonii*	__/__/4.3/__/G3/S3.2
Ribbed cryptantha	***Cryptantha costata***	**__/__/4.3/__/G4G5/S3.3**
Winged cryptantha	***Cryptantha holoptera***	**__/__/4.3/__/G3G4/S3?**
Wiggins' cholla	*Cylindropuntia wigginsii (syn=Opuntia wigginsii)*	__/__/3.3/__/G3?Q/S1.2?
Utah vining milkweed	***Cynanchum utahense***	**__/__/4.2/__/G4/S3.2**
Glandular ditaxis	*Ditaxis claryana*	__/__/2.2/__/G4G5/S1S2
California ditaxis	*Ditaxis serrata* var. *californica*	__/__/3.2/__/G5T2T3/S2.2
Harwood's eriastrum	***Eriastrum harwoodii***	**__/__/1B.2/BLM/G2/S2**
California satintail	*Imperata brevifolia*	__/__/2.1__/G2/S2.1
Cottontop cactus	*Echinocactus polycephalus* var. *polycephalus*	__/__/__/__/__/__
Pink velvet mallow	*Horsfordia alata*	__/__/4.3/__/G4/S3.3
Bitter hymenoxys	*Hymenoxys odorata*	__/__/2/__/G5/S2
Spearleaf	*Matelea parvifolia*	__/__/2.3/__/G5?/S2.2
Argus blazing star[2]	*Mentzelia puberula*	__/__/__/__/__/__
Slender woolly-heads	*Nemacaulis denudata* var. *gracilis*	__/__/2.2/__/G3G4T3?/S2S3
White-margined penstemon	*Penstemon albomarginatus*	__/_ /1B.1/S/G2/S1
Lobed cherry	*Physalis lobata*	__/__/2.3/__/G5/S1.3
Desert portulaca	*Portulaca halimoides*	__/__/4.2/__/G5/S3
Desert unicorn plant	***Proboscidea althaeifolia***	**__/__/4.3/__/G5/S3.3**
Orocopia sage	*Salvia greatae*	__/__/1B.3./S/G2/S2.2
Desert spikemoss	*Selaginella eremophila*	__/__/2.2./__/G4/S2.2?
Cove's cassia	*Senna covesii*	__/__/2.2/__/G5?/S2.2
Mesquite nest straw	*Stylocline sonorensis*	__/__/1A/__/G3G5/SX
Dwarf germander	*Teucrium cubense* ssp. *depressum*	__/__/2.2/__/G4G5T3T4/S2

[2] Proposed new addition to the CNPS Inventory (Andre, pers. comm. in CEC 2010ab)

Jackass clover	*Wislizenia refracta* ssp. *refracta*	__/__/2.2/__/G5T5?/S1.2?
Palmer's jackass clover[3]	*Wislizenia refracta* ssp. *palmeri*	__/__/Proposed 1B/__/__/__
WILDLIFE		
Common Name	**Scientific Name**	**Status State/Federal**
Reptiles/Amphibians		
Desert tortoise	***Gopherus agassizii***	**ST/FT**
Couch's spadefoot toad	***Scaphiopus couchii***	**CSC/__/BLM Sensitive**
Mojave fringe-toed lizard	***Uma scoparia***	**CSC/BLM Sensitive**
Desert rosy boa	*Charina (Lichanura) trivirgata*	__/__
Chuckwalla	*Sauromalus obesus*	__/__
Birds		
Western burrowing owl	***Athene cunicularia hypugaea***	**CSC/BCC/BLM Sensitive**
Golden eagle	*Aquila chrysaetos*	CFP/__/BLM Sensitive
Short-eared owl	*Asio flammeus*	CSC
Ferruginous hawk	***Buteo regalis***	**WL/BLM Sensitive**
Swainson's hawk	***Buteo swainsoni***	**ST**
Prairie falcon	*Falco mexicanus*	WL
American peregrine falcon	*Falco peregrinus anatum*	SFP
Vaux's swift	*Chaetura vauxi*	CSC
Mountain plover	*Charadrius montanus*	CSC/__/BLM Sensitive
Northern harrier	***Circus cyaneus***	**CSC**
Gilded flicker	*Colaptes chrysoides*	SE
Yellow warbler	*Dendroica petechia sonorana*	CSC
California horned lark	*Eremophila alpestris actia*	WL
Yellow-breasted chat	*Icteria virens*	CSC
Loggerhead shrike	***Lanius ludovicianus***	**CSC/BCC**
Gila woodpecker	*Melanerpes uropygialis*	SE
Black-tailed gnatcatcher	*Polioptila melanura*	__/__
Purple martin	*Progne subis*	CSC
Vermilion flycatcher	*Pyrocephalus rubinus*	CSC
Brewer's sparrow	*Spizella breweri*	BCC
Bendire's thrasher	*Toxostoma bendirei*	CSC/__/BLM Sensitive
Crissal thrasher	*Toxostoma crissale*	CSC
Le Conte's thrasher	*Toxostoma lecontei*	WL/BCC/Sensitive
Mammals		
Pallid bat	*Antrozous pallidus*	CSC/__ /BLM Sensitive
Townsend's big-eared bat	*Corynorhinus townsendii*	CSC/__/BLM Sensitive
Spotted bat	*Euderma maculatum*	CSC/__/ BLM Sensitive
Western mastiff bat	*Eumops perotis californicus*	CSC/__/ BLM Sensitive
Hoary bat	*Lasiurus cinereus*	__/__
California leaf-nosed bat	*Macrotus californicus*	CSC/__/ BLM Sensitive
Arizona myotis	*Myotis occultus*	CSC
Cave myotis	*Myotis velifer*	CSC/__/ BLM Sensitive
Yuma myotis	*Myotis yumanensis*	__/__/BLM Sensitive

[3] Proposed new addition to the CNPS Inventory (Silverman, pers comm. in CEC 2010ab)

Colorado Valley woodrat	*Neotoma albigula venusta*	__/__
Pocket free-tailed bat	*Nyctinomops femorosaccus*	CSC
Big free-tailed bat	*Nyctinomops macrotis*	CSC
Burro deer	***Odocoileus hemionus eremicus***	**__/__/__**
Nelson's bighorn sheep	*Ovis canadensis nelson*	__/BLM Sensitive
Yuma mountain lion	*Puma concolor browni*	CSC
American badger	***Taxidea taxus***	**CSC**
Desert kit fox	***Vulpes macrotis arsipus***	**__/__**

Sources: CEC 2010ab; AECOM 2010u

*Status Legend (State/Fed/CNPS/BLM/Global Rank/State Rank):
FE = Federally listed Endangered; FT = Federally listed Threatened; BCC = USFWS Bird of Conservation Concern; SE = State listed Endangered; ST = State listed Threatened; CSC = California Species of Concern; SFP = State Fully Protected; CCR = Protected under CDFG Code Title 14, CCR §460; WL = State Watch List; List 1B = Rare or Endangered in California and elsewhere; List 2 = Rare, threatened, or endangered in California but more common elsewhere; List 4 = Limited distribution – a watch list; .1 = Seriously threatened in California (high degree/immediacy of threat); .2 = Fairly threatened in California (moderate degree/immediacy of threat)

Global Rank/State Rank
G1 or S1 = Critically imperiled; Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals; G2 or S2 = Imperiled; 6-20 EOs OR 1,000-3,000 individuals; G3 or S3 = Rare, uncommon or threatened, but not immediately imperiled; 21-100 EOs OR 3,000-10,000 individuals; G4 or S4 = Not rare and apparently secure, but with cause for long-term concern; G5 or S5= Demonstrably widespread, abundant, and secure. Threat Rank .1 = very threatened; .2 = threatened; .3 = no current threats known

Surveys conducted of the BSPP linears included the proposed telecom line (AECOM 2010u). Special-status plants observed during fall 2009 and spring 2010 surveys include: Harwood's milkvetch, Harwood's eriastrum, ribbed cryptantha, Utah milkvine, and desert unicorn plant. Special status wildlife observed include: Mojave fringe-toed lizard, desert kit fox (active complex), Swainson's hawk, ferruginous hawk, northern harrier, loggerhead shrike. Additionally, ponded features that could provide suitable breeding habitat for Couch's spadefoot toad occur in three locations along the telecommunication line route near Interstate 10. Additionally, desert tortoise bone fragments and possible tortoise burrow or pallet were observed along the telecommunication line route; no live tortoise were observed.

Surveys conducted of the CRS substation expansion area also included the proposed gen-tie connection area (AECOM 2010u). Special-status plants observed during spring 2010 surveys include: Harwood's milkvetch, Harwood's eriastrum, ribbed cryptantha, and winged cryptantha. Special status wildlife observed include: many Mojave fringe-toed lizards, desert kit fox, Swainson's hawk, loggerhead shrike. Additionally, desert tortoise bone fragments were observed within 0.75 to one mile of the CRS expansion area; no live tortoise or recent sign were observed. The CRS expansion area may also provide suitable foraging habitat for raptors, including golden eagle and Swainson's hawk.

Impacts

The proposed CRS expansion is considered in the Biological Resources section of the RSA as a reasonably foreseeable development scenario, and a screening-level analysis of potential impacts to biological resources is included in the RSA. The BSPP off-site linears (i.e., gen-tie transmission line, access road, and gas pipeline) were fully analyzed by staff in the Biological Resources section of the RSA as a part of the proposed BSPP. The telecommunication line and gen-tie connection would be co-located with these linears and therefore, impacts would be substantially similar. Staff's analysis of impacts from the CRS expansion and off-site linears, as presented in the Biological Resources section of the RSA (Section 6.2.4.2), are summarized below.

CRS Expansion and Gen-Tie Connection

Based on the information from the Blythe Project 2010 surveys (AECOM 2010u Figure 2 - Preliminary Results Botany Rare Plants Spring 2010 Surveys, and Figure 4 - Incidental Wildlife Observations Spring 2010 Surveys) staff has concluded that Mojave fringe-toed lizards and a number of other sensitive sand dune-dependent species are likely to be directly impacted by expansion of the Colorado River Substation. Many Mojave fringe-toed lizards were detected in and near the proposed CRS, as well as numerous rare plants, including Harwood's eriastrum, Harwood's milk-vetch, winged cryptantha and ribbed cryptantha.

Harwood's eriastrum, a California endemic and BLM Sensitive species, has a global distribution restricted to the southeast corner of California, and it is known from only 14 documented locations. As described above in the subsection on impacts to special-status plants, direct or indirect impacts to Harwood's eriastrum or Harwood's milk-vetch would be significant. Late summer/fall botanical surveys might also reveal the presence of additional sensitive plant species in the vicinity of the proposed substation expansion. BLM requests 100% avoidance for BLM sensitive species such as Harwood's eriastrum (Lund pers. comm. in CEC 2010ab).

Even if the substation expansion avoided direct mortality to these sensitive sand dune species, suitable habitat would be lost and indirect impacts are also likely to occur. Alterations in drainages could adversely affect special-status plant populations that occur downstream of the project area. Other indirect effects include the spread of the non-native Sahara mustard and other non-native invasive species, which degrade sand dune habitat by prematurely stabilizing dunes.

No desert tortoise were detected in or within the one-mile buffer around the proposed substation during the 2010 surveys (AECOM 2010u), but given the proximity of good habitat in the immediate vicinity of the proposed substation, desert tortoise could occur in or near the proposed substation expansion/gen-tie connection area and could be directly or indirectly impacted. The CRS expansion would result in the permanent loss of approximately 33 acres of sand dune habitat, which is known to be occupied by Mojave fringe toed lizard.

Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could result in increased disturbance from human intrusions and increased risk of mortality from vehicle strikes and crushing of burrows. Construction activities and addition of new perching structures such as transmission poles and lines could result in increased raven numbers, and hence an increase in desert tortoise predation. Road construction could also increase the opportunities for non-native invasive plant species, with adverse effects to native plant and wildlife communities. Nesting birds, badger, kit fox, and burrowing owls could also be directly or indirectly affected by construction and operation of the expanded substation. Staff does not have information about the presence of ephemeral washes, desert dry wash woodland and other waters of the state in the proposed substation expansion area. The proposed expansion and associated drainage modifications could result in direct and indirect impacts to state waters.

Telecommunications System

As described above, impacts to biological resources from construction and operation of the proposed BSPP off-site linears (i.e., gen-tie transmission line, access road, and gas pipeline) were analyzed as part of the BSPP in the RSA. The telecommunication line would be co-located with the gen-tie transmission line or other BSPP off-site linears. For the majority of its length, the underground redundant telecom line would be installed in proximity to the trench required for the proposed gas pipeline; however, south of Interstate 10, the BSPP gas pipeline would terminate at the existing SoCal Gas transmission pipeline and the redundant telecommunication line would continue in new trench within the BSPP gen-tie right of way to the CRS.

Surface disturbance and trenching activities required to install the telecommunication lines would result in temporary habitat disturbance. Direct impacts to special-status plants could occur during trenching and grading, or if plants are crushed or otherwise damaged by construction equipment and vehicle or foot traffic. Based on known occurrences within the proposed route of the underground telecommunication line, it is expected that ribbed cryptantha, Harwood’s eriastrum, Harwood’s milkvetch, Utah milkvine and desert unicorn plant would be directly impacted. However, several late season plants (i.e., Abram’s spurge, flat-seeded spurge, and lobed ground cherry) have moderate to high potential for occurrence in the project area Project area and would be similarly impacts if present. Ground-disturbing activities have the potential to indirectly affect adjacent vegetation communities by facilitating the transport and dispersal of invasive weed propagules, thereby potentially introducing new weeds and exacerbating invasions already present in the project vicinity.

Potential impacts to special-status wildlife include direct mortality from encounters with construction equipment, burrow/nest destruction during equipment staging, entombing adults, eggs, or young, and disruption or harassment. In addition, short and long-term habitat loss, modification, and fragmentation, as well as the potential spread of noxious weeds could decrease local and regional wildlife habitat values.

Surface disturbance within ephemeral drainages would directly impact state jurisdictional waters and would eliminate the hydrological, biogeochemical, vegetation, and wildlife functions of these drainages. Desert washes downstream from the project area would also be indirectly impacted as a result of changes to upstream hydrology, with downslope vegetation in washes receiving lower or higher volumes and velocities of water than current conditions. Even temporary diversions could significantly alter the hydrology and wash-dependent vegetation of any features that may occur downstream of the project.

Cumulative Impacts

Cumulative impacts resulting from the proposed CRS/BSPP interconnection project would be similar to the BSPP Project albeit at a much reduced level; refer to Section C.2.8 of the RSA. In the BSPP RSA, staff concluded that implementation of proposed conditions of certification would mitigate biological resource impacts to biological resources below the level of significance, thereby eliminating the projects contribution to cumulatively considerable impacts. It is anticipated that with implementation of similar measures, the CRS/BSPP interconnection project could also adequately mitigate potential cumulative effects.

Impact Minimization Measures

The proposed CRS/BSPP interconnection project, especially expansion of the Colorado River Substation, has the potential to result in significant direct, indirect and cumulative impacts to biological resources. Staff recommends implementation of measures similar to the following conditions of certification presented in the BSPP RSA:

- General impact avoidance and minimization measures (**BIO-8**). Confine work to delineated areas, control standing water, adhere to speed limits, dispose of trash, etc.
- Revegetation of temporarily disturbed areas (**BIO-8**). Restore temporarily disturbed areas to pre-construction conditions and conduct monitoring to ensure effectiveness.
- Desert tortoise clearance surveys and fencing (**BIO-9**). Conduct clearance surveys and install exclusion fencing ensure no desert tortoises are within the project area during construction.
- Desert tortoise translocation plan (**BIO-10** and **BIO-11**). Implement a USFWS- and CDFG-approved translocation plan to remove desert tortoises found within the project area.
- Desert tortoise compensatory mitigation (**BIO-12**). Acquire compensatory habitat to support desert tortoises.
- Raven management plan (**BIO-13**). Minimize raven subsidies, implement a project Raven Plan, contribute payment toward the USFWS-coordinated regional raven management effort.
- Weed management plan (**BIO-14**). Inspect and clean construction equipment, eradicate and monitor weed populations, quickly restore temporarily disturbed areas.
- Pre-construction nest surveys (**BIO-16**). Conduct pre-construction nest surveys and implement impact avoidance measures including establishing no-disturbance buffers around nests.
- American badger and desert kit fox avoidance and minimization measures (**BIO-17**). Conduct pre-construction clearance surveys and passively relocate individuals.

- Burrowing owl impact avoidance and minimization measures (**BIO-18**). Conduct pre-construction clearance surveys, passive relocation, burrow construction; acquire compensatory habitat;
- Special-status plant impacts avoidance and minimization measures (**BIO-19**). Conduct pre-construction surveys at the appropriate blooming period, flag and avoid plant populations, control herbicide drift, implement erosion control measures, acquire compensatory habitat to mitigate for unavoidable impacts.
- Sand-dune community/Mojave fringe-toed lizard mitigation (**BIO-20**). Acquire compensatory habitat for impacts, including loss of sand dune habitat.
- Mitigation for impacts to state waters (**BIO-22**). Acquire and protect off-site waters of the state; implement best management practices.
- Golden eagle inventory and monitoring (**BIO-24**). Conduct golden eagle inventory and monitoring and develop and implement a territory-specific management plan to avoid disturbance.
- Couch's spadefoot toad mitigation (**BIO-26**). Limit noise and vibration; prepare and implement a protection and mitigation plan, create and protect suitable breeding ponds.

Provision of qualified personnel (Designated Biologist and Biological Monitors; e.g., **BIO-1** through **BIO-5**), worker training (e.g., **BIO-6**), and monitoring and reporting (e.g., **BIO-7**) are recommended to ensure that any impact avoidance, minimization, and mitigation measures, such as those listed above, are effectively implemented.

As stated in the **Biological Resources** section of the BSPP RSA, implementation of the measures in these conditions of certification would require site-specific information about the location of proposed project features in relation to sensitive biological resources. Staff does not currently have that project-specific information and therefore cannot address the feasibility of implementing effective avoidance measures as a means of reducing impacts below the level of significance.

3.3 CULTURAL RESOURCES

This cultural resources analysis is based on applicant-provided cultural resource information for the BSPP (Solar Millenniun 2009a; EDAW 2009a, b, c, d, e; EDAW 2010a; Solar Millennium 2010v). Site-specific information was not available for much of the BSPP linear corridor or the CRS/BSPP Project area. Additional cultural resources will likely be identified during the independent, site-specific analysis which will be conducted by the CPUC and BLM as they comply with CEQA and NEPA.

Environmental Setting

The environmental setting for cultural resources is common to the proposed CRS expansion, gen-tie connection, and telecommunication system areas. Further, the redundant fiber optic cable would be co-located with the BSPP natural gas pipeline and access road; the prehistoric and historic setting of these linear features is described in detail in Section C.3 of the BSPP RSA.

Regional Setting

The proposed project area is located in Palo Verde Valley, along the western edge of the Colorado River. This area is part of the Mojave Desert, a sub-region of the Lower Sonoran Life Zone. The project vicinity has two main vegetation types: Sonoran creosote bush scrub and stabilized and partially stabilized sand dunes (Solar Millennium 2009a, p. 5.3-1). Humans have inhabited this region for the last 10,000 years, with the population ebbing and flowing primarily in response to several climatic shifts. These shifts have resulted in variable availability of vital resources, and that variability has influenced the scope and scale of human use of the vicinity of the project site. During cool, wet times the regional lakes filled and the necessary resources for human occupation were available. During warm, dry times the lakes dried and the region became a difficult place to live and traverse.

Eight successive temporal periods, each with distinctive cultural patterns, have been defined for the prehistoric Colorado Desert. They are: Paleo-Indian Period (about 10,000–8000 BC), Lake Mojave Complex (8000–6000 BC), Pinto Complex (8000–3000 BC), Deadman Lake Complex (7500–5200 BC), Possible Abandonment (3000–2000 BC), Gypsum Complex (2000 BC–200 AD), Rose Spring Complex (200 AD–1000 AD), and the Late Prehistoric Period (1000 AD–1700 AD). Within the Chuckwalla Valley, prehistoric sites are clustered around springs, wells, and other obvious important features/resources. Sites include villages with cemeteries, occupation sites with and without pottery, large and small concentrations of ceramic sherds and flaked stone tools, rock art sites, rock shelters with perishable items, rock rings/stone circles, geoglyphs, and cleared areas, a vast network of trails, markers and shrines, and quarry sites.

This region does not appear to be associated clearly with any historic Native American group (Singer 1984, pp. 36-38). However, seven groups - Chemehuevi, Serrano, Cahuilla, Mojave, Quechan, Maricopa, and Halchidhoma - claim territory nearby or describe this region in their oral history. The trails, rock art, geoglyphs and other prehistoric features are still of religious importance to many of these Native American groups.

The major historical themes for the Mojave Desert region and BSPP vicinity are the establishment of transportation routes, water access, agriculture, ranching, mineral exploitation, and military uses. Mineral deposits identified in the region include gold, silver, fluorite, manganese, copper, gypsum, and uranium. Most mining in the region took place in the 1880s and 1890s, but gypsum mines in the McCoy Mountains were also profitable from 1925 to the 1960s. Evidence of mining activity in the region primarily takes the form of access roads, pit mines, tailing piles, and refuse.

Transportation is also an important theme for the region. One of the earliest major trans-desert trail/wagon routes established in the vicinity of the BSPP was known as Frink’s Route. Based on a prehistoric Native American trail, Frink’s Route for wagons was established prior to 1856, connecting southern California supply points with mines and outposts along the Colorado River. Frink’s Route appears to have passed south of the BSPP site footprint. Automobile travel across and within the Colorado Desert area first developed using existing wagon roads such as Frink’s Route. The Mecca-Blythe-Ehrenberg route approximates the current Interstate 10 route. Travelers along these routes relied on natural water sources such as springs and wells excavated by wagon road users. In the early 1920s, Highway 60 was built to the south of the original route through Shavers Valley and Chuckwalla Valley. In the 1960s, the current Interstate Highway 10 was constructed along the old route of Highway 60. With the arrival of roads, settlement patterns changed from occasional miner's camps to roadside businesses serving travelers.

With the passage of the Homestead Act in 1862, vast areas of public land were opened up to private citizens, and agriculture became an economically important industry in California. Although much of the desert lands were poorly suited to farming, the Palo Verde Valley of the lower Colorado River was an exception. Thomas H. Blythe was the first to develop large tracts of land along the west bank of the Colorado River, across from the established portage point at Ehrenberg, Arizona, near the present-day town of Blythe. Farming continues to be a commercial industry in Blythe. On the Palo Verde Mesa, however, in the vicinity of the BSPP, agriculture was never a significant pursuit due to the poor soils and lack of readily accessible water. In the early twentieth century, some ranching activities were attempted on the mesa, as evidenced by ranch remains identified during the inventory of the BSPP area.

Military uses of the region are primarily associated with Gen. Patton's World War II Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA), which was in operation from 1942-1944. The area was chosen by Gen. George S. Patton, Jr. to prepare troops for the harsh conditions and environment of combat for the North Africa Campaign. At 12,000,000 acres, the DTC/C-AMA was the largest-ever military training center, stretching from west of Pomona, California, to Yuma, Arizona, and north into Nevada. The remains of the DTC/C-AMA areas consist of rock features, faint roads, structural features, concertina wire, tank tracks, footprints of runway and landing strips, foxholes and bivouacs, concrete defensive positions, refuse, and trails (Bischoff 2000).

Existing Resources

The information about existing cultural resources provided for the CRS/BSPP analysis was spotty. The linear corridor route has recently changed; therefore the AFC and RSA provide only partial information about cultural resources that are expected to be subject to impacts from the proposed project.

Additional cultural resources surveys and analyses covering the proposed CRS expansion project area would be conducted by the CPUC and BLM as part of their compliance with CEQA, NEPA, and Section 106 of the National Historic Preservation Act (NHPA). If these surveys identify new resources that are more than 45 years old, and might be affected by the project, they would be evaluated for eligibility for listing on the California Register of Historical Resources (CRHR) and the National Register of Historic Places (NRHP). The BLM would also consult with local Native American groups regarding impacts and potential mitigation for the proposed project. The results of these negotiations would be formalized in a Programmatic Agreement (PA), as required by Section 106 of the NHPA, and included in BLM's environmental document.

The archaeologists for the BSPP Applicant reviewed a number of resources during their background inventory research, but their primary information source was a literature search conducted by the Eastern Information Center (EIC) of the California Historical

Resources Information System (CHRIS), at the Department of Anthropology, University of California, Riverside. Searches were conducted for the area within a 1.0-mile radius of the proposed plant site and within a 0.25-mile radius of the routes of all proposed linear facilities (Solar Millennium 2009a, vol. 1, p. 5.4-18; EDAW 2009b, p. 16). Twenty-six previous cultural resources investigations were identified within the search area, ten of which crossed the BSPP facility footprint or proposed linear alignments. The most pertinent of the studies to the BSPP cultural resources assessment are the regional overview by Von Till Warren et al. (1980) and the sampling and evaluation of prehistoric quarry sites by Mitchell (1989).

The overview depicts a region of archaeological resources that, for both the prehistoric and historic periods, represent primarily transportation and resource exploitation. In this landscape, people have mostly left remains of being in transit or of extracting useful or valuable materials—Native Americans sought and removed food, toolstones, and other raw materials for manufacturing, and Euro-Americans sought and removed various minerals. The trails and roads that cross the BSPP site footprint and linear corridors either took people across the region or went to the places where the desired resources were found (Von Till Warren et al. 1980). An important exception to this generality is the use of the region by the U.S. military for training on a large scale, both early in World War II and just prior to involvement in Vietnam.

The BLM archaeologist who sampled and evaluated ancient Colorado River pebble terraces (one of which is located at the edge of the proposed BSPP plant site) explored Native American extractive behavior at several sites recognized as prehistoric quarries. He analyzed Native American behavior in assaying, roughly preparing, and collecting material appropriate for the manufacture of stone tools elsewhere. Additionally the study identified other nearby sites indicative of other aspects of toolstone acquisition behavior, such as temporary habitation sites. The study also evaluated the NRHP eligibility of the terrace quarries and their integrity, which has suffered in recent times from the mechanized removal of the water-rounded rocks for use in masonry and landscaping—another desert extractive activity (Mitchell 1989).

To facilitate the environmental review of their projects, applicants have conducted intensive pedestrian surveys to identify previously unrecorded cultural resources; these surveys include areas in or near the BSPP site footprint and linear facilities corridor. Based on the BSPP Staff Assessment, previous projects and the cultural resources surveys of the BSPP Applicant have identified a total of 210 archaeological sites, 1,210 archaeological isolates, and two built-environment resources within the BSPP site footprint and linear corridor. Thirty of these sites are prehistoric and 180 are of the historic period. The built environment resources, a reservoir radio communications facility, were built in the 1940s and 1950s (EDAW 2009e, p. 22; fig. 3).

Staff estimates that a minimum of 19 resources would be impacted by the CRS/BSPP Project. Two historic refuse scatters would be directly impacted by the construction of the CRS. Three resources would be impacted by the linear corridor south of I-10, which consists of the gen-tie, the fiber optic cable, the buried redundant fiber optic cable, and the gas pipeline (limited length). The buried BSPP telecom line located immediately north of I-10 would impact a small segment of a historic-period two-track road. North of I-10 the proposed linear corridor splits in two parts. The western section consists of the gen-tie and fiber optic cable. This section would impact one prehistoric quarry. The eastern section includes the BSPP telecom, the gas pipeline, the access road and the buried redundant fiber optic cable. The eastern linear corridor would impact a minimum of 13 resources.

In general, the previous research in the region suggests that prehistoric archaeological sites are typically located near water (specifically, near springs), on terraces near the shore of the dry lake beds, and in areas where natural resources were utilized. Prehistoric site types in the BSPP site footprint and vicinity include lithic scatters, quarry sites, sites with features, trails, and pot drops (EDAW 2010a, pp. 137–142). EDAW defined three broad categories of historic-period sites, Early Twentieth-Century Mining and Ranching Sites, World War II-era DTC/C-AMA Sites, and Other Historic-period Sites (EDAW 2010a, pp. 127, 144–156), under which they identified 10 site types. The Early Twentieth-Century Mining and Ranching Sites consisted of: habitation sites, sites with features, and refuse scatters. The World War II-era DTC/C-AMA Sites consisted of: sites with features, refuse dumps, and refuse scatters. The Other Historic-period Sites consisted of: transportation routes, non-specific sites with features, non-specific refuse dump sites, and non-specific refuse scatters.

Staff has grouped sites associated with prehistoric trails and those associated with historic military maneuvers into two groups which staff has defined as cultural landscapes.

Cultural Landscapes

A cultural landscape consists of “geographic area, including both natural and cultural resources, associated with a historic event, activity or person” (NPS 1996). Cultural landscapes can be determined eligible and nominated for inclusion on the NRHP as either sites or districts. As such, these landscapes can be contiguous or noncontiguous (Evans et al. 2001).

Staff has proposed the Prehistoric Trails Network Cultural Landscape (PTNCL), which is a noncontiguous cultural landscape (historic district) that incorporates prehistoric archaeological sites associated with the Halchidhoma Trail (CA-Riv-0053T). This landscape consists of important destinations in the Colorado Desert near Blythe, California, the network of trails that tie them together, and the features and sites associated with the trails. Native American groups in the Mojave and Colorado Deserts consistently accord mythological importance to springs, petroglyph sites, and particularly trails systems. Trails across the desert mark the locations of travels of ancestral groups as they migrated to the confluence of the Gila and Colorado Rivers. Trails also facilitate dream travel to these places and the times when events mentioned in story and song occurred (Cleland 2005, p. 132).

The particular trail that forms the connecting link for this cultural landscape, the Halchidhoma Trail (CA-Riv-0053T), is well known from multiple historical and ethnographic sources. It was an essential trade, transportation, and ritual route for Native American peoples and early European visitors in the Colorado Desert during prehistoric and historic times. This route was an essential connection between the Pacific Coast and the Southwestern deserts of Arizona and New Mexico. As such, staff considers the resources that make up the PTNCL to be significant under NRHP

Criterion A (CRHR Criteria 1), for their ties to important events in American history. These sites are also considered register-eligible under Criterion D/4 for their ability to yield information important in history and prehistory. As both ethnographic and archaeological resources, PTNCL sites are subject to both direct and indirect project impacts. Indirect impacts include the visual degradation of the historical integrity of a resource through the construction of the proposed BSPP and its associated downstream improvements.

Staff has also proposed the creation of the Desert Training Center California-Arizona Maneuver Area (DTC/C-AMA) Cultural Landscape (DTCCL) a contiguous cultural landscape (historic district) that incorporates historical archaeological sites associated with General Patton's Desert Training Center (Bischoff 2000). Energy Commission staff recommends that DTCCL is eligible for listing on the NRHP under Criterion D (CRHR Criterion 4). The DTC/C-AMA was the largest and the only such military training facility in American military history. The training that took place here undoubtedly helped to win World War II. Most property types associated with the DTC/C-AMA, across the full extent of the resource, exist today as archaeological resources, such as refuse deposits, tank tracks, foxholes, and bivouacs. These sites would be considered primarily eligible under NRHP Criterion D (CRHR Criterion 4) for their ability to yield information important in history.

Staff has identified contributors to these landscapes beyond the boundaries of a single project. The PTNCL has 2 potential contributors and the DTCCL has 10 potential contributors within the CRS/BSPP Project area. Staff has also identified contributors within the Genesis Solar Energy Project and the Palen Solar Power Project site foot prints and linear corridors. As many contributing elements to both of these landscapes are often considered not to be significant in their own right, staff expects that previously identified cultural resources will need to be re-evaluated.

CRS Expansion and Gen-Tie Connection

The proposed CRS expansion consists of the already permitted 45 acre substation, supplemented by an additional 45 acres. Recent cultural resources evaluations of the original 45 acre CRS footprint have resulted in conflicting reports.

In Appendix B of the Energy Commission Revised Staff Assessment for the Blythe Energy Project Transmission Line (BEPTL) the substation is referred to as the Desert Southwest Transmission Project Midpoint Substation Option (DSWTP MSO). Approximately 41 acres of the total 90 acres (original footprint plus expansion footprint) was examined by archaeologists on February 21-22, 2006. No cultural resources were identified during this pedestrian survey. A CHRIS records search conducted at the same time found no previously recorded sites within or near by the proposed substation location (CEC 2006,App. B, pp.8-9). The BEPTL RSA further reports that no ethnographic resources, or Traditional Cultural Properties (TCPs), whose historical integrity could be visually degraded by the proposed project are present nearby.

In contrast, maps included in the BSPP AFC identify two archaeological sites in the original 45 acres of the CRS. CA-Riv-9011 and SMB-H-002 are both WWII era refuse scatters that appear to be contributing elements to the DTCCL. As such they are eligible for listing on the CRHR under Criterion 4 (NRHP Criterion D).

Future cultural resources surveys and analyses conducted by the CPUC and BLM as part of their compliance with CEQA, NEPA, and Section 106 of the National Historic Preservation Act (NHPA) would need to address potential impacts to cultural resources in the unsurveyed 45 acres, identify impacts to possible TCPs, and identify contributors to the two new cultural landscapes.

Table 10.
Cultural Resources Subject to Potential Impacts from the CRS/BSPP Project

Resource Type and Identifying Number	Resource Description	Cultural Components and Dates	Location
CA-Riv-9011	Historic-period refuse scatter: 2 concentrations	Prospecting/ranching and DTC/C-AMA. Early 20th century and 1942-1944 (WWII).	Substation
SMB-H-002	Historic-period refuse scatter: cans and bottles	DTC/C-AMA 1942-1944 (WWII)	Substation
SMB-H-702	Unknown	Unknown	Linear Corridor South of I-10
SMB-H-263	Historic-period refuse scatter: 5 cans	Prospecting/ranching and DTC/C-AMA. Early 20th century and 1942-1944 (WWII)	Linear Corridor South of I-10
SMB-H-265	Historic-period refuse scatter: 75 cans, bottles, military rations	DTC/C-AMA, 1942-1944 (WWII)	Linear Corridor South of I-10
SMB-H-600	Historic-period dirt two-track road	Early 20th century	Road and Linear Corridor North of I-10
SMB-H-525	Historic-period refuse scatter: 638 cans, military rations, household metal scraps, milled lumber	Other historic site and possibly Desert Strike. 20th century.	Linear Corridor North of I-10
SMB-H-522	Historic-period refuse scatter: 43 cans, military rations and other food cans, glass fragments, historic-period ceramic fragments, metal pieces, milled lumber	Prospecting/ranching and DTC/C-AMA. 20th century and 1942-1944 (WWII)	Linear Corridor North of I-10
CA-Riv-3417	Toolstone quarry: small concentration of tested cobbles and debris	Prehistoric	West Linear Corridor North of I-10
SMB-H-262	Historic-period refuse scatter and 2 historic-period rock and cinder block hearths: cans, glass, auto parts.	Prospecting/ranching. Early 20th century	Linear Corridor North of I-10
SMB-H-261	Historic-period refuse scatter: 42 military ration cans, bottles, milled lumber	Prospecting/ranching and DTC/C-AMA. Early 20th century and 1942-1944 (WWII)	Linear Corridor North of I-10
SMB-H-260	Historic-period refuse scatter: 10 cans, 2 glass jars	Prospecting/ranching. Early 20th century.	Linear Corridor North of I-10
CA-Riv-3419	Toolstone quarry: tested cobbles, testing debris over extensive area on a remnant Pleistocene-era Colorado River terrace	Prehistoric	Linear Corridor North of I-10
SMB-H-257	Historic-period refuse scatter: 9 food cans, military rations	DTC/C-AMA, 1942-1944 (WWII)	Linear Corridor North of I-10
SMB-H-258	Historic-period refuse scatter: 3 cans, bottle	DTC/C-AMA, 1942-1944 (WWII)	Linear Corridor North of I-10

Resource Type and Identifying Number	Resource Description	Cultural Components and Dates	Location
SMB-H-256	Historic-period refuse scatter: cans, glass, milled lumber	DTC/C-AMA, 1942-1944 (WWII)	Linear Corridor North of I-10
SMB-H-259	Historic-period refuse scatter: 4 cans, 2 glass bottle fragments	20th century, and possibly Desert Strike.	Linear Corridor North of I-10
SMB-H-255	Historic-period refuse scatter: food and beverage cans	Prospecting/ranching. Early and late 20th century.	Linear Corridor North of I-10
SMB-H-290	Historic-period refuse scatter: 10 food and beverage cans, military rations.	Prospecting/ranching, DTC/C-AMA, and possibly Desert Strike. Early 20th century and 1942-1944 (WWII).	Linear Corridor North of I-10

Telecommunications System

The proposed telecommunication system would consist of a fiber-optic line strung along the transmission towers, and a redundant buried line. Both lines would extend along the full length of the BSPP linear corridor, from the proposed site footprint to the proposed CRS footprint. No cultural resources information was provided for more than half of the linear corridor south of I-10. North of I-10 the gen-tie and fiber optic line diverge from the other linear corridor elements towards the west for an unspecified distance, and then rejoin the main linear corridor before reaching the proposed plant site. This western branch is a new addition to the proposed project, and staff does not have cultural resources data for this route. The eastern branch is slightly offset to the east of the originally proposed corridor, therefore some, but not all, of the sites that may be impacted by this eastern section can be discussed in this analysis specifically. Additional surveys would need to take place. The redundant fiber optic line would likely be added to the linear corridor utility trench, whose cultural resource impacts and proposed mitigation for the western portion are discussed in detail in the BSPP RSA.

Based on the RSA, staff concludes that at least 19 cultural resources would be directly impacted by the proposed project. Two of these resources are prehistoric quarries. Ten of these resources are World War II era historic refuse scatters. The remaining six historic era sites include one historic two-track road and five refuse scatters associated with prospecting, ranching or unidentified 20th century activities. A final site is of an unknown type. If the telecom line is added to the already planned utility trench, the line will impact the identical cultural resources. Impacts to these resources and appropriate mitigation for 15 of these 19 sites are described in detail in the BSPP RSA.

In addition, staff concludes that the construction of the proposed CRS/BSPP Project (including buried telecom line) is likely to result in direct and indirect impacts to cultural resources. In particular, contributing elements of the PTN and DTC Cultural Landscapes are expected. Some of these sites may have been determined ineligible for the CRHR and NRHP during previous archaeological surveys. However, the establishment of two new cultural landscapes would require that these resources be re-evaluated to determine their role in the context of these landscapes. In addition, previous research suggests that the project area is one of high ethnographic sensitivity. Unidentified Traditional Cultural Properties may be present. Future cultural resources surveys and analyses conducted by the CPUC and BLM would need to address potential impacts to cultural resources in the unanalyzed area, identify impacts to possible TCPs, and identify contributors to the two new cultural landscapes.

Impacts

Direct, indirect and cumulative impacts would be similar for CRS expansion, the gen-tie connection and the telecommunication systems; therefore, impacts from all three project elements are discussed jointly below.

Direct Impacts

Direct impacts to cultural resources would potentially occur from ground disturbance during construction. Staff expects ground disturbance to consist of site grading and compaction for substation construction, excavation for tower footings for the gen-tie connection, and trenching for installation for the telecommunications system. Cultural resources located within the proposed project area are expected to be completely destroyed by this ground disturbance. At a minimum these cultural resources would include the 19 resources located within the BSPP linear corridor/buried telecom line. Additional cultural resources subject to direct impacts would likely be identified by future CPUC and BLM analyses.

Indirect Impacts

Indirect impacts to cultural resources can have both physical and cultural or spiritual components. The construction of the proposed project could potentially result in increased visitation to nearby archaeological sites, and in turn result in erosion and vandalism. Alternatively, the historical integrity of nearby ethnographic resources (or TCPs) could be visually degraded by the proposed project. Impacts to the integrity of ethnographic resources can only be identified by members of the community who value the resources culturally and/or spiritually, in this case Native Americans. BLM is currently in the process of consulting with local Native American groups regarding impacts and potential mitigation for the BSPP project area. As discussed earlier, previous research suggests that the project area is one of high ethnographic sensitivity. Unidentified Traditional Cultural Properties may be present.

Cumulative Impacts

Cumulative impacts resulting for the CRS/BSPP Project would be similar to the BSPP Project. The proposed project impacts, when combined with impacts from past, present, and reasonably foreseeable projects, contribute in a small but significant way to the cumulatively considerable adverse impacts for cultural resources at both the local I-10 Corridor and regional levels. This analysis, presented in detail in the BSPP RSA, estimates that more than 800 sites within the I-10 Corridor, and 17,000 sites within the Southern California Desert Region, would potentially be destroyed. Staff concludes that mitigation can reduce the impact of this destruction, but not to a less-than-significant level.

Impact Minimization Measures

Staff concludes that the most appropriate impact minimization measures for the CRS/BSPP Project are a selection of the cultural resources conditions of certification proposed in the BSPP RSA. The primary reason for this conclusion stems from the fact that the proposed CRS/BSPP Project would impact the same 19 cultural resources as the BSPP linear corridor. These conditions were crafted specifically for these 19 cultural resources, and additional conditions are not necessary. Further, these conditions were designed for particular prehistoric and historic site types common to the PTN and DTC Cultural Landscapes. Newly identified sites should be accommodated by the existing conditions. Finally, this decision is consistent with staff's decision to coordinate the mitigation of all impacts to PTNCL and DTCCL potential contributors by developing shared conditions of certification for the three solar projects proposed by NextEra and Solar Millennium for areas north of the I-10 corridor between Blythe and Desert Center: Genesis Solar Energy Project, Blythe Solar Power Project, and Palen Solar Power Project. The conditions relevant to the proposed project are summarized below, and presented in detail in BSPP RSA Section C.3.

- **CUL-1** and **CUL-2** would fund programs to define, document, and nominate to the NRHP two cultural landscapes that the proposed project shares with BSPP and two other nearby solar projects, identifying specialists who would be hired to supervise the mitigation of the proposed project's cumulative impacts to these resources and establishing a fund, to which multiple project owners will contribute, to hire these specialists. While the implementation of these conditions would reduce the proposed project's cumulative impacts to the greatest extent possible, they would still be cumulatively considerable.
- **CUL-3** and **CUL-4** are administrative conditions that set out who the people would be who will implement the balance of the conditions, what their qualifications and roles would be, and the information the project owner would supply them to help them fulfill those roles.
- **CUL-5** provides for the preparation and implementation of the Cultural Resources Monitoring and Mitigation Plan (CRMMP), which would structure and govern the implementation of the broader treatment program.
- **CUL-7** and **CUL-8** are treatment conditions for direct impacts to historic-period and prehistoric resources that would reduce the severity of the proposed project impacts to less-than-significant.
- **CUL-9** would provide training of project personnel to identify, protect, and provide appropriate notice about known and new potential cultural resources in the project construction area.
- **CUL-10** and **CUL-11** would provide construction monitoring and cultural resources discovery protocols.
- **CUL-12** provides for the preparation of a final report to analyze, interpret, and document the ultimate results of the project cultural resources management program.

3.4 GEOLOGY AND PALEONTOLOGY

Environmental Setting

The environmental setting for geological and paleontological resources is common to the proposed CRS expansion, gen-tie connection, and telecommunication system areas. The entire proposed telecommunication system would be co-located with either the BSPP natural gas pipeline and access road or the BSPP gen-tie; the geologic setting of these linear features is described in Section D.2 of the BSPP RSA. The geotechnical investigation report prepared for the proposed BSPP (Kleinfelder 2009) does not address the off-site linears south of the BSPP; however, surface soil units for the linears south of I-10 are identified in the Soils and Water Resources section of the RSA and this Appendix.

Geology

The proposed project area is located in the southeastern portion of the Mojave Desert geomorphic province (CGS 2002a), in the Mojave Desert of Southern California near the Arizona border. The Mojave Desert is a broad interior region of isolated mountain ranges which separate vast expanses of desert plains and interior drainage basins. The physiographic province is wedge-shaped, and separated from the Sierra Nevada and Basin and Range geomorphic provinces by the northeast-striking Garlock Fault on the northwest side. The northwest-striking San Andreas Fault defines the southwestern boundary, beyond which lie the Transverse Ranges and Colorado Desert geomorphic provinces. The topography and structural fabric in the Mojave Desert is predominately southeast to northwest, and is associated with faulting oriented similar to the San Andreas Fault. A secondary east to west orientation correlates with structural trends in the Transverse Ranges geomorphic province.

The proposed CRS/BSPP project area is located on the alluvial-filled basin of the Palo Verde Mesa east of the McCoy Mountains. Overall, the project area and vicinity gently slope down from the McCoy Mountains in the west in a southwesterly direction at an approximate gradient of less than 1% toward the low topographic elevations of the Palo Verde Mesa. As described in the BSPP RSA, quaternary age alluvial, lacustrine and eolian sedimentary deposits are mapped in the vicinity of the BSPP site, which encompasses the CRS Expansion and BSPP Interconnection project area. Marine and transitional sediments of the Pliocene Age Bouse Formation are presumed to underlie alluvial fan deposits, and metasedimentary bedrock of the McCoy Mountains Formation outcrop in the McCoy Mountains within the project area. Holocene units within the project area include alluvial fan and alluvial valley deposits. The younger alluvium deposits generally form a very gently sloping to nearly flat surface and consist of sand, pebbly sand, and sandy pebble-gravel (CEC 2010ab).

Mineral Resources

The proposed BSPP site is located within Mineral Resource Zone 4, which denotes “areas of no known mineral occurrences where geological information does not rule out either the presence or absence of significant mineral resources” (CDMG 1994); however, the project area is not currently used for mineral production, nor is it under claim, lease, or permit for the production of locatable, leasable, or salable minerals. Many inactive mines and mineral prospects are hosted by in metamorphic and intrusive basement rocks within 10-15 miles of the proposed CRS/BSPP Project. These have produced a number of precious and base metals and minerals, including iron (magnetite), gold, silver, copper, uranium, and pyrophyllite, several borrow pits are present along Interstate 10. No mines are known to have existed in the proposed project area (USGS 2008).

Seismicity

The proposed CRS/BSPP project area is not crossed by any known active faults or designated Alquist-Priolo Earthquake Fault Zones (CGS 2002b). The nearest feature is the Mojave-Sonoran Belt, a roughly 60-mile-wide structural belt that has been correlated with the southern extension of the Walker Lane Fault Zone. The Mojave-Sonoran belt is approximately 5 to 10 miles northwest of the project. The project's close proximity to the Mojave-Sonoran belt and relatively great distance from more seismically active areas to the west and northwest would suggest a relatively low to moderate probability of intense ground shaking in the CRS Expansion and BSPP Interconnection project area. Also, the substation site is located on a flat to gently sloping mesa and is not susceptible to landslides.

The BSPP site is located within an area with low to moderate level of liquefaction potential as per Riverside County Land Information System (RCLIA 2010). However, a depth to groundwater of greater than 150 feet suggests that the telecommunication route near the BSPP site likely has a low potential for liquefaction. However, subsurface information gathered via geotechnical information would be needed to substantiate this. The Riverside County Land Information System designates the CRS expansion area as being susceptible to subsidence; however, no localized or regional subsidence has been recorded and no petroleum or natural gas withdrawals are taking place in the vicinity of the project the proposed site. Therefore, the potential for local or regional subsidence is considered to be very low.

Paleontology

In the BSPP RSA, which included an analysis of the offsite linears that would be collocated with the telecommunication line, staff concludes that the paleontological resource sensitivity of Quaternary age sediments varies from low in Holocene age younger alluviual, lacustrine and eolian deposits at shallow depths to high as Pleistocene age older alluvium and lacustrine deposits are encountered at deeper depths.

Staff considers the probability for significant paleontological resources to be encountered during construction activities to be low in Holocene age deposits. However, grading and trenching may penetrate underlying Pleistocene age soils at undetermined depths. Overall, the potential for exposure of paleontological resources during trenching would be considered as high, until determined otherwise by a qualified professional paleontologist.

The paleontological sensitivity map produced by the Riverside County land Information System designates the CRS expansion area as having low and undetermined paleontological sensitivity.

Impacts

Impacts to geologic resources would potentially occur from ground disturbance during construction. Ground disturbance from site grading for substation construction, excavation for tower footings for the gen-tie connection, and trenching for installation for the telecommunications system would result in similar impacts to geological and paleontological resources; therefore, impacts from all three project elements are discussed jointly below.

Geologic Hazards

Prior to the start of construction, SCE expects to conduct a geotechnical study of the CRS expansion area that would include an evaluation of the depth to the water table, evidence of faulting, liquefaction potential, physical properties of subsurface soils, soil resistivity, slope stability, and the presence of hazardous materials (Solar Millennium 2010v). Staff recommends the geotechnical study also include the telecommunication route. The results of the geotechnical investigations would then be applied to the project's engineering design to ensure that potential impacts to geology are avoided or minimized.

There are no known active faults in the immediate vicinity of the proposed substation site. As such, the hazard of direct surface displacement by faulting of any portion of the proposed facility is not expected.

As described above, the project would be located in an area of minimal seismicity and would only be susceptible to groundshaking in the event of a significant earthquake on any of the regional active faults. The project facilities would be engineered to withstand potential ground shaking in accordance with the CPUC's General Order 95 and would meet relevant seismic requirements. Proper design would reduce the threat of damage to the proposed facilities from the potential maximum ground acceleration to less than significant levels.

The susceptibility of a site to liquefaction is a function of the depth, density, and water content of the granular sediments and the magnitude and frequency of earthquakes in the surrounding region. As described above, the CRS/BSPP project area has moderate liquefaction potential and is susceptible to subsidence. Despite the presence of potentially liquefiable alluvial sediments, anticipated seismic groundshaking is not expected to be of sufficient frequency or intensity to cause liquefaction of these sediments. A properly designed facility would reduce the minor threat of damage to the proposed facilities as a result of lateral spreading, subsidence, liquefaction, or collapse to less than significant levels. The CRS/BSPP Project is located on relatively level ground and thus no impact is expected from landslides.

Construction would occur in relatively flat terrain and the geologic investigation described above would identify the affected soils and their site-specific erosion potential. Erosion control best BMPs would be used where excavation and grading occurs as would be required by the project National Pollution Discharge Elimination System (NPDES) permits and the SWPPP (see the Soils and Water Resources section of this Appendix). With proper construction practices there should be no notable erosion or transport of sediment from the site. Considering these factors, there should be little or no impact due to erosion or loss of topsoil. Potential impacts would be less than significant and no mitigation is recommended.

Paleontology

Ground disturbances associated with construction of the telecommunications facilities could disturb significant paleontological resources potentially located within the project area. Indirect impacts to paleontological resources may include erosion of features due to channeling of runoff or damage to outcrop areas due to earth-shaking activities associated with drilling, trenching, or grading activities. Impacts to paleontological resources, if present, would be potentially significant.

Minerals

Since there are no known mining operations identified in the project area, construction of the project is unlikely to interfere with daily ongoing or planned mining operations. No impacts would occur and no mitigation is recommended.

Cumulative Impacts

Cumulative impacts resulting from the proposed CRS/BSPP Project would be similar to the BSPP Project albeit at a much reduced level; refer to Section D.2.9 of the RSA. Implementation of the conditions of certification recommended below would mitigate potential geological and paleontological impacts below the level of significance, thereby eliminating the projects contribution to cumulatively considerable impacts.

Impact Minimization Measures

As described above, soils and rock testing should be conducted and analyzed by a professional, licensed geotechnical engineer or geologist to determine existing foundation conditions, as described in conditions of certification **GEN-1, GEN-5, and CIVIL-1** in the Facility Design section of the BSPP RSA. The results of the geotechnical investigation would then be applied to the project's engineering design and this would ensure that potential impacts to geology are avoided or minimized.

Implementation of a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (paleontological resource specialist, or PRS) would mitigate potential unforeseen impacts to less than significant. Recommended paleontology mitigation requirements are described in conditions of certification **PAL-1** to **PAL-7** in the Geology, Paleontology, and Minerals section of the BSPP RSA. Earthwork would be halted any time potential fossils are recognized by either the paleontologist or the worker. For finds deemed significant by the PRS, earthwork cannot restart until all fossils in that strata, including those below the design depth of the excavation, are collected. When properly implemented, the conditions of certification would yield a net gain to the science of paleontology since fossils that would not otherwise have been discovered can be collected, identified, studied, and properly curated. A paleontological resource specialist would be retained, for the project by the applicant, to produce a monitoring and mitigation plan, conduct the worker training, and provide the monitoring.

Implementation of staff's recommended conditions of certification as presented in the BSPP RSA, or similar measures would reduce potential direct, indirect, and cumulative impacts to geological and paleontological resources to less than significant.

3.5 LAND USE

Environmental Setting

This land use analysis focuses on the CRS/BSPP Project's consistency with existing land use resources, land use plans, ordinances, regulations, policies, and the project's compatibility with existing or reasonably foreseeable land uses. The proposed project site is located in the Colorado Desert in eastern Riverside County. The surrounding area consists of undeveloped desert land with small rural communities in the vicinity with a mixture of public and private lands. There are federal wilderness areas located on mountainous land to the west, northeast, south and southwest of the project site. Additional land uses in the study area include Open-Space-Rural, Agricultural and Public Facility (Solar Millennium 2009a pg. 5.17-4). Vacant desert lands for the most part surround the site. Blythe Airport is about one mile east of the underground telecom line route, and irrigated lands are located adjacent to the southwest corner of the telecom route. A mobile home is located approximately 725 feet east and 775 feet south of the BSPP site boundary; numerous residences are located just south of I-10 and approximately 1 mile east of the proposed gen-tie where it crosses over I-10; and the Chuckwalla Valley Ironwood State Prisons are located roughly 6.5 miles southwest of the CRS expansion site.

No rangeland allotments exist within this part of eastern Riverside County. The CRS/BSPP expansion, gen-tie and telecommunications system is located in an area designated as Open Space-Rural by the Riverside County General plan (GP) (RCTLMA 2008). Portions of the proposed BSPP linear components would traverse areas designated as agricultural and open space land.

The proposed project area is located entirely on BLM land designated as LU-Limited Use category of the BLM's California Desert Conservation Area (CDCA) Plan Multiple Use Categories (Solar Millennium 2009a, pg. 5.7-4). The CDCA LU classification states that new transmission facilities are allowed only in designated utility corridors areas. The CRS expansion site and gen-tie connection is located in an existing BLM utility corridor (BLM 2009g). The telecommunications portion of the CRS/BSPP project is not within the corridor and a BLM ROW grant and a project-specific CDCA Plan Amendment would be encompassed within an overall BSPP ROW grant and Plan Amendment.

Impacts

The proposed gen-tie, as well as the proposed natural gas line and access road were analyzed in Section C.6 (Land Use) of the BSPP RSA (CEC 2010ab). Staff concluded that land use impacts of the these project linears would be less than significant and would comply with applicable land use plans, ordinances, regulations, policies and reasonably foreseeable land uses. The Farmland Mapping and Monitoring Program (FMMP) of the California Department of Conservation (DOC) provides statistics on conversion of farmland to non-agricultural uses throughout the State. According to the farmland map of Riverside County, the proposed CRS/BSPP Project site is almost entirely within BLM-administered lands, and has not been surveyed or included in a farmland mapping category (DOC 2008) of the DOC. The proposed project would not impact any agriculture or rangelands, areas designated by BLM as Herd Areas or Herd

Management Areas or divide an existing community. The proposed project does not conflict with any current or proposed land use plans (BLM 2009c, BLM 2009e, CEC 2010ab). The BPSP would not directly disrupt activities in established federal, state, or local recreation areas but would impact a wilderness area as a result of significant visual impacts to viewers at the Palin/McCoy Wilderness Area.

Cumulative Impacts

The cumulative impacts of the BSPP energy project, transmission line, natural gas line and access road were analyzed in the Land Use section of the BSPP RSA (section C.6.8.1). Staff concluded that the proposed BSPP would combine with other past and reasonably foreseeable future projects to substantially reduce scenic values of wilderness areas and recreational resources in the southern California desert region and therefore, would result in a significant and unavoidable cumulative land use impact in this regard.

Impact Minimization Measures

No additional minimization measures are recommended beyond the proposed BSPP project's compliance with all applicable land use LORS for both operation and construction.

3.6 NOISE AND VIBRATION

Environmental Setting

The environmental setting for the CRS/BSPP Project is shared among each of the project components. All project components would occur within and immediately north and east of the proposed CRS expansion boundary. The overhead telecom line would be strung on the gen-tie and the underground line would be co-located with the proposed BSPP natural gas pipeline and access road ROW along the southern portion of the route to the SoCal gas pipeline and within the gen-tie route ROW on the western portion to the CRS. The environmental setting and noise impacts of the proposed gen-tie, and the natural gas line and access road, were described and analyzed in Section C.7 (Noise and Vibration) of the BSPP RSA.

The proposed CRS expansion site is located within the eastern portion of Riverside County approximately 12 miles west of the city of Blythe in a largely rural, open space area. As described in the BSPP RSA, existing noise sources in the proposed project area include air traffic and highway traffic (Section C.7.4.1). Ambient noise measurements taken along the proposed transmission line and natural gas line route revealed a Leq of 45 dBA and an Lmax of 60 dBA (SM 2009a). The nearest noise-sensitive receptors are a mobile home located approximately 725 feet east and 775 feet south of the BSPP site boundary; numerous residences located just south of I-10 and approximately 1 mile east of the proposed gen-tie where it crosses over I-10; and the Chuckwalla Valley Ironwood State Prisons, located roughly 6.5 miles southwest of the CRS expansion site.

Impacts

Construction

The CRS/BSPP Project would generate noise above ambient levels from construction of the substation expansion, gen-tie connection, and installation of the telecommunication cables. Construction noise would include the operation of construction equipment and vehicles at the proposed construction sites, and the transport of construction materials and workers as vehicle trips to and from the project sites. Construction would generate temporary noise levels from equipment and vehicles during site grading activities, substation construction, trench construction, and surface paving. Construction along the telecommunication route would be temporary and short term while construction of the substation expansion would be over a longer term at the substation site; the exact duration is unknown at this time. Noise impacts to the noise sensitive receptors (mobile home) in proximity to the transmission line and natural gas line were analyzed in the BSPP RSA (section C.7.4.2). As noted above, several residences are located approximately 1.0 mile east of the proposed gen-tie and Chuckwalla Valley State Prison and Ironwood State Prison are located approximately 6.5 miles southwest of the proposed CRS expansion site.

Noise impacts from construction are a function of the noise generated by equipment, the location and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Potential impacts to noise-sensitive receptors from construction noise would be limited to receptors in proximity to CRS facilities and the telecommunication system route.

Typical construction equipment is estimated to generate maximum noise levels of short duration not to exceed 94 A-weighted decibels (dBA) at 50 feet. Without intervening topography or structures, these levels would attenuate over distance at a conservative rate of approximately 6 dBA per doubling of distance (i.e., 80 dBA at 50 feet would attenuate to approximately 74 dBA at 100 feet, and approximately 68 dBA at 200 feet, etc.). Assuming an average construction noise of 94 dBA L_{eq} at 50 feet from the noise center (the upper range of noise levels for construction equipment), project construction noise would attenuate to 52 dBA at the residences nearest the proposed gen-tie location, approximately 1 mile east of the telecommunication system route. Project construction noise would further attenuate to 40 dBA at the state prisons, approximately 6.5 miles southwest of the proposed CRS expansion location.

While staff does not have information on noise associated with substation expansion, Riverside County Code 847 limits noisy construction activity to daylight hours when construction activities occur within one quarter mile of noise-sensitive receptors. Given the distance between construction activities and noise-sensitive receptors (several residences east of proposed project and the state prisons), this limit does not apply. Because there are no noise sensitive receptors in the proposed project vicinity, the BSPP RSA found noise impacts from construction and operation of the proposed project linears to be less than significant. Staff assumes that with appropriate mitigation, noise impacts from construction of the expanded substation would also be less than significant.

Noise impacts from construction of the gas pipeline and gen-tie were analyzed in the BSPP RSA (Section C.7.4.2) and found to be less than significant. Similarly, construction of the underground telecom line is not anticipated to be substantial and would not exceed Riverside County and CEQA significance thresholds.

CRS Expansion and Gen-Tie Connection

The substation expansion would generate noise primarily from facility site construction (i.e., substation and interconnection elements) and linear facilities installation (i.e., telecommunications cable). Construction activities would include site grading, facility installation, trenching and paving. Project noise from the substation expansion and interconnection are not anticipated to exceed any County or CEQA significance thresholds. Noise-sensitive receptors are not located in proximity to the site and would not be affected by construction noise.

Telecommunications System

Ground disturbing activities including new trenching for the underground telecom line and connection of telecom lines to the MEER would generate typical construction noise levels. Trenching activities would generate temporary short-term noise levels of approximately 52 dBA to the receptors nearest the trenching activities. Since Riverside County Code limitations do not apply to this project given the distance of the proposed project from noise-sensitive receptors, trenching activities for the telecom system would not result in a significant noise impact.

Vibration

Potential impacts from vibration were analyzed in Section C.7.4.2 of the BSPP RSA. Equipment needed for the proposed project construction is not likely to create vibration impacts that would be perceived at the nearest noise-sensitive receptor. No impact from vibration would occur.

Operation

Operational noise impacts of the CRS/BSPP Project would be insignificant. Noise associated with the telecom line and substation would be limited to occasional operation and maintenance activities, including emergency repair and there are no nearby receptors.

Worker Effects

SCE would be required to protect construction, operation and maintenance workers from noise hazards per applicable LORS.

Cumulative Impacts

Cumulative impacts were analyzed in Section C.7.8 of the BSPP RSA and it was determined that no cumulative noise impact would result from the proposed BSPP Project. Similarly, no cumulative impacts would be expected from the CRS/BSPP Project.

Impact Minimization Measures

Noise levels from project construction and operation would attenuate to an acceptable level to the nearest noise-sensitive receptors. In the event that actual construction noise should annoy sensitive receptors, implementation of measures similar to condition of certification **NOISE-1** and **NOISE-2** as described in the Noise and Vibration section of the BSPP RSA, would establish a public notification process to notify nearby residents of the project construction and operation, and a Noise Complaint Process that would require the applicant to resolve any complaints regarding project noise. To ensure that construction, operation and maintenance workers are adequately protected, condition of certification **NOISE-3** and **NOISE-4** (noise control program), as described in the Noise and Vibration section of the BSPP RSA, would reduce noise impacts to workers. In addition, implementation of a minimization measure similar to **NOISE-6** (construction restrictions), would ensure compliance with the Riverside County Noise Ordinance 847 by requiring the noisy construction activities occur during certain daylight hours.

It is likely that no additional noise control features or mitigation measures are needed beyond the proposed CRS/BSPP Project's compliance with all applicable noise and vibration LORS for both construction and operation. The CRS/BSPP Project is not anticipated to produce significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively.

3.7 SOCIOECONOMICS

Environmental Setting

The proposed CRS/BSPP Project is located in the Southern California inland desert on federal land managed by the BLM, approximately 8 miles west of the City of Blythe in eastern Riverside County. The area is sparsely populated, with the largest urban center being the city of Riverside located approximately 100 miles west of the site. A reasonable study area for localized socioeconomic impacts would include the three nearest communities: the city of Blythe, CA (approximately 8 miles east of the BSPP site); the city of Ehrenburg, AZ (approximately 12 miles east of the BSPP site); and the city of Quartzsite, AZ (approximately 25 miles east of the BSPP site). Research shows that workers may commute as much as two hours each direction from their communities rather than relocate (EPRI 1982). Therefore, the local and regional study area is considered to be Riverside County, CA; San Bernardino County, CA; La Paz County, AZ; and Maricopa County, AZ. Population data for the BSPP Project is considered applicable to the CRS expansion area and the telecom route. The total population within a six-mile radius of the proposed BSPP Project is 1,758 persons, and the total minority population is 946 persons or 53.8% of the total population. The total low income population is 147 persons or 15.3% of the total population. The current vacancy rates for the cities of Blythe, CA and Ehrenberg, AZ and Quartzsite, AZ are 16.1, 34.9 and 41.9%, respectively (BSPP 2009a AFC).

Impacts

Socioeconomic impacts could result from long-term employment of people from regions outside the study area as a result of relocations and population influx; however, no significant adverse socioeconomics impacts would occur as result of the construction or operation of the CRS/BSPP Project given that no socioeconomic impacts were identified for the BSPP Project.

Growth Inducing Impacts

To determine whether the proposed CRS/BSPP Project would induce population growth, staff analyzes the availability of the local workforce and the population within the region. Staff defines “local workforce” for the CRS/BSPP Project to be Riverside/San Bernardino/Ontario Metropolitan Statistical Area (MSA), which includes both Riverside and San Bernardino Counties. The city of Ehrenberg within La Paz County, AZ and Quartzsite within Maricopa County, AZ are located within the proposed project local and regional study areas, respectively, and could contribute to the local workforce.

Construction

It is anticipated that the construction period for the CRS/BSPP Project would occur over a 20-month construction period. There would be an average of approximately 25 daily construction workers on any given day, depending on the month and the work required. Laborers would consist of craftspeople and supervisory, support, and construction management personnel on site during construction. As evaluated in the Section C.8.4.2 of the BSPP RSA, there is more than adequate local availability of construction workforce within the Riverside/San Bernardino/Ontario MSA alone for the BSPP. As such, the additional 75 workers (total) needed for the proposed CRS expansion (see **Tables 3 and 5**), gen-tie, and telecommunications system would not create a significant impact on the local workforce. Labor for the telecommunications system is subsumed within the labor figures for construction of the BSPP.

Should some construction workers from within the study area choose to stay temporarily at a local area motel or hotel close to the proposed CRS/BSPP Project site, there is ample transient housing available. There are approximately 630 hotel/motel rooms and suites among 11 different establishments in the Blythe area. In addition, the current vacancy rates for the cities of Blythe, CA, Ehrenberg, AZ, and Quartzsite, AZ are 16.1 and 34.9 and 41.9%, respectively (CEC 2010ab). Staff concludes that inducement of substantial population growth either directly or indirectly by the CRS/BSPP Project would not be significant or adverse and construction of the proposed project would not encourage people to permanently relocate to the area.

Operation

Operation of the proposed project would not require any addition to the current workforce. The CRS expansion, gen-tie, and telecommunication system would not permanently or significantly increase the population in the area and therefore would not result in significant demands on law enforcement or medical services, schools nor parks or recreation. The nearest residences would be more than five miles from the proposed CRS site, so no populations, high-minority, low-income, or otherwise, would be affected by the proposed project.

Cumulative Impacts

The cumulative impacts of construction and operation of the proposed BSPP Project ancillary facilities, which include the transmission line and its associated infrastructure, were analyzed in the BSPP RSA. Staff concluded that that the BSPP project could cause a significant direct and cumulative impact on local fire protection services. Direct and cumulative impacts to fire protection services are discussed in detail in the Worker Safety and Fire Protection section of the BSPP RSA (Part 2). This potentially significant impact to fire protection services was determined using the significance thresholds presented in the Worker Safety and Fire Protection section, which are independent and differ from those used in this Socioeconomics section to determine potential impacts to police, school, emergency services and recreational public services. The expansion of the CRS would likely not require fire protection services to the extent expected by the operation of solar thermal power plants in the region.

Foreseeable development in the project area includes primarily renewable energy electrical generation and transmission infrastructure projects. With the large number of renewable energy projects occurring within the BSPP regional study area, it is possible that some overlap of construction phasing could occur between the BSPP and the cumulative development projects. Refer to Section B.3., Cumulative Scenario of the BSPP RSA for a complete list of the cumulative projects. Staff concluded that the local and regional labor force would adequately serve construction and operation of the proposed BSPP and it would not contribute to cumulative increases in population that would generate an increase in demand for local housing and public services. Staff concludes that construction and operation of the proposed CRS/BSPP Project would similarly not contribute to adverse cumulative socioeconomic impacts in regards to population, housing and public services other than fire protection services.

Impact Minimization Measures

The proposed project would not cause a significant adverse direct, indirect, or cumulative impact to the study area’s population, housing, schools, law enforcement, , hospitals, and utilities. However, a significant direct and cumulative impact was identified on local fire protection services for the BSPP. Please refer to the Worker Safety and Fire Protection section of BSPP RSA for a description of the proposed mitigation measures that would reduce this impact to a less than significant level). Because there would be no adverse project-related socioeconomic impacts, minority and low-income populations would not be disproportionately impacted. No impact minimization measures are recommended.

3.8 SOIL AND WATER RESOURCES

Environmental Setting

The environmental setting for the proposed CRS expansion and gen-tie connection are the same, and are discussed together below. The northern portion of the proposed telecommunications system would be co-located with the BSPP natural gas pipeline and access road; the soil and water resources setting of these linear features is described in Section C.9.4.1 of the BSPP RSA. The southern and western portion of the telecommunications system would be the same as the gen-tie route to the CRS with a minor segment following the natural gas line/access road route.

Regional Setting

The project area is located within the Mojave Desert Geomorphic Province, which is a broad interior region of isolated mountain ranges separated by expanses of desert plains/valleys. It has an interior enclosed drainage and many playas, but no perennial streams or permanent natural bodies of water. Standing water may persist for short periods in dry lakes and low areas after heavy rainfall events. Several ephemeral desert washes extending from mountain ranges to playas traverse the project area.

CRS Expansion and Gen-Tie Connection

The CRS expansion and gen-tie connection area is east of the Chuckwalla Dunes within the Palo Verde Mesa, which covers approximately 280 square miles and topographically lies about 70 feet above the elevation of the adjacent Palo Verde Valley to the east. The proposed CRS expansion and gen-tie connection area shows evidence of surface storm water runoff (Solar Millennium 2010v). While no designated blue-line streams occur within the expansion area, staff does not have information about the presence of ephemeral washes.

The CRS expansion, gen-tie connection area would be located within the Palo Verde Mesa groundwater basin; no groundwater would be used for construction or operation of this project component. No information is available at this time regarding the source of water that would be needed during construction of the substation expansion.

The USDA soil survey classified the soil within the proposed CRS expansion and gen-tie connection area as typical torripsamments, mixed, hyperthermic (Rositas series). The Rositas series consists of very deep, somewhat excessively drained soils formed in sandy eolian material. Rositas soils are on dunes and sand sheets; are reported to be somewhat excessively drained; have negligible to low runoff; and rapid permeability (USDA 2010).

Telecommunications System

The proposed telecommunication route is also located within the Palo Verde Mesa. Although there are several ephemeral desert washes along the route, the only perennial surface water resources are in the eastern Chuckwalla Valley and include McCoy Spring, at the foot of the McCoy Mountains. McCoy Spring is located approximately 11.5 miles northwest of the substation and 6.8 miles northwest from the BSPP site. Chuckwalla Spring is located approximately 24.5 miles west-southwest of the substation and 28 miles southwest of the BSPP site in the Chuckwalla Mountains.

There are three mapped soil units beneath the proposed gen-tie/telecommunications route: 1) the Rillito-Gunsight map unit, 2) the Vaiva-Quilotosa-Hyder-Cipriano-Cherioni map unit, and 3) the Rositas-Dune land-Carsitas map unit (RSA Soil and Water Figure 4). The gen-tie route was not included as part of the soil survey conducted for the Project site as part of the Preliminary Geotechnical Investigation.

The telecommunications system would be located within the Palo Verde Mesa groundwater basin; no groundwater would be used for construction or operation of this project component.

Impacts

Potential direct and indirect impacts to soil and water resources are primarily related to drainage, erosion, and sedimentation control during construction and operation. Most of the potential impacts would be expected to occur during construction, with a lower potential of occurring during operation. Potential impacts resulting from ground disturbance would be similar for all proposed CRS/BSPP Project elements and are discussed jointly below.

Although there are no perennial water resources, the CRS expansion and gen-tie connection area shows evidence of surface storm water runoff. Additionally, it is unclear whether the substation expansion or other project components would affect ephemeral desert washes. SCE may need to redirect surface water and protect the substation from runoff by installing a berm designed to direct the flow around both sides of the substation pad. These drainage improvements would potentially disturb an area approximately 80 feet wide around three sides of the substation, resulting in a total permanent disturbance area of approximately 20 acres. Internal surface runoff would be directed towards a 0.5-acre detention basin located at the south end of the substation (Solar Millennium 2010v).

Soil related issues in the project area include a high potential for wind and water erosion of soils disturbed during construction. Disturbed soils lack their normal, although limited, natural vegetative cover. If ephemeral drainages are present, erosion of disturbed areas could transport/deposit sediment downstream within an ephemeral drainage, which would result in a significant adverse impact to water quality. Localized grading along the telecommunications route could impact existing drainages if not properly stabilized. Further, inadvertent construction-related discharges of petroleum hydrocarbons or other contaminants could potentially result in significant impacts to water quality in surface flow if improperly contained.

The proposed CRS/BSPP Project area is not located within a 100-year floodplain and therefore would not exacerbate flood conditions or substantially impede flood flows.

Groundwater within the Palo Verde Mesa groundwater basin is recharged through the pervious surfaces throughout the basin, including those within graveled portions of the proposed CRS expansion area. Although there would be some impervious paved surfaces created by the proposed substation expansion, the net decrease in water recharged to the basins would be negligible. A net deficit in aquifer storage volume or a substantial lowering of the local groundwater table would not occur during construction or operation. Further, regional groundwater occurs at a level deeper than any proposed excavations and is not expected to be encountered during construction. Impacts to groundwater would be less than significant and no mitigation is recommended.

Cumulative Impacts

Cumulative impacts resulting from the proposed CRS/BSPP Project would be similar to the BSPP Project albeit at a much reduced level; refer to Section C.9.7 of the BSPP RSA. . Implementation of the conditions of certification recommended below would mitigate potential soil and water resources impacts below the level of significance. Likewise, the project’s contribution to cumulative impacts would be less than considerable.

Impact Minimization Measures

The Soil and Water Resources section of the BSPP RSA discusses mitigation measures that are designed to avoid and reduce the amount of soil loss due to wind and water erosion. These mitigation measures include implementation of a construction Storm Water Pollution Prevention Plan (SWPPP) or Drainage Erosion and Sedimentation Control Plan (DESCP), as described in Condition of Certification **Soil & Water-1**. The Clean Water Act (CWA) (33 U.S.C. Section 1251 *et seq*.), regulates discharges through the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). Pursuant to NPDES permit requirements, SCE would be required to prepare and adhere to a SWPPP that would include temporary and permanent Best Management Practices (BMPs) to reduce or prevent construction pollutants from leaving the site in storm water runoff and minimize construction erosion. The content of a DESCP is very similar to a SWPPP, but the DESCP covers both construction and operation in one document whereas separate SWPPPs are prepared for construction and operation.

Examples of BMPs and approaches to erosion control that should be implemented as described in Condition of Certification **Soil & Water-1** include:

- Minimizing initial land disturbance and clearing within the working area;
- Segregating topsoil, stockpiling and replacing;
- Applying temporary and permanent erosion control measures; and
- Restoration of disturbed areas.

If drainage of the existing site is altered, as described above, staff recommends that SCE submit a Project Drainage Report/Plan for review and approval by the appropriate licensing authority (e.g., BLM and CPUC) in coordination with the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB). The project drainage plan, when completed and implemented consistent with the requirements of Condition of Certification **Soil & Water-11** in the BSPP RSA would adequately protect the facility from significant damage due to flooding and mitigate impacts to soils related to water erosion.

SCE must comply with all applicable LORS and incorporate all related requirements of other responsible agencies, potentially including, but not limited to CPUC, BLM, the State Water Resources Control Board/CRBRWQCB, California Department of Fish and Game, Metropolitan Water District, and Riverside County. With implementation of the recommended Conditions of Certification or similar measures, staff anticipates that there would not be any significant adverse direct, indirect, or cumulative impacts to soil and water resources resulting from construction or operation of the proposed CRS/BSPP Project.

3.9 TRAFFIC & TRANSPORTATION

<u>Environmental Setting</u>

CRS Expansion

The expanded CRS substation would be located 8 miles west of the City of Blythe, and 1.5 miles south of I-10. It would be accessed from I-10, via the Wiley's Well Road interchange, 4.5 miles to the west. Based on historical rates, the year 2012 estimated average daily traffic count is 3,350 vehicles on I-10 west of Wiley's Well Road and 3,700 vehicles to the east; these estimates do not include projected traffic from the BSPP and other large solar projects. In the project vicinity, I-10 has a two-way capacity of 6,800 vehicles per hour (CEC 2010ab).

For construction of the substation expansion, SCE anticipates a minimum of 25 construction personnel on any given day (Solar Millennium 2010v Section 1.3.3.10).

Gen-Tie Connection

The gen-tie would be connected at the substation, and vehicle access would be the same as described above for the CRS expansion. For connection of the gen-tie to the substation, SCE estimates a workforce of 20 over 2 days (see **Table 5**).

Telecommunications System

The telecom line would be built underground from the BSPP to the CRS, following the gen-tie route. Vehicle access would be the same as described above. Trench construction at the CRS would require 5 personnel over 4 days, underground fiber cable installation 5 personnel over 2 days, and telecommunications 2 personnel over 10 days (see **Table 7**).

Staff does not have similar data for trenching of the underground telecom line. Staff assumes that the assessment of the natural gas line from the BSPP to the interconnection with the SoCal gas pipeline presented in the BSPP RSA reflects impacts associated with trenching of the underground telecom line. Staff does not have information on trenching for the remainder of the telecom line to the CRS, but expects that the traffic and transportation analysis of the western portion of the underground line would be similar to the gas line analysis.

<u>Impacts</u>

The substation expansion could add 25 or more commuter roundtrips per day, in addition to construction vehicles. The number of trips associated with the CRS expansion would vary based on the degree of overlap of activities and whether workers carpool. As with BSPP construction, there is a likelihood that workers would commute to the site via I-10, with 75% from the east (Blythe, California and Parker, Arizona) and 25% from the west.

The project components would add a minor volume of trips and would not affect I-10 Level of Service (LOS) "A" or capacity in the vicinity. In addition, SCE would repair any construction-related damage to existing roads upon completion of construction, in accordance with local agency requirements.

Cumulative Impacts

Construction of the CRS expansion, gen-tie connection, and telecommunications system would add a minor amount of vehicles to I-10 and would not impact the highway's capacity. However, the CRS/BSPP Project components would have construction schedules (first quarter 2011 to May 2013) that could overlap with construction for the BSPP, Palen, and Genesis solar projects (fourth quarter 2010 through 2016). All three solar projects are located off of I-10, and expect to employ more than 3,000 workers combined during peak construction (CEC 2010ab). The overlapping construction could result in an unacceptable LOS. However, conditions of certification identified in Staff Assessments prepared for those projects require traffic coordination and control plans to reduce and local traffic exacerbation. Also, since each project would use a different I-10 offramp/intersection, no substantial highway backup would occur.

Impact Minimization Measures

Implementation of SCE's measures TRANS-1 (traffic control services), TRANS-2 (off-peak hour construction traffic schedule), and TRANS-3 (appropriate permits for modifications or activities within local roadway and railroad ROWs) would minimize impacts to traffic and transportation. In addition, the SCE should follow BSPP Traffic & Transportation conditions of certification **TRANS-3** for oversized and overweight vehicles.

3.10 WASTE MANAGEMENT/HAZARDOUS MATERIALS

Environmental Setting

All of the proposed CRS/BSPP Project components could generate non-hazardous and hazardous wastes. In addition, substation expansion would require soil and vegetation removal (Solar Millennium 2010v), requiring additional disposal. Waste streams generally include solid waste, including excavated soil that could not be backfilled, vegetation and sanitation waste as well as empty cable reels and cut-off pieces of fiber optic cable. All waste streams are regulated and discharges or disposal of any waste material either requires specific permitting, or disposal at a permitted facility based on the type of waste. Both solid and liquid waste streams can be either hazardous or non hazardous, depending on the constituents in the waste stream and the characteristics (e.g., ignitability, reactivity, toxicity, and corrosivity) of the waste. The status of the waste stream determines both the storage options for the material, and the disposal method for the material.

As identified in the BSPP AFC (Solar Millennium 2009a), there are seven Class III waste disposal facilities in Riverside County that could potentially take non-hazardous waste generated by the project. They have a combined remaining capacity of 160 million cubic yards. The nearest is the Blythe Sanitary Landfill, which has a remaining capacity of 2.3 million cubic yards and accepts 400 tons per day. Hazardous waste landfills include Clean Harbors' Buttonwillow in Kern County and Chemical Waste Management's Kettleman Hills Landfill in Kings County.

Hazardous materials – in the form of contaminated soil and unexploded ordnance – may be present on the site. As such, SCE expects to conduct a geotechnical study prior to construction that would include evaluation of the presence of contaminated soils. A Phase I Environmental Site Assessment would be required prior to construction of the substation expansion.

Impacts

Ground surface improvement for the substation expansion would generate 20,000 cubic yards of soil and vegetation waste for export (Solar Millennium 2010v). SCE did not quantify other waste streams for the CRS expansion or for the gen-tie connection and underground telecom installation, but the total quantity would be expected to be much less than that for BSPP construction.

Construction of the substation expansion would result in the generation of various waste materials that can be recycled and salvaged. Waste items and materials would be collected by construction crews and separated into roll off boxes at the materials staging area. All waste materials that are not recycled would be categorized by SCE in order to assure appropriate final disposal. Nonhazardous waste would be transported to local authorized waste management facilities. Given the 2.3 million cubic yard remaining capacity of the Blythe Sanitary Landfill and the 160 million cubic yard remaining capacity of all Class III landfills in Riverside County, the project's non-hazardous waste disposal would not create a significant environmental impact.

Hazardous materials would include small amounts of fuels, lubricants, and cleaning solvents. All hazardous materials would be stored, handled and used in accordance with applicable regulations. Storage locations would be designated in the Storm Water Pollution Prevention Plan (SWPPP) prepared for the CRS/BSPP and BSPP projects. The SWPPP would also include protective measures, notifications, and cleanup requirements for any incidental spills or other potential releases of hazardous materials. Material Safety Data Sheets would be made available at the construction site for all crew workers.

At the conclusion of construction, SCE would conduct a final inspection to ensure that all work areas are brought to the original conditions (e.g., free of trash, litter etc).

Cumulative Impacts

Large facilities in the area that currently generate waste include the Chuckwalla Valley State Prison, Ironwood State Prison, and Blythe Energy Project. In addition, four commercial projects, 15 residential projects, and 16 renewable projects are proposed along the I-10 corridor in the BSPP region (CEC 2010ab). Even if all reasonably forseeable projects are built in addition to the proposed substation components, waste disposal would not result in a significant cumulative impact. Furthermore, it is unlikely that the Blythe Sanitary Landfill's 400 tons per day disposal limit would be exceeded.

Impact Minimization Measures

Under SCE's mitigation measure HAZ-1, a Phase I ESA would be performed at the expanded substation location and along any newly acquired transmission and subtransmission line ROWs. This would reduce the potential for trenching and excavation to expose contaminated soil to construction workers. In addition, SCE's HAZ-2 through HAZ-7 would implement standard fire prevention, waste handling, storage, and disposal measures.

BSPP Condition of Certification **WASTE-1** includes steps for UXO identification, training, and reporting. Measures **WASTE-2** through **WASTE-3** in the Waste

Management section of the BSPP further discuss procedures in the event that contamination is identified during assessment of the project site. **WASTE-4** requires preparation of a Construction Waste Management Plan.

3.11 VISUAL RESOURCES

The visual resources analysis of the CRS/BSPP Project is based on applicant-provided visual resource information for the BSPP (Solar Millenium 2009a, Solar Millennium 2010v) and the Revised Cultural Resources Assessment for the BSPP Project (CEC 2010ab). In the BSPP RSA, staff employed a combination of the standard visual assessment methodology developed by California Energy Commission staff and BLM's Visual Resources Management (VRM) Methodology. In addition, staff relied on the visual analysis of the Colorado River Substation (or DSWTP MSO) in Appendix B of the Blythe Energy Project Transmission Line Energy Commission Revised Staff Assessment (CEC, 2006). The setting for visual resources is shared by the proposed CRS expansion and gen-tie connection. Therefore they are considered together in the following discussion. Further, the telecommunication system would be co-located with the BSPP gen-tie line, natural gas pipeline and access road. In these shared locations, staff has identified the identical visual impacts and mitigation as in the BSPP RSA.

Environmental Setting

The proposed CRS/BSPP Project is located within the Mojave Desert, a sub-region of the Sonoran Desert. The Mojave Desert is a landscape typical of the basin and range physiographic province of which it is part, with small, rocky mountain ranges with jagged peaks alternating with talus slopes and desert floor. Flat basins form broad flat expanses of barren plains typified by low scrub vegetation and expansive views. Dark browns and garnets are the dominant mountain hues, although blues and purples prevail as viewing distance increases. In contrast, lighter brown and tan soils dominate the desert floor, sparsely dotted with the grey-green of Sonoran creosote bush and golden bursage scrub vegetation.

The project site is located adjacent and to the north of I-10 on the upper tier (of two tiers) of Palo Verde Mesa, approximately eight miles west of Blythe in eastern Riverside County. Information describing the BSPP site is generally applicable to the CRS/BSPP site and is presented below.

The Palo Verde Mesa is a broad alluvial plain situated between, and derived from, the McCoy Mountains to the west, Little Maria Mountains to the north, and Big Maria Mountains to the northeast. To the south are the Mule Mountains. The mountain ranges add visual variety to the otherwise flat desert landscape. The mesa is characterized by a mostly undeveloped desert landscape of level terrain and sparse desert scrub vegetation.

This portion of the mesa offers open, panoramic views of a desert mesa landscape that appears relatively visually intact. As described in the RSA, the project area viewshed (area where the project would be visible from) includes Blythe Airport and I-10 (I-10 is the main travel corridor between Southern California and Phoenix, Arizona), the McCoy Mountains to the west, the Little Maria Mountains and Palen McCoy Wilderness to the north, the Big Maria Mountains and Wilderness to the northeast, and the Mule

Mountains (and ACEC) to the south. From the east, the BSPP project would also be visible from Palo Verde Community College and the Mesa Bluffs Golf Community – both situated to the northwest of Blythe. The BSPP site would also be visible from BLM's Midland Long-Term Visitor Area and Campground – both located northeast of the site, off Midland Road.

The BSPP project site is presently undeveloped and consists mainly of desert scrub (largely scattered Creosote Bush) and is predominantly intact on the broad, mesa plain (elevation 800 feet). The mesa is visually dominated on the west by the steeply rising (to 2,830 feet) rugged McCoy Mountains (Solar Millenium 2009a, p. 5.15-6).

The BSPP project site is primarily a natural setting comprised of a mosaic of sparse, shrubby vegetation of darker greens and tans, low-growing grasses and light-colored soils, rocks and desert pavement openings. The natural features of the project site form a strong, coherent pattern, and the visual integrity in the natural landscape is high (Solar Millenium 2009a, p. 5.15-8). Views from the site are panoramic, encompassing the open Palo Verde Mesa and the various mountain ranges that border the Mesa. The rugged ridges, angular forms and bluish hue of the McCoy Mountains to the immediate west of the BSPP project site provide a contrast of visual interest to the flat, light-colored horizontal landform of the mesa and project site. The area immediately surrounding the BSPP and CRS/BSPP sites is lightly populated.

The CRS/BSPP project area is located on, and surrounded by, land managed by BLM as part of the California Desert Conservation Area (CDCA). This designation imparts a High rating for Viewer Sensitivity, using the BLM system, for all lands within the CDCA. Nearby areas that are especially visually sensitive include the Mule Mountain Area of Critical Environmental Concern (ACEC).

I-10 and the city of Blythe are the visually dominant man-made features in the area. Other distinct features include the Blythe Airport and the I-10 weigh station.

Approximately one to three miles to the south of I-10, there are Western Area Power Administration (WAPA) and SCE transmission lines and substations within BLM's Utility Corridor K (Solar Millenium 2009a). The Devers-Palo Verde transmission line runs east to west roughly south of the highway but remains largely visually subordinate from the highway. Despite these man-made features the natural setting predominates and the existing landscape appears relatively intact, dominated by vast expanses of scrub-covered mesa and vivid mountains behind them. The project visual setting is described in detail in the BSPP RSA.

CRS Expansion and Gen-Tie Connection

The proposed CRS 45-acre expansion area, gen-tie connection and telecommunications system would be located at the southeastern end of Palo Verde Mesa adjacent to the existing DPV No. 1 Transmission Line (Solar Millennium 2010v). The proposed site is on BLM lands characterized by open, flat and sparsely vegetated terrain with short grass and low growing shrubs of muted colors. Looking south towards the site from I-10 near the Mesa Verde (Nicholls Warm Springs) residential community, the proposed substation and gen-tie connection would be approximately 4 miles away. The surrounding area is predominantly flat desert with widely scattered vegetation and four-wheel drive vehicle trails. The existing H-frame transmission structures are in the background and almost completely blend in the blue-grey Palo Verde Mountains (CEC 2006, p.4.11-10).

Telecommunications System

The proposed telecommunication system would consist of a fiber-optic line strung along the transmission towers, and a redundant buried line. Both lines would extend along the full length of the BSPP linear corridor, from the proposed site footprint to the proposed CRS footprint. North of I-10 the gen-tie and fiber optic line diverge from the other linear corridor elements towards the west for an unspecified distance, and then rejoin the main linear corridor before reaching the proposed plant site. This western branch is a new addition to the proposed project, and is located significantly closer to the McCoy Mountains. The eastern branch is slightly offset to the east of the originally proposed corridor. The exact location of the telecom trench is unspecified. However, the telecom line could be easily added to the linear corridor utility trench, whose visual resource impacts and proposed mitigation is discussed in detail in the BSPP RSA.

From the point where the proposed BSPP transmission line crosses I-10, the foreground to middleground terrain is flat and supports a sparse desert scrub vegetation although there are a number of built facilities in the general vicinity of the transmission line span – an I-10 weigh station and Blythe Airport to the east, residences to the southeast, and a transmission line that parallels the south side of I-10. The project would be prominently visible in the foreground of views from I-10. Although built features are visible in the vicinity of the span as described above, much of the landscape visible to the north and south of I-10 is characterized by a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat, grass- and shrub-covered mesa, which is backdropped by the rolling to angular forms of the McCoy Mountains, north of I-10. The mountains to the west add visual interest and contribute to staff’s low-to-moderate rating for visual quality. In contrast, panoramic views to the east are available of the distant, rolling to angular forms of the Dome Rock and Big Maria mountain ranges, which add considerable visual interest. These mountains form the horizon for eastbound travelers and are prominently visible in the center of the primary cone of vision.

As the landscapes along the I-10 corridor become more and more industrialized with the addition of built features with industrial character, opportunities for expansive views of natural appearing desert landscapes are rapidly diminishing. Combined with the high volume of travelers on I-10 (the primary travel corridor between Southern California and Phoenix) and viewer expectations of observing higher quality landscape features while traveling through a designated conservation area (CDCA), travelers would be highly sensitive to the introduction of additional industrial character to this predominantly naturally appearing landscape, which would be perceived as an adverse visual change. Therefore, staff rates overall viewer concern when traveling east or west as high.

Site visibility would be high in that the view of the transmission line route would be unobstructed at a foreground viewing distance. The number of viewers is high and the view duration for motorists on I-10 would be extended with uninterrupted sightlines to the route from I-10 for several miles of travel distance from either direction (east or west). The high visibility and numbers of viewers and extended duration of view would result in high viewer exposure.

For viewers at this point, the moderate visual quality combined with high viewer concern and viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

Impacts

Staff analyzed visual resource-related information and concluded that the proposed CRS/BSPP Project, with all staff recommended conditions of certification, would have adverse and significant visual impacts.

CRS Expansion and Gen-Tie Connection

The CRS substation, its proposed expansion, and the associated gen-tie connection would appear as an assemblage of complex, geometric forms with vertical to diagonal lines. Although the structures would exhibit an industrial character similar to the existing DPV No. 1 transmission line, the substation and gen-tie structures would be more numerous and would increase the overall structural complexity at this location. The resulting visual contrast for form and line would be moderate in the context of the existing infrastructure. The overall level of change would also be moderate. Although the substation would not repeat the basic elements of the existing natural features in the landscape, it would repeat the characteristics of the existing transmission lines and it would not dominate the view of the casual observer. Additionally, the substation would have the potential to cause light and glare impacts if night lighting is not properly controlled.

In their analysis of the CRS substation (original footprint), the CPUC and BLM staff concluded that the moderate visual impacts resulting from the construction and operation of the substation would be adverse but less than significant (CPUC/BLM 2006, p. D.3-65). The additional 45-acre expansion would have similar visual impacts. Connection of the BSPP tie-line to the CRS would not be expected to create visual impacts given the surrounding substation structure and transmission lines.

Telecommunications System

Telecom line construction actions would be short-term and visual impacts from construction equipment would be minor compared to construction of the CRS substation and BSPP Project. Operational impacts are primarily associated with the gen-tie line and the associated fiber-optic cable. The buried redundant fiber optic line is not expected to have visual impacts during operation.

As presently proposed, the transmission line would be a bundled, double circuit (six conductors and shield wire) transmission line on steel poles. The primary fiber optic line would be attached to these poles, but would probably not be a dominant part of the visual impact. The span of I-10 would be prominently visible with curvilinear conductor lines spanning the freeway and the prominent vertical forms of the steel poles located adjacent to the freeway. The proposed transmission line (analyzed in the RSA) would add industrial features with prominent vertical and curvilinear lines to the foreground landscape. Such characteristics are not prominently visible in the existing landscape in the vicinity of the span. Although the strong vertical lines of the steel poles would contrast with the prevailing horizontal lines of the mesa and the irregular ridgelines of the mountains beyond, nearby transmission line structures do exhibit similar linear characteristics, though at a smaller and less noticeable scale. The resulting visual contrast caused by these industrial characteristics and contrasting features would be moderate.

The proposed project would appear highly prominent given the foreground proximity of the structural features to I-10. The proposed project would also appear comparable in prominence to the linear form of the freeway, the broad horizontal form of the mesa, and the angular forms of the background mountains. The proposed transmission line would appear spatially prominent in the views from both eastbound and westbound travel directions, and the extension of the transmission structures and conductors above the horizon line would contribute to the project’s overall structural prominence. Overall project dominance would be co-dominant.

From the point where the transmission line crosses I-10, the line (lower quality landscape feature) would block from view portions of the McCoy Mountains and sky (higher quality landscape features). The resulting view blockage would be moderate. The values for visual contrast, project dominance, and view blockage, when taken together, would constitute a moderate level of overall visual change.

When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderate visual change that would be perceived looking to the west, would cause an adverse but less than significant visual impact. This conclusion is substantially based on the visual influence of the adjacent weigh station with its noticeable light standards. In contrast, the moderate-to-high visual change that would be perceived for the view to the east would cause an adverse and significant visual impact.

The BSPP RSA concludes that the gen-tie towers themselves would result in a substantial adverse impact to existing scenic resource values in the project vicinity. These impacts could not be mitigated to less than significant levels and would thus result in significant an unavoidable impacts under CEQA. However, the fiber optic cables, which constitute the contribution of the proposed CRS/BPSS Project, consist of a very minor aspect of this impact.

Cumulative Impacts

Previous analyses of cumulative visual impacts in the project area have resulted in differing opinions. The authors of the Blythe Energy Project Transmission Line Energy Commission Revised Staff Assessment (2006) conclude that the distance and angle of view of the proposed BEPTL and other transmission lines from I-10 viewers, visual awareness of the transmission lines would be low and therefore there would not be a significant cumulative visual impact (CEC 2006 p. 4.11-16).

In contrast, the authors of the DPV No. 2 Transmission Line FEIR/FEIS, concluded that the addition of two proposed transmission lines in the same general corridor as the existing DPV line would have the potential to raise the cumulative level of contrast and dominance of the overall transmission corridor to a level that begins to attract attention and detract from the intactness and visual quality of the viewshed as seen from I-10. Specifically, impacts would include an increase in industrial character, structure prominence, and view blockage.

The DPV No. 2 Transmission Line Project, through its proposed transmission line, would contribute incrementally to that increase in dominance of transmission lines within the Palo Verde Valley. The proposed mitigation, which would essentially require the consolidation of separate transmission corridors to the greatest extent possible, would reduce cumulative visual impacts, but not to a less than significant level.

Similarly, staff concludes that the BSPP gen-tie and the CRS/BSPP Project along with it would result in a significant and unavoidable cumulative visual impact in the context of existing cumulative conditions. Furthermore, BSPP's contribution to the visible industrialization of the desert landscape would constitute a significant visual impact when considered with existing and future foreseeable projects, both within the immediate project viewshed (extending 15 miles from the project site) and in a broader context that encompasses the whole of the California Desert Conservation Area. Staff concludes that the proposed mitigation, would reduce cumulative visual impacts, but not to a less than significant level.

Impact Minimization Measures

With the inclusion of the following recommended mitigation measures or similar, potential visual impacts related to proposed project would be less than significant:

- **VIS-1** Surface Color Treatment of Non-Mirror Structures: to lower color contrast of the proposed transmission poles and blend with the visual background;
- **VIS-2** Visual Mitigation and Revegetation: to minimize the visual prominence of the proposed construction to travelers on I-10;
- **VIS-3** Temporary and Permanent Exterior Lighting: low glare, not visible from a distance.
- **VIS-4** Project Design: To the extent possible, the project owner will use applicable design principles to reduce the visual contrast of the project with the characteristic landscape.

Staff also suggests that the use of lattice-style towers could reduce the contrast of transmission towers.

3.12 WORKER SAFETY

Environmental Setting

Industrial facilities generally pose worker safety concerns. These include exposure to loud noises, moving/falling equipment, trenches, confined space entry and egress, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. Workers may experience falls, trips, burns, lacerations, and other injuries.

The CRS/BSPP Project would be located on an approximately 140 acre parcel of land located approximately 1.5 miles south of Interstate 10 and 4.75 miles east of Wileys

Well Road, in the County of Riverside, California. The expanded substation would be generally located in the eastern portion of the parcel.

From the BSPP, the underground telecom line would be co-located with the BSPP natural gas pipeline and access road until it reaches the Southern California Gas Company transmission pipeline. From that point, the line would be within the right of way of the proposed BSPP gen-tie until it reaches the CRS. The above ground fiber optic line would be installed on the BSP gen-tie. The CRS/BSPP Project is located entirely on undisturbed federal land administered by the BLM.

Fire support services would be under the jurisdiction of the Riverside County Fire Department (RCFD). RCFD fire stations have full-time staff with a minimum of three personnel, including paramedics. The nearest stations to the BSPP side of the proposed components are #45 Blythe Air Base and #4 Ripley Station approximately 3 miles and 12 miles away, respectively. There are also fire stations manned by the City of Blythe and Chuckwalla Valley State Prison. The nearest hazardous materials team is located in Palm Desert (90 miles to the west), with a response time of 1.5 to 2 hours (CEC 2010ab).

Construction workers may be at risk of exposure to Coccidiodomycosis (known as Valley Fever). Soil disturbance (primarily of previously undisturbed lands) could release the spores of the fungus Coccidiodes immitis, which can be inhaled and affect the lungs with potentially severe consequences. Riverside County has approximately 50 cases of Valley Fever per year, with nine reported deaths between 2005 and 2008. This compares to Kern County with a recent average of 1,000 cases per year.

The site also has the potential to contain unexploded ordnance (UXO) and soil contaminated with hazardous materials.

Impacts

Workers could be exposed to hazardous materials that are already present (i.e. contaminated soil and UXO) or that are used in construction. Soil excavation for substation grading and trenching for the telecom cable have the potential to release the fungus that causes Valley Fever.

Hazardous materials used during construction would be stored, handled and used in accordance with applicable regulations. Material Safety Data Sheets would be made available at the construction site for all crew workers. Also, safety devices such as traveling grounds, temporary grounding grid/mats around stringing equipment, guard structures, and radio equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

Due to the scale of the proposed components, a significant impact on emergency and fire response is not expected.

Cumulative Impacts

The RCFD may not be adequately equipped to respond in a timely manner to fire, hazmat, rescue, and EMS emergencies for the proposed CRS/BSPP Project components in addition to the BSPP and other large solar projects. Construction and operation of these projects could present short and long-term adverse impacts on services. The Worker Safety and Fire Protection section in the BSPP RSA discusses that the significant impact could be mitigated under measures to increase resources for the fire department. As noted previously, the expansion of the CRS substation would likely not require fire protection services to the extent expected by the operation of solar thermal power plants in the region.

Impact Minimization Measures

SCE mitigation measure HAZ-1 and BSPP RSA condition **WASTE-1** would reduce the potential for worker exposure to hazardous materials and UXO, respectively. The BSPP RSA section on Worker Safety and Fire Protection includes **WORKER SAFETY-7** to respond to RCFD concerns and **WORKER SAFETY-8** to minimize construction workers to VF exposure.

SCE measures HAZ-2 through HAZ-5 contain steps for fire prevention and response, and hazardous waste and materials handling. Under HAZ-6, the substation would be grounded to limit electric shock and surges that could ignite fires. The BSPP Worker Safety and Fire Protection section also includes additional measures that would mitigate any impacts to worker safety to less than significant.

4.0 SUMMARY OF CONCLUSIONS

Energy Commission staff has prepared this TSE Appendix to the BSPP RSA to discuss reasonably foreseeable actions needed to interconnect the 1,000 MW BSPP to SCE's existing DPV 500 kV transmission line. The reasonably foreseeable actions include: 1) expanding the proposed and already permitted CRS: 2) looping the DPV 500 kV line and terminating the new Devers-Colorado River transmission line into the CRS; 3) modifying existing 220 kV structures; 4) constructing a distribution line for CRS light and power; 5) connecting the last tower of the BSPP gen-tie to the CRS; and 6) installing and connecting telecom system components between the BSPP and the CRS, including an underground telecom line which would follow the natural gas line/access road and BSPP gen-tie route. Only the CRS substation expansion, BSPP tie-line connection, and telecom facilities are evaluated in this Appendix since the other elements have already been analyzed and permitted.

The CRS expansion and connection of BSPP gen-tie and telecommunications facilities would be built by SCE and would be fully evaluated in a future environmental document prepared in response to an application to the BLM for a lease to construct the CRS. Because no application has yet been submitted and the SCE project is still in the planning stages, the level of impact analysis and the conclusions presented below are based on available information.

The proposed CRS/BSPP interconnection project, especially expansion of the Colorado River Substation has the potential to result in significant direct, indirect and cumulative impacts to biological resources. Mojave fringe-toed lizards and a number of other sensitive sand dune-dependent species are likely to be directly impacted by expansion of the CRS. Even if the substation expansion avoided direct impacts to these sensitive sand dune species, indirect impacts are also likely to occur. The proposed expansion and associated drainage modifications could result in direct and indirect impacts to state waters. Without project-specific information, staff cannot address the feasibility of implementing effective avoidance measures as a means of reducing impacts below the level of significance. Impacts from other project components are likely to be relatively small; staff's proposed conditions of certification would likely be sufficient to reduce impacts to biological resources to less than significant levels.

Staff was not provided any cultural resources information regarding the proposed CRS expansion/gen-tie connection or buried telecom line. Construction of the CRS/BSPP Project is likely to result in direct and indirect impacts to cultural resources. Project impacts, when combined with impacts from past, present, and reasonably foreseeable projects, may contribute to cumulatively considerable adverse impacts for cultural resources at both the local I-10 Corridor and regional levels. Future cultural resources surveys and analyses conducted by the CPUC and BLM as part of their compliance with CEQA, NEPA, and Section 106 of the National Historic Preservation Act would need to address potential impacts to cultural resources in the CRS/BSPP Project footprint.

Impacts to geologic resources would potentially occur from ground disturbance during construction. Direct surface displacement by faulting of any portion of the proposed facility is not expected. The CRS/BSPP project facilities would be engineered to withstand potential ground shaking in accordance with the CPUC's General Order 95 and would meet relevant seismic requirements. The project is located on relatively level ground and in an area of low seismicity. No impact is expected from landslides. With proper construction practices there should be no notable erosion or transport of sediment from the site. Impacts to paleontological resources, if present, would be potentially significant. No impacts to mining would occur. The proposed CRS/BSPP Project would not result in cumulative impacts. Mitigation measures would reduce potential geological and paleontological impacts below the level of significance.

Land use impacts of the proposed CRS/BSPP Project would be less than significant. The project would comply with applicable land use plans, ordinances, regulations, policies and reasonably foreseeable land uses. The project would not impact any agriculture or rangelands, recreation and wilderness areas, areas designated by BLM as Herd Areas or Herd Management Areas or divide an existing community. The CRS/BSPP Project may combine with other past and reasonably foreseeable future projects to reduce scenic values of wilderness areas and recreational resources in the Chuckwalla Valley and southern California desert region and therefore, would result in a significant and unavoidable cumulative land use impact in this regard.

The CRS/BSPP Project would generate noise above ambient levels from construction of the substation expansion, gen-tie connection, and construction and installation of the telecommunication system. There are no occupied residences or noise sensitive receptors within one mile of the proposed CRS/BSPP project locations. Project noise is not anticipated to exceed any County or CEQA significance thresholds. Impacts from vibration are not expected. Compliance with LORS would protect construction, operation and maintenance workers from noise hazards. No cumulative impacts would occur.

The CRS/BSPP Project would not cause a significant adverse direct, indirect, or cumulative impact to the study area's population, housing, schools, law enforcement, emergency services, hospitals, and utilities. No minority and low-income populations would be disproportionately impacted. Fire protection impact conclusions are presented below.

Soil related issues in the CRS/BSPP Project area include a high potential for wind and water erosion of soils disturbed during construction. Disturbed soils lack their normal, although limited, natural vegetative cover. If ephemeral drainages are present, erosion of disturbed areas could transport/deposit sediment downstream within an ephemeral drainage, which would result in a significant adverse impact to water quality. Further, inadvertent construction-related discharges of petroleum hydrocarbons or other contaminants could potentially result in significant impacts to water quality in surface flow if improperly contained. The proposed CRS/BSPP project area is not located within a 100-year floodplain and therefore would not exacerbate flood conditions or substantially impede flood flows. Impacts to groundwater would be less than significant and no mitigation is recommended. Impacts would not be cumulatively considerable. Mitigation measures would reduce potential soil and water resources impacts below the level of significance, thereby eliminating the projects contribution to cumulatively considerable impacts.

Construction of the CRS expansion, gen-tie connection, and telecommunications system would add a minor amount of vehicles to I-10 and would not impact the highway's capacity. Traffic coordination and control plans prepared for the I-10 projects would reduce any local traffic exacerbation.

No impacts are expected from the use of hazardous materials or from waste generation. Compliance with LORS would ensure proper handling and disposal of materials. There is sufficient capacity at approved disposal facilities to accept CRS/BSPP waste. Mitigation measures would reduce impacts if UXO or existing contamination is present.

In their analysis of the CRS substation (original footprint), the CPUC and BLM staff concluded that the moderate visual impacts resulting from the construction and operation of the substation would be adverse but less than significant. The additional 45-acre expansion would have similar visual impacts. Connection of the BSPP tie-line to the CRS would not be expected to create visual impacts given the surrounding substation structure and transmission lines. No visual impacts from the buried telecom line would remain after construction. The anticipated operational visual impacts of the CRS/BSPP Project in combination with past and foreseeable future projects in the local viewshed of Chuckwalla Valley are considered potentially significant. Anticipated cumulative operational impacts of past and foreseeable future region-wide projects in the southern California desert are considered cumulatively considerable and potentially significant.

Worker safety and public health impacts would be reduced to less than significant levels through compliance with LORS and implementation of mitigation measures, including measures relating to Valley Fever and UXO. The Riverside County Fire Department may not be adequately equipped to respond in a timely manner to fire, hazmat, rescue, and EMS emergencies for the proposed CRS/BSPP project components in addition to the BSPP and other large solar projects. Construction and operation of these projects would present short and long-term adverse impacts on services but could be mitigated with measures as described in the BSPP RSA.

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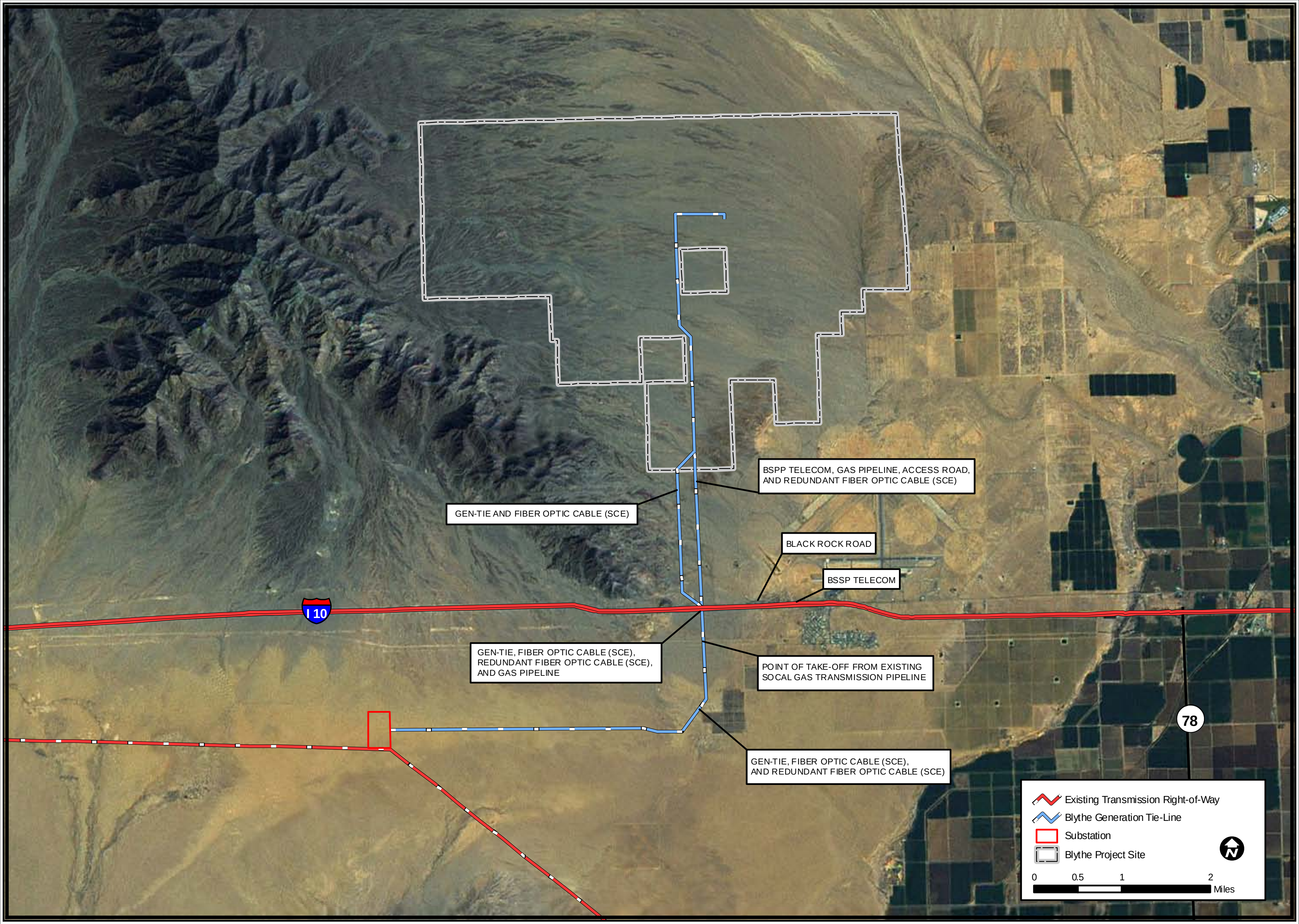
TRANSMISSION SYSTEM ENGINEERING - APPENDIX A - FIGURE 1

Blythe Solar Power Project/SCE Actions



TRANSMISSION SYSTEM ENGINEERING

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AECOM, Aspen Environmental

Response to Public and Agency Comments

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
6/16/2010	TN-57196	Lisa T. Belenky, Senior Attorney, Center for Biological Diversity	Group/Organization	BLM's analysis of the proposed plan amendment and proposed project fail to comply with FLPMA	BLM will respond to this comment in its FEIS.
				The DEIS fails to adequate address the Plan Amendment in the Context of the CDCA Plan	BLM will respond to this comment in its FEIS.
				The DEIS fails to adequately address impacts to Multiple Use Class L lands and loss of Multiple Use in favor of a Single Use for Industrial purposes.	BLM will respond to this comment in its FEIS.
				The DEIS fails to adequately address other ongoing planning efforts. The impacts of the gen-tie and the Colorado River substation are not analyzed.	BLM will respond to this comment in its FEIS. Staff notes that impacts from the BSPP gen-tie and Colorado River substation are analyzed in TSE Appendix A.
				BLM failed to inventory the resources of public lands that could be affected by the proposed project before making a decision to allow destruction of the resources.	BLM will respond to this comment in its FEIS.
				The DEIS fails to provide adequate information to ensure that the BLM will prevent unnecessary and undue degradation of public lands	BLM will respond to this comment in its FEIS.
				The DEIS fails to comply with NEPA	BLM will respond to this comment in its FEIS.
				Purpose and Need and Project Description are too narrowly construed and unlawfully segment the analysis. The DEIS fails to address risks associated with global climate change in context of including both the need for climate change mitigation and adaptation strategies.	BLM will respond to this comment in its FEIS. Staff noted that RSA Subsection C.2.4.2 discusses the impacts of the project on listed species and other sensitive resources, and incorporates an assessment of climate change in this analysis. The cumulative impact analysis in subsection C.2.8 also considered the effects of climate change.
				The DEIS does not adequately describe the environmental baseline, particularly in areas where surveys are ongoing.	BLM will respond to this comment in its FEIS. Staff notes that the RSA discusses the baseline condition of habitat and biological resources within the proposed Project area in subsection C.2.1. New survey data has been incorporated.
				The DEIS fails to adequately analyze the direct, indirect and cumulative impacts of the proposed project on the environment.	BLM will respond to this comment in its FEIS. Staff notes that a detailed analysis of impacts of direct, indirect and cumulative impacts is provided in RSA subsections C.2.4.2 and C.2.8. Staff conducted a detailed and quantitative cumulative effects analysis for biological resources affected by the project using GIS-based datasets for vegetation, landforms, soils, watersheds, CNDDB

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					occurrences, and the USGS desert tortoise habitat model. The cumulative effects analysis also carefully considered cumulative indirect effects that are more difficult to quantify in a GIS-based analysis of habitat loss.
				The DEIS does not include a Desert Tortoise Relocation/Translocation Plan	BLM will respond to this comment. Staff notes that Condition of Certification **BIO-10** requires the Project owner to develop and implement a final Desert Tortoise Relocation/Translocation Plan (Plan) that is consistent with current USFWS approved guidelines, and meets the approval of the CPM. The final Plan shall be based on the draft Desert Tortoise Relocation/Translocation Plan prepared by the Applicant (AECOM 2010t) and shall include all revisions deemed necessary by BLM, USFWS, CDFG and the Energy Commission staff.
				Surveys for desert bighorn sheep have not been conducted and suggested mitigation or perceived impacts are pure conjecture	BLM will respond to this comment. Staff notes that although no systematic bighorn sheep surveys have been conducted that would provide a definitive answer as to their presence or absence in these mountains, staff conducted an analysis of habitat connectivity and cumulative impacts to bighorn sheep in RSA subsection C.2.8.7., and concluded that the Project contributes to cumulative impacts to Desert bighorn sheep due to loss of spring foraging habitat. Staff's proposed Condition of Certification **BIO-21** would reduce these impacts to a less than significant level.
				Basic data on rare and special status plants are not provided in the DEIS.	BLM will respond to this comment. Staff has included additional information on special status plants in its RSA and Staff's proposed Condition of Certification **BIO-19** (Special-Status Plant Mitigation) includes a requirement to conduct late-season surveys in summer-fall 2010 to ensure that any plants missed during the spring surveys would be detected and any impacts mitigated.
				The DEIS does not evaluate impacts to birds from mirror strikes or as result of evaporation ponds.	BLM will respond to this comment. Staff notes that direct and indirect impacts from mirror strikes, and evaporation ponds, including potential impacts to flight operations, are discussed in the RSA and SSA.
				Insufficient information on burrowing owls is provided in the DEIS.	BLM will respond to this comment. Staff analyzed the potential impacts to burrowing owls from construction and operation of the

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					project in subsection C.2.4.2, and staff's proposed Condition of Certification **BIO-18** recommends avoidance, minimization and compensation measures for burrowing owls in accordance with CDFG (1995) recommendations.
				The DEIS fails to identify specific mitigation for the loss of foraging habitat for the golden eagle.	BLM will respond to this comment in its FEIS. Staff quantified cumulative loss of foraging habitat from future projects within the NECO planning area in its RSA. Conditions of Certification requiring implementation of Golden Eagle Nest Inventory and Monitoring (**BIO-24**) and off-site habitat acquisition and enhancement (**BIO-12**) were included.
				The EIS should identify suitable habitat for badger and desert kit foxes if passive relocation is used as a mitigation strategy	BLM will respond to this comment in its FEIS. Staff analyzed the impact of the Project to American badger and kit fox in **Biological Resources** subsection C.2.4. and is requiring Conditions of Certification implementation of avoidance and minimization measures (**BIO-17**) and off-site habitat acquisition and enhancement (**BIO-12**).
				The DEIS must evaluate cryptobiotic soil crusts.	BLM will respond to this comment in its FEIS. Staff notes that additional discussion of soil crust is provided in the RSA. Siltation and impacts to soils were specifically addressed for rare plants and biotic crust.
				The DEIS fails to address insects on the proposed project site.	BLM will address this comment in the FEIS. Staff discussed sand dune impact in its RSA and included Condition of Certification **BIO-20**, Implement Sand Dune Community Impact Mitigation.
				A Decommission and Reclamation Plan is needed and a bond should be posted.	BLM will address this comment in the FEIS. Section E of the RSA discusses closure requirements and references Condition of Certification **BIO-14** that requires the project owner to develop and implement a Closure, Revegetation and Rehabilitation Plan.
				A Fire Prevention and Protection Plan should be developed.	BLM will respond to this comment in its FEIS. In the RSA Staff requires the applicant to submit a final Fire Prevention Plan to the CPM for review and approval and to the RCFD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**..

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				The DEIS fails to identify appropriate mitigation.	BLM will respond to this comment in its FEIS. Staff notes that extensive and detailed Conditions of Certification are provided throughout the RSA.
				The DEIS fails to include key plans for public review	BLM will respond to this comment in its FEIS. Additional plans are included in the RSA and required as Conditions of Certification.
				The DEIS need to determine if soil and water LORS are complied with and the status of mitigation.	BLM will respond to this comment in its FEIS. Staff addressed LORS compliance in its RSA and concluded that where potential impacts have been identified, proposed mitigation measures would reduce identified impacts to levels that are less than significant.
				The DEIS fails to adequately identify, analyze and offset impacts to air quality and GHG emissions.	BLM will respond to this comment in its FEIS. RSA Appendix Air-1 presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements. Carbon storage and sequestration are also discussed in the Section C.2, Biological Resources, of the RSA.
				The analysis of cumulative impacts in the DEIS is inadequate.	BLM will respond to this comment in its FEIS. Cumulative impacts on resources are addressed in each resource section of the RSA and SA.
				The EIS' Alternatives Analysis is inadequate. Alternative sites on degraded land should have been evaluated.	BLM will respond to this comment in its FEIS. Staff conducted an extensive review of degraded lands in compiling its alternatives analysis.
6/16/2010	TN-57193	Alice Bond of the Wilderness Society, and Johanna Wald and Helen O'Shea of NDRC	Group/Organization	The western portion of the proposed project site clearly contains the greatest diversity and density of biological resources. The western half of the site contains numerous braided washes of varying size and complexity. Impacts to these washes in the western portion of the proposed project site should be avoided or minimized in order to protect the important ecological and habitat values they provide.	**RSA Section C.2.11 Biological Resources** Staff concurs that the reduced acreage alternative would avoid some of the impacts to desert dry wash woodland, but has concluded that habitat compensation at a 3:1 ratio would mitigate the proposed Project's impacts to desert dry wash woodland to less than significant levels, as described in staff's proposed Condition of Certification **BIO-22**.
				A second area of concern is potential impacts of the proposed project is to federally endangered bighorn sheep. The BLM needs to incorporate information on Bighorn sheep from Blythe RSA C.2-38 into its review and assess all project impacts – direct, indirect and cumulative – to this species. Bighorn sheep surveys throughout the McCoy Mountains (especially near McCoy Spring) in the summer	BLM will respond to this comment in its FEIS.

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				and fall should be conducted to identify the status of the species in relation to the project.	
				Reiterate scoping comment that the BLM develop strategies to minimize and mitigate impacts on the area's outstanding cultural resources and engage in consultation with local Native American tribes.	BLM will respond to this comment in its FEIS.
				The Purpose and Need statement remains too narrow. Suggested wording for BLM: The purpose of the proposed action is to "facilitate environmentally responsible commercial development of solar energy projects" consistent with the statutory authorities and policies applicable to the Bureau of Land Management, including those providing for contributions towards achieving the renewable energy development objectives under the Energy Policy Act of 2005 (EPAct), the American Recovery and Reinvestment Act, and Presidential and Secretarial orders. The need for this action is to implement Federal policies, orders and laws that mandate or encourage the development of renewable energy sources, including the Energy Policy Act of 2005, which requires the Department of Interior to seek to approve at least 10,000 MW of non-hydropower renewable energy on public lands by 2015, and the Federal Policy goal of producing 10% of the nation's electricity from renewable sources by 2010 and 25% by 2025; to enable effective implementation of the economic incentives for qualifying projects intended by the American Recovery and Reinvestment Act; and to support the State of California's renewable energy and climate change objectives, consistent with BLM's mandates and responsibilities.	BLM will respond to this comment in its FEIS.
				A true "range" of alternatives has not been considered and alternatives evaluated in the DEIS do not go far enough to avoid impacts to the biological resources on the western portions of the project site including desert wash woodland habitats.	**RSA Section B.2.9 Alternatives Evaluated** CEQA requires consideration of a reasonable range of alternatives that meet the CEQA screening criteria (see CEQA Guidelines Section 15126 (a)). CEQA does not require full analysis of all potential alternatives to a proposed project. The SA includes a

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					comprehensive alternatives analysis, including full consideration of four alternatives (the Reconfigured Alternative, Reduced Acreage Alternative, Blythe Mesa Alternative, and No Project Alternative) and discussion of an additional 18 alternatives that were considered but eliminated from detailed consideration.
				We request that a 500 MW alternative on more environmentally suitable public lands in eastern portion of the proposed project area be considered.	**RSA Section B.2.9 Alternatives Evaluated** The commenter's support for a 500 MW solar facility is acknowledged. A Reduced Acreage Alternative was fully analyzed in the SA/Draft EIS Section C. The Reduced Acreage Alternative would eliminate one of the two 250 MW western solar fields (Unit 3). However, this alternative would allow development of the other western solar field (Unit 2). The second western solar field was not incorporated into the Reduced Acreage Alternative because the alternative had been designed to avoid the large desert wash at the southwestern portion of the site and the majority of the desert dry wash woodland which was achieved by eliminating the use of Unit 3.
				We recommend strong consideration be given to alternative proposed by Defenders of Wildlife (letter dated 5/13/2010) that would combine disturbed private lands comprising Section 1 of the Blythe Mesa alternative and the public lands in the eastern portion of the project site.	**RSA Section B.2.9 Alternatives Evaluated** As the commenter noted, the Blythe Mesa Alternative, specifically Section 1, was analyzed in Section B.2.7.2 of the SA. Units 2 and 3 were also analyzed in full in Section C as part of the proposed BSPP project. As such, the alternative suggested was fully analyzed within the SA. The commenter's support for this alternative that combines a portion of the BSPP project and a portion of the Blythe Mesa Alternative is acknowledged. As stated in CEQA Guidelines Section 15092, after considering the final EIR and in conjunction with making findings under Section 15091 the Lead Agency may decide whether or how to approve or carry out the project.
				More quantitative information is needed to supplement qualitative information about existing and foreseeable projects to develop estimates and model impacts to key topics. Analysis should conform to BLM policy on special status species management (Manual 6840) and wildlife habitat management (Manual 6500).	Cumulative impacts on resources are addressed in each resource section of the RSA and SA. Quantification of impacts is provided where possible. BLM will respond to this comment in its FEIS.

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				BLM should consider all new information (including cultural resources, reconfigured alternative, and complete survey results such as special status plants and golden eagle) published since release of the DEIS. BLM should make sure this new information is available to the public.	BLM will respond to this comment in its FEIS.
6/16/2010	TN-57171	Joan Taylor, Chair, CNRCC Desert Committee	Group/Organization	Support a reduced Blythe Solar Power Project alternative and/or a conjunctive use alternative that avoids dry wash woodland habitat in western part of the project.	**RSA Section C.2 Biological Resources** Staff requested that the Applicant develop alternatives that reduced impacts to valuable desert dry wash woodland habitat. Sections C.2.5 through C.2.7 provides an analysis of the Reconfigured and Reduced Acreage Alternatives with the intent of finding project alternatives that reduced impacts to desert wash woodland and other sensitive habitats
				Specific location of project-required gen-tie transmission lines and new natural gas lines has not been specified.	**RSA TSE Appendix A.** Offsite transmission impacts are discussed in this Appendix. The project's natural gas line is evaluated in applicable sections of the RSA.
				SA/DEIS violates CEQA and NEPA due to omitted or future studies or conditions and cursory discussion of alternate technologies. Examples: Drainage, Erosion, Sedimentation Plan is incomplete. Army Corps has yet to determine if waters of the United States occur onsite.	Additional studies have been made available. The RSA considered multiple technologies (e.g., solar technologies [utility-scale and distributed], wind, natural gas, etc.) alternatives.
				The SA/DEIS has not adopted mitigation or avoidance to lessen impacts on desert tortoise population.	**RSA Sections C.2 Biological Resources:** The Biological Resources section discusses off-site mitigation in depth. It includes Conditions of Certification requiring offsite mitigation for the desert tortoise (**BIO-12**).
				Any tortoises that are moved more than 1000 feet should be tested for disease and the host population should also be tested.	The California Department of Fish and Game and the US Fish and Wildlife Service are currently developing updated guidance for disease testing of translocated and host desert tortoise populations. This updated guidance will include a distance threshold for disease testing based on the best available science.
				SA/DEIS fails to fully disclose and avoid or mitigate for potentially significant impacts to Nelson's bighorn sheep; focused surveys were not conducted.	**RSA Section C.2.11 Biological Resources** Staff agrees that t no systematic bighorn sheep surveys have been conducted that would provide a definitive answer as to their presence or absence in these mountains. Staff conducted an analysis of habitat connectivity and cumulative impacts to bighorn sheep in subsection C.2.8.7., and concluded that the Project contributes to cumulative impacts to

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					Desert bighorn sheep due to loss of spring foraging habitat. Staff's proposed Condition of Certification **BIO-21** would reduce these impacts to a less than significant level.
				SA/DEIS fails to include real quantification regarding the project's impacts on the American Badger and other protected species; focused surveys were not conducted.	**Biological Resources SSA** Staff analyzed the impact of the Project to American badger in **Biological Resources** subsection C.2.4.2.
				BLM and CEC failed to include the entire project in the SA/DEIS.	The environmental documents prepared on the BSPP (SA, RSA, SSA) include all the elements of the BSPP.
				SA/DEIS fails to disclose significant impacts to all special-status plants, failing to require Fall surveys	**RSA Section C.2.11, p. C.2-158 Biological Resources**. Staff acknowledges the comment and responds that surveys for biological resources were conducted in spring of 2009 and again in spring 2010. Staff has also required a variety of preconstruction surveys in 2010, and a survey of the entire Project Disturbance Area in summer-fall 2010 for late season special-status plants.
				SA/DEIS discussion of cultural resources impacts is inadequate under section 106, instead choosing to defer evaluation, mitigation and treatment. Cultural surveys are incomplete and cultural mitigation is not formulated.	As the BLM and the Energy Commission require, the applicant completed 100 percent surface pedestrian archaeological survey of all of the BSPP project areas, including those recently identified as affected by project description changes. The Bureau of Land Management is currently in the process of consulting with local Native American groups and others regarding impacts and potential mitigation for the BSPP. The results of these negotiations will be formalized in a Programmatic Agreement, as required by Section 106 of the National Historic Preservation Act, and included in BLM's FEIS for the BSPP.
				SA/DEIS assessment of hydrology and soils is insufficient in examination of wet-cooling, impact on waters of the U.S., and consistency with section 404 of the Clean Water Act	**RSA Section C.9 Soil & Water Resources** Staff concludes that the BSPP complies with the state's water policy to feasibly use the least amount of the lowest-quality water available. A complete analysis of related water issues is presented in section C.9-4. Section C.9.8.1.1.1 discusses applicability of a Section 404 permit, pending 401 permitting.
				Project is inconsistent with Riverside County General Plan. Project also fails to acknowledge BLM's own governing planning documents to provide guidance for this scale of land conversion (neither CDCA plan nor	**SSA Traffic and Transportation.** With new data regarding Blythe Airport flight operations, staff believes that the project is consistent with the Riverside County General Plan. BLM will address governing planning

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				NECO plan ever contemplated this scale).	documents in its FEIS.
				The SA/DEIS has no decommissioning plan.	Each issue area discusses requirements for decommissioning. Section E of the RSA discusses closure requirements and references Condition of Certification **BIO-14** that requires the project owner to develop and implement a Closure, Revegetation and Rehabilitation Plan.
				SA/DEIS fails to identify cumulative impact mitigation for Nelson's bighorn and other sensitive species. The project will also have cumulative growth-inducing impacts; considering the context of other proposed energy projects in the region, cumulative impacts of the project are significant in nearly every issue category.	Staff believes that all information has been presented, including cumulative impacts that are discussed in each section of the RSA.
				SA/DEIS must be recirculated when missing information is added.	Staff believes that all information has been presented.
				BLM unlawfully rejected site alternatives, alternative technologies and distributed generation on the basis of inconsistency with the applicant's purpose and need. BLM failed to consider the East Mesa and other alternatives because none would accomplish the purpose and need for the proposed action. Solar voltaic generation would meet project objectives and avoid most significant project issues.	BLM will respond to this comment in its FEIS.
				SA/DEIS unlawfully rejected the conservation and demand side management alternative without adequate analysis, failing to take into account California's downward energy usage trend and failing to quantify energy conservation in terms of achieving RPS goals.	**RSA Section B.2.9 Alternatives Evaluated** Staff evaluated conservation and demand side management in light of current state programs and energy demand /conservation and efficiency projections identified in the Energy Commission's Integrated Energy Policy Report.
				SA/DEIS unlawfully segments this project by ignoring its reliance on offsite transmission and natural gas. Until requisite gen-tie lines and gas powerlines are completed, the project can't proceed.	**RSA TSE Appendix A.** Offsite transmission impacts are discussed in this Appendix. The project's natural gas line is evaluated in applicable sections of the RSA.
				BLM approval of the project, along with other large projects, violates FLMPA and requires revision of the CDCA plan and its NECO plan amendment.	BLM will respond to this comment in its FEIS.

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
5/13/2010	TN-56668	Jeff Aardahl, Defenders of Wildlife (DOW)	Group/Organization	DOW identified an alternative intended to avoid impacts to biological resources within the western half of the proposed project. This alternative would no longer use the Applicant's Units 2 and 3 of the project (the westernmost units) and would instead combine the Applicant's Units 1 and 4 (the eastern most units) with Section 1 of the Blythe Mesa Alternative, located immediately east of Units 1 and 4 for a 1,000 MW project. This proposed alternative was not analyzed in the SA/DEIS and was recommended for analysis by DOW.	**RSA Section B.2.9 Alternatives Evaluated** As the commenter noted, the Blythe Mesa Alternative, specifically Section 1, was analyzed in Section B.2.7.2 of the SA. Units 2 and 3 were also analyzed in full in Section C as part of the proposed BSPP project. As such, the alternative suggested was fully analyzed within the SA. The commenter's support for this alternative that combines a portion of the BSPP project and a portion of the Blythe Mesa Alternative is acknowledged. As stated in CEQA Guidelines Section 15092, after considering the final EIR and in conjunction with making findings under Section 15091 the Lead Agency may decide whether or how to approve or carry out the project.
5/10/2010	TN-56602	Kenneth Waxlax, Peter Murray and Associates Real Estate	Group/Organization	Commenter states that he is participating in a market study for the Coachella Valley Conservation Commission and that this study will be valuable in providing local parcel values for mitigation lands. Therefore, local land values should be used to accurately determine the appropriate mitigation costs for acquisition of mitigation lands.	**RSA Section C.2 Page C.2-146 Biological Resources** Staff agrees and is currently undertaking a more detailed analysis of anticipated land acquisition cost that would help refine the security estimates provided in the conditions of certification.
				Commenter states that the $500 per acre estimate for acquisition of lands in the Chuckwalla Bench area may be accurate. However, the commenter does not believe it is accurate for all lands that might be acquired within the Colorado Desert Recovery Unit for all proposed solar projects in the region. In addition, based on previous sale rates at $500/acre, it could potentially require several years to locate willing sellers at that price to acquire the needed mitigation acreage for solar projects in the region.	**RSA Section C.2 Page C.2-146 Biological Resources** Staff agrees and is currently undertaking a more detailed analysis of anticipated land acquisition costs that would help refine the security estimates provided in the conditions of certification.
				Commenter states that proposed Condition of Certification **BIO-12** should be reworded to include language that summarizes all costs of land acquisition such as included in **BIO-22** and that clearly states that costs are subject to change based on market conditions.	**RSA Section C.2 Page C.2-147 Biological Resources** Staff agrees and has made the suggested revision in proposed Condition of Certification **BIO-12 (C.2-182 to 186, Sec 3 a-i)**
				Commenter states that the land values from the previously mentioned market survey should be used in the mitigation land acquisition calculations to more accurately estimate land acquisition costs. The	**RSA Section C.2 Page C.2-147 Biological Resources** Staff is analyzing the factors that may affect estimates of acquisition and management costs, including the referenced market survey,

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				commenter also states that there may be economies of scale for restoration and management of mitigation lands that may reduce the cost per acre below the $1,450 per acre estimate.	and agrees with the commenter that there are economies of scale to be achieved with large-scale restoration and management efforts.
				Commenter states that limiting acquisition of desert tortoise compensation lands to the Colorado Desert Recovery Unit precludes the potential to acquire lands in the Joshua Tree DWMA or lands on the western edge of NECO that may be critical to provide habitat for conservation of desert tortoise in the face of climate change.	**RSA Section C.2 Page C.2-147 to 148 Biological Resources** Comment is addressed in detail.
5/4/2010	TN-56544	Jeff Aardahl, Defenders of Wildlife	Group/Organization	DOW suggested an alternative during scoping that would result in an approximately 500 MW project that would exclude the western one-half of the proposed project due to biological resources and habitat concerns. DOW continues to believe this is a superior alternative to the proposed project and to the Reduced Acreage Alternative.	**RSA Section B.2.9 Alternatives Evaluated** The commenter's support for a 500 MW solar facility is acknowledged. A Reduced Acreage Alternative was fully analyzed in the SA/Draft EIS Section C. The Reduced Acreage Alternative includes half of the exclusion area suggested by the commenter; it would eliminate one of the two 250 MW western solar fields (Unit 3). However, this alternative would allow development of the other western solar field (Unit 2). The second western solar field was not incorporated into the Reduced Acreage Alternative because the alternative had been designed to avoid the large desert wash at the southwestern portion of the site and the majority of the desert dry wash woodland which was achieved by eliminating the use of Unit 3. CEQA requires consideration of a reasonable range of alternatives that meet the CEQA screening criteria (see CEQA Guidelines Section 15126 (a)). CEQA does not require full analysis of all potential alternatives to a proposed project. The SA includes a comprehensive alternatives analysis, including full consideration of four alternatives (the Reconfigured Alternative, Reduced Acreage Alternative, Blythe Mesa Alternative, and No Project Alternative) and discussion of an additional 18 alternatives that were considered but eliminated from detailed consideration.
				DOW states that the applicant should demonstrate to what extent they sought to gain control of private lands, including the	**RSA Section B.2.9 Alternatives Evaluated** Staff did not accept the applicant's opinion that site control was uncertain or costly. The Blythe

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				consolidation of multiple parcels. CEC staff should refrain from simply accepting the applicant's opinion that site control was deemed uncertain or too costly.	Mesa Alternative is comprised of private lands adjacent to the proposed BSPP site and would require consolidation of multiple parcels. Staff used the Renewable Energy Transmission Initiative (RETI) criteria regarding the number of private parcels that could be reasonably acquired to help define the Blythe Mesa Alternative. As stated above, The Final Phase 2a Report published by RETI and updated in September 2009 identified private land areas for solar development only if there were no more than 20 owners in a two square mile (1,280 acre) area.
				DOW recommends strong consideration be given to photovoltaic technology as an alternative because it can be deployed on smaller tracts of land, thus making it ideal for use on smaller parcels of private land that have been previously disturbed, or on a combination of disturbed private and public lands that lack the high biological values associated with intact natural plant and animal communities typically found on more remotely located, undisturbed public lands.	**RSA Section B.2.9 Alternatives Evaluated** Section B.2.8.2 considered photovoltaic technology both at the utility and distributed scale. Utility scale solar PV technology was considered, but eliminated because its use would not reduce major impacts of the BSPP facility. The BSPP facility would require use of approximately 6-7 acres per MW while a solar PV facility would require use of up to 10 acres per MW. Distributed solar PV was evaluated, but eliminated because while it will likely be possible to achieve 1,000 MW of distributed solar energy over the coming years, the very limited numbers of existing facilities make it speculative to conclude with confidence that it will happen within the timeframe required for the BSPP. Also, a range of solar technologies, including both distributed and utility scale, is considered to be necessary to meet the State's 33% renewable portfolio standard.
				DOW states that the availability and sustainability of groundwater to support the proposed project needs to be analyzed and considered with regard to project feasibility. The commenter referenced a letter from Mr. Gerald Zimmerman, Executive Director of the Colorado River Board of California	**RSA Section C.9.10Soil and Water Resources** The RSA states that at the present time, the USBR has not promulgated a regulation that would make a determination whether a well would be extracting groundwater from the Colorado River and require an entitlement. However Staff has recognized that in part, the Project extraction of groundwater may originate from the Colorado River which is fully entitled. Consequently, staff has identified this as potential CEQA impact to the Colorado River. Therefore staff has recommended the applicant be required to offset this water use through compliance with Conditions of

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					Certification **SOIL&WATER-2** and **-16**. Moreover, if the USBR promulgates a regulation concerning determination of whether a well would be extracting groundwater from the Colorado River, the Project Owner would be required to comply with that regulation if and when it is promulgated.
				DOW states that the western half of the proposed Project contains the greatest density and diversity of biological resources. For example, the western half contains braided washes, which support unique vegetation communities such as desert dry wash woodland. Therefore, DOW reiterates their support of a reduced acreage alternative that avoids impacts to the western half of the proposed Project site.	**RSA Section C.2.11 Biological Resources** Staff concurs with DOW that the reduced acreage alternative would avoid some of the impacts to desert dry wash woodland, but has concluded that habitat compensation at a 3:1 ratio would mitigate the proposed Project's impacts to desert dry wash woodland to less than significant levels, as described in staff's proposed Condition of Certification **BIO-22**.
				DOW states that the proposed Project will change the local hydrology through the filling and rerouting of existing braided channels around the perimeter of the site. They further state that only an alternative that significantly reduces or avoids these impacts is the only way to fully mitigate this impact.	**RSA Section C.2.11 Biological Resources** Staff concluded that the proposed Project would significantly affect the local hydrology of the Project site, as described in the Soil & Water Resources section. The Project would change the extent and physical characteristics of the existing floodplain within the Project site and downstream of the Project site, as well as change the sediment transport and depositional characteristics. The proposed Project would also significantly affect the biological resources associated with the ephemeral drainages at the site. However, staff does not agree that avoidance is the only way to mitigate for these impacts. Condition of Certification **BIO-22** requires compensatory mitigation for loss of the biological functions associated with rerouting the ephemeral drainages at the Project site; **SOIL&WATER-11** and **SOIL&WATER-12** is anticipated to minimize impacts related to surface drainage associated with construction and operation of the Project to below the level of significance. **RSA Section C.9.10 Soil and Water Resources** The development of the Project requires modification to the onsite drainage system to capture upstream surface flows and direct those flows around and through the site using

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					engineered channels. The channels have been designed by the Project proponent to hold the 100-year recurrence interval flood event without causing flooding upstream, within the Project facility boundaries, or increase the flooding potential downstream. In addition, the Project Owner will be required to maintain the drainage channel system for the life of the Project. The impacts to surface water resources would be reduced to below the level of significance with the implementation of Conditions of Certification **SOIL&WATER-11** through **-15.**
				DOW states that the McCoy Mountains represent suitable habitat for Desert Bighorn Sheep and that they are unaware of any recent surveys to support BLM's conclusion that the McCoy Mountains are not currently occupied by bighorn sheep. DOW request that an analysis of the Project's potential to impact habitat connectivity and a cumulative analysis of impacts to connectivity for bighorn sheep be performed in conjunction with proposed projects to the north and northeast of the proposed Project.	**RSA Section C.2.11 Biological Resources** Staff agrees that the McCoy Mountains provide suitable habitat for bighorn sheep and that no systematic bighorn sheep surveys have been conducted that would provide a definitive answer as to their presence or absence in these mountains. Staff conducted an analysis of habitat connectivity and cumulative impacts to bighorn sheep in subsection C.2.8.7., and concluded that the Project contributes to cumulative impacts to Desert bighorn sheep due to loss of spring foraging habitat. Staff's proposed Condition of Certification **BIO-21** would reduce these impacts to a less than significant level.
				DOW questions the applicability of a guzzler as suitable mitigation for Project-related impacts to habitat connectivity for bighorn sheep. DOW states that they believe the proposed Project will remove suitable seasonal foraging habitat and that installation of a guzzler is not appropriate mitigation for this impact.	**RSA Section C.2.11 Biological Resources** Staff agrees that the Proposed Project would result in the loss of suitable spring foraging habitat. The McCoy Mountains are believed to be unoccupied, but there have been no recent systematic surveys to verify this status. The McCoy Mountain range has been determined to be an important area for sheep recovery and is designated as a desert bighorn sheep WHMA within BLM. Bighorn sheep have recently been documented as occurring in 2009 in the Big Maria and Little Maria mountain ranges. The Project would fence over 7,000 acres of lands and desert washes that can be used by bighorn sheep for spring foraging habitat in the Project area. Staff feels that providing and maintaining a supplemental water source such as a wildlife guzzler (**BIO-21**) would reduce the effect of cumulative spring foraging habitat loss for bighorn sheep

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					within the Project area. This artificial water source would attract bighorn sheep and expand foraging opportunities in the lower elevations of the mountains to replace spring foraging habitat lost to Project facilities. This water source would also serve to attract the bighorn during seasonal movements and keep them in the mountainous portion of the wildlife corridor. See subsection C.2.8.7 for complete analysis.
				DOW encourages a more in-depth analysis of preserving desert dry wash woodland as a movement corridor and habitat that supports high species diversity as temperatures rise due to global climate change.	**RSA Section C.2.11 Biological Resources** Staff agrees that desert dry wash woodland supports high species diversity and that this habitat type may be of increasing importance in light of increasing temperatures. Staff concluded that acquisition and enhancement of desert dry wash woodland at a 3:1 ratio would mitigate impacts to this habitat type to less than significant levels.
4/29/2010	TN-56469	Carlsbad Fish and Wildlife Office	Federal Agency		The subject comment letter is from the USFWS to the applicant regarding the applicant's draft desert tortoise plan. Staff does not prepare this document and comments on the DT plan do not require a response or other consideration by staff.
4/26/2010	TN-56554	Daniel Kopulsky, Office Chief	State Agency	Caltrans agrees with Condition of Certification **TRANS-3** requiring a Transportation Control Plan	**RSA Section C.10.11, p. C.10-30** The authors acknowledged the comments and clarifications and incorporated the information into the FSA.
				On page C.10-5, it is stated that bicycles are not allowed on I-10. Caltrans clarifies that bicycles are allowed on I-10 from Dillon Rd, Coachella to Mesa Dr., Blythe.	**RSA Section C.10.11, p. C.10-30**. Section C.10.4.1 was revised to address clarification.
				Vehicles/loads exceeding statutory limitation require a discretionary permit from Caltrans.	**RSA Section C.10.13, p. C.10-32**. Comment is addressed in Condition of Certification **TRANS-3**.
				Prior to construction, the project would require a Caltrans Encroachment Permit and must comply with all design standards, applicable policies, and construction practices.	**RSA Section C.10.13, p. C.10-32.** Comment is addressed in Condition of Certification **TRANS-4**.
4/21/2010	TN-56553	Michael Mistica, Environmental Health Specialist IV	County Agency	The project's water system would be classified as a non-community, non-transient domestic water system and would have to comply with all appropriate State and Federal EPA requirements. DEH enforces these regulations.	**RSA Section C.9.10, p. C.9-91.** Staff acknowledges the comment and has added Condition of Certification **SOIL&WATER-18** to ensure compliance.

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				Groundwater for the project may require extensive treatment prior to use. The water system must be supervised by a CA Certified Water Treatment Plant Operator and must meet CA Technical, Managerial, and Financial requirements. New wells drilled onsite require a well-drilling permit from DEH and water system plans must be approved by DEH. Operation of the water system will be subjected to a renewable annual operating permit. The project must obtain written clearance from the RWQCB for onsite wastewater discharge and may be required to have an Advanced Treatment Unit. The facility may be required to have an emergency plan for the storage of hazardous, acutely hazardous, or extremely hazardous materials. The Hazardous Materials Management Division may regulate the business in accordance with applicable County Ordinances.	**RSA Section C.9.10, p. C.9-91** Staff acknowledges the comment and has added Condition of Certification **SOIL&WATER-18** to ensure compliance. **RSA Section C.9.11, p. C.9-98** Comment is addressed in Condition of Certification **SOIL&WATER-3**. **RSA Section C.9.10, p. C.9-91** Staff acknowledges the comment and revised the discussion of the project's sanitary wastewater system based on the clarification. **RSA Section C.4.13, p. C.4-23** Comment is addressed in Condition of Certification **HAZ-2**.
4/2/2010		M. Harper	Public Individual	The 20.4-acre William Y. Murphey trust, CA parcel 818-160-015, would be landlocked by the proposed BSPP. Physical access is precluded.	As of July 6, 2010, access is under discussion between the applicant and landowner.
3/22/2010	TN-56094	Gerald R. Zimmerman, Executive Director	State Agency	The water supply for each project will be pumped groundwater from on-site wells. If the proposed wells are pumping Colorado River water, a contract with the Secretary of the Interior is required before such a use is deemed to be a legally authorized use of this groundwater. It does not appear that LCWSP water is a viable option for the Blythe and Palen Projects because at this time, the capacity to pump the fully authorized volume of 10,000 acre-feet of water per year has not been constructed. Furthermore, when the Congress passed the Act authorizing the LCWSP, water for large scale solar power/energy projects was not envisioned.	**RSA Section C.9.10, page C.9-93** Conditions of Certification **SOIL&WATER-2** and **SOIL&WATER-16** have been developed to address potential impacts to pumping water derived from the Colorado River. **RSA Section C.9.10, page C.9-94** Conditions of Certification **SOIL&WATER-2** and **SOIL&WATER-16** have been developed to address potential impacts to pumping water derived from the Colorado River. As part of the Condition of Certifications, the Project owner will be required to develop and submit a Water Supply Plan that details the source of the offsets. In addition, the Project owner will be required to comply with any future regulations

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				The Board's staff has identified a preferred option for obtaining a legally authorized and reliable water supply for both the Blythe and the Palen Solar Power Projects over the life of the project that fits into the timeframe that has been established by Solar Millennium-obtaining water through existing Section 5 BCPA contract holder -MWD.	that govern the use of Colorado River water that may be promulgated by the Bureau of Reclamation.
3/4/2010	TN-55745	Lin Porter	Public Individual	Lin Porter's 160-acre private property would be surrounded by, but not included in the BSPP project boundary.	Although **RSA Section C.6 Land Use** does not specifically discuss the comment or the property, there would be no direct land use impact, as the BSPP does not overlap this property
3/4/2010	TN-55787	Elizabeth Klebaner, California Unions for Reliable Energy (CURE)	Group/Organization	The PDOC is moot because it does not address the entire Project since it fails to adequately describe the District's permitting activities. As such, the District must withdraw the PDOC, issue one PDOC for the entire Project, i.e. all four power blocks and inform the public accordingly. The Clean Air Act requires the District to provide the public with adequate notice of a preliminary determination on an application and to allow the public a minimum of thirty days to review and submit comments on its preliminary determination. The notice must identify the activity or activities involved in the permit action, the application, all relevant supporting materials, and all other materials available to the permitting authority that are relevant to the permit decision. Failure to comply with these public notice provisions is grounds for the U.S. Environmental Protection Agency to object to a permit. The District's February 2, 2010 notice fails to identify the activities involved in the permit action and the permit applications, and to include information that would be relevant and necessary for the public to comment on the PDOC. The District excludes the relevant information that Chevron Energy Solution is no longer seeking a permit, and that Solar Millennium, LLC has requested a permit to operate the entire, four 250 MW solar unit facility. In effect, the District has led the public	Comments on the PDOC for this project are under the purview of the Mojave Desert Air Quality Management District. A revised PDOC for all four power blocks was issued on May 25, 2010 (MDAQMD 2010c) and noticed on May 28, 2010. The District will issue a Final Determination of Compliance after the 30 day public notice period ends on June 28, 2010. Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the Revised PDOC. The District's PDOC conditions are presented in the Conditions of Certification (**AQ-1 to AQ-60**).

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				to believe that its PDOC now open for public comment addresses the entirety of the Project, whereas the PDOC addresses only half. As such, the February 2, 2010 notice violates the Clean Air Act and the District's New Source Review rules. The District must withdraw the February 2, 2010 notice and publish notice that adequately describes the permitting action involved once it performs the required analyses. The District is required to issue a preliminary determination with regard to the Project's application for an ATC. In doing so, the District is required to quantify the facility's potential to emit criteria pollutants and toxic contaminants and determine the required permit conditions to bring the facility into compliance with the State Implementation Plan and the federal Clean Air Act. The District's preliminary determination must include consideration of the entire Project. The District failed to quantify the Project's potential to emit for all permit units that comprise the facility. Thus, the PDOC noticed for public comment analyzes only half of the facility. The PDOC suffers from a lack of adequate documentation The Revised PDOC must contain an estimate of VOC emissions from the land treatment units and contain adequate permit conditions. District does not provide backup documentation regarding BACT analysis being performed. The District must provide a BACT analysis for the HTF expansion tank/ullage vent system The Revised PDOC for the Project must contain a top-down BACT analysis for all applicable permit units. The District's Determination of U.S. EPA Tier II	

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				Emission Factors for the Emergency Generator Is Erroneous The District's Revised PDOC must use the correct emission factors for calculating emissions from the emergency generators. The Revised PDOC must contain a permit condition specifying the applicant must purchase emergency generators that comply with the U.S. EPA's interim Tier IV standard if the equipment is not ordered until 2011. The Revised PDOC must specify compliance testing based on the appropriate emission factors, i.e. Tier II or interim Tier IV depending on the purchase date. The District's determination of emission factors for fugitive VOC emissions from heat transfer fluid system Is erroneous The District's emission calculations fail to account for all toxic air contaminant emissions The Revised PDOC must identify exceedance of the 1-hour California Ambient Air Quality Standard and National Ambient Air Quality Standard for NO2. The Revised PDOC for the Project must present an AQ analysis for all four power blocks and identify the significant impacts on air quality due to exceedance of the 1-hour CAAQS for NO2. The Revised PDOC must Include cumulative ambient air quality modeling for the Project The PDOC must set forth the proposed permit conditions and the reasons for imposing such permit conditions. The PDOC fails to propose permit conditions for each permit unit. The Revised PDOC must contain a permit condition restricting maximum daily and maximum annual operating hours, heat input, or fuel volume for the boilers that reflect the hours used for calculating maximum daily and annual emissions from the Project. The PDOC fails to contain a Section 4, i.e. the	

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				section containing estimates of maximum daily and annual potential to emit for each permit unit. The Revised PDOC should contain this section, which is necessary to determine the applicability of BACT for each permit unit. The PDOC contains typographical errors that should be corrected in the Revised PDOC for the Project: on page thirteen, Permit Conditions 4.a.2 incorrectly specify the emission limit for NOx at 100% load instead of at 25% load.	
2/16/2010	TN-55457	Ron Goldman, Planning Director and Jeffrey Jolliffe, Deputy Planning Director	County Agency	Project is located in Riverside county's Land Use of Rural Foundation Component and designated Rural Desert, which allows for solar energy. However, it is located on federal land, where development is not subject to local land use or zoning restrictions.	**RSA Section C.6 Land Use** The Land Use section includes discussion of applicable federal and BLM LORS.
				Include comprehensive mapping of the project location with township, range, and section numbers,	**RSA Section A Introduction.** Section A provides township, range and section numbers as well as APN numbers.
				Contact the Riverside County Transportation Department to discuss public access roads, County rights-of-way, easements, circulation, etc.	**RSA Section C.10 Traffic and Transportation** Conditions of Certification **TRANS-3, -4,** and -**5** require the project owner to coordinate with Riverside County on these issues.
				Address how the proposed project would demonstrate consistency with the Coachella Valley Multiple Species Habitat Conservation Plan, if applicable.	**RSA Section C.2 Biological Resources** While the section does not specifically address whether the project would be consistent with the CVMSHCP, there are several references to the plan and the species it protects.
2/6/2010	TN-55448	Jason Neuman, Captain, Strategic Planning Division	County Agency	The project will adversely impact the Fire Department's ability to provide an acceptable level of service and the applicant shall pay a Development Impact Fee to mitigate these impacts. The project will be required to have an Alternate or Secondary Access(s) and needs concurrence and approval of both the Transportation and Fire Departments. Secondary access leading into the complex is inadequate on the site plan and a second point of ingress needs to be provided to the facility.	**RSA Section C.14.4.2, p. C.14-26** Comment is discussed in the Staff's Proposed Mitigation and addressed in Condition of Certification **WORKER SAFETY-7**. **RSA Section C.14.4.2, p. C.14-21.** Comment is discussed under Operation and is addressed in Condition of Certification **WORKER SAFETY-6**. **RSA Section C.14.4.2, p. C.14-21.** Comment is discussed under Operation and is addressed in Condition of Certification **WORKER SAFETY-6**.

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
1/19/2010	TN-54932	John J.G. Guerin, Principal Planner	County Agency	The project could constitute a hazard to flight by reflecting sunlight towards aircraft approaching or departing from Blythe Airport.	**RSA Section C.6.10, p. C.6-24**. Staff shares the concerns raised by the ALUC and has contracted with an aviation consulting firm to assist in assessing potential hazards. This aviation addendum will be presented at the Evidentiary hearing.
				The ALUC recommends analyzing the reflectivity of the proposed parabolic mirror system in comparison to the panels used in other solar technologies. If the parabolic mirror system has substantially greater reflectivity, alternatives should be developed with PV and mixed solar technology.	**RSA Section C.6.10, p. C.6-24**. Staff shares the concerns raised by the ALUC and has contracted with an aviation consulting firm to assist in assessing potential hazards. This aviation addendum will be presented at the Evidentiary hearing.
				The cumulative effects of the Blythe and Palen solar projects should be considered with projects on privately owned properties nearby.	**RSA Section C.10.4.2, p. C.10-22**. Comment is addressed in the Traffic and Transportation Cumulative Impacts and Mitigation analysis.
				If the reflection of sunlight towards aircraft would interfere with aircraft operations, the project would not be incompliance with the ALUC's requirements.	**RSA Section C.6.10, p. C.6-24**. Staff shares the concerns raised by the ALUC and has contracted with an aviation consulting firm to assist in assessing potential hazards. This aviation addendum will be presented at the Evidentiary hearing.
				The ALUC recommends conditions of approval requiring mirrors to be mounted on a flat or matte finish framework to minimize reflection of sunlight and to take all measures necessary to eliminate glare or interference.	**RSA Section C.12.11, p. C.12-39**. Comment is addressed in Condition of Certification **VIS-1**.
12/29/2009	TN-54952	Lin Porter	Public Individual	Lin Porter's 160-acre property would fall within the BSPP project boundary. In addition, he is not willing to accept Solar Millennium's purchase option.	See response for the subsequent comment received from Lin Porter on 3/4/2010.
12/23/2009	TN-54790	Alice Bond and Alex Dane of the Wilderness Society, and Johanna Wald and Helen O'Shea of NDRC	Group/Organization	The agencies should consider alternative configurations of the project site that avoid impacts to the western portions of the site where the desert dry wash woodland communities are located.	**RSA Section C.2 Biological Resources** Staff requested that the Applicant develop alternatives that reduced impacts to valuable desert dry wash woodland habitat. Sections C.2.5 through C.2.7 provides an analysis of the Reconfigured and Reduced Acreage Alternatives with the intent of finding project alternatives that reduced impacts to desert wash woodland and other sensitive habitats.

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				The agencies should work to address impacts from the project to desert tortoise dispersal and movement of other important species.	**RSA Section C.2 Biological Resources** Staff considered the impacts of the project on desert tortoise dispersal and regional movement on other wildlife species subsections C.2.4.2 and C.2.8, and concluded that desert tortoise connectivity could be affected by the Project. Staff has developed mitigation for this impact in proposed Condition of Certification **BIO-12**.
				BLM should develop strategies to minimize and mitigate impacts on the area's outstanding cultural resources and engage in consultation with local Native American tribes.	**RSA Section C.3 Cultural Resources and Native American Values:** Comment is directed to BLM. Staff notes that Conditions of Certification to minimize and mitigate impacts are discussed in the RSA. BLM is charged with consultation with Native American Tribes.
				Both the applicant and the agencies should dedicate adequate time and resources early in the process to addressing soil resources issues adequately, including through the preparation of a detailed drainage, erosion and sediment control plan that addresses these potential impacts and provides mitigation measures that will render these hazards to a level less than significant.	**RSA Section C.9 Soil and Water Resources** A Drainage, Erosion, and Sedimentation Control Plan (DESCP) has been developed to mitigate the potential storm water and sediment project-related impacts. The Plan is implemented through Condition of Certification **SOIL&WATER-1.**
				The agencies should gather additional information to confirm that the water needed for the Blythe Solar Power Project will be available as well as that the source of the needed water will conform to existing California Energy Commission policy and all laws, ordinances, regulations and standards (LORS). The agencies should consider alternative configurations of the project site that avoid impacts to the western portions of the site where the desert dry wash woodland communities are located.	**RSA Section C.9 Soil and Water Resources** The project's impacts to groundwater basin and balance (Section C.9.4.3.2) and levels (C.9.4.3.3) would be mitigated to less than significant. Section C.9.8 discusses how the project would be in compliance with applicable LORS. The Reduced Acreage Alternative would avoid the washes in the southwestern portion of the site, and is discussed under Soil & Water Resources in Section C.9.5. Since washes would still need to be reengineered, there would be similar impacts as the proposed project.
				The BLM and CEC should continue to collaborate on a visual analysis conforming to BLM regulations to address concerns.	**RSA Section C.12 Visual Resources** Section C.12.2 states that "BLM has agreed to utilize the Energy Commission's methodology for the purpose of this joint document and agrees that the conclusions would likely be similar if the BLM's Visual Resources Management (VRM) Methodology had been used."

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				The plan amendment must fully analyze the impacts of this scale of industrial development on public lands of a largely undisturbed nature, including impacts to the Wildlife Habitat Management Area.	**RSA Section C.6 Land Use** Conclusions in Section C.6 state that direct or indirect impacts on agricultural lands, recreation and rangelands would be less-than-significant.
				The agencies should comprehensively analyze the project's net reductions to GhG emissions, including GhG emissions during manufacture, construction, operation, decommissioning, and reclamation of the project site. The analysis should consider both the potential for the project to reduce GhG emissions as well as potential for the project to increase GhG emissions, for example, by disturbing undisturbed land currently useful for carbon sequestration. The results of this analysis should then be compared to the same type of analysis for fossil-fuel based energy production, including combined-cycle natural gas fired and coal fired power plants.	**RSA Section C.1 Air Quality** Air Quality Appendix Air-1 includes discussion of the project's GHG emissions during construction, operations, and closure/decommissioning. Staff concluded that the BSPP would emit considerably less greenhouse gases (GHG) than existing power plants and most other generation technologies.
				The agencies should do a thorough analysis of the anticipated costs of decommissioning and restoring the project site. The agencies should also require bonds be purchased prior to development.	This comment is acknowledged.
				The agencies must thoroughly consider and present the public with a true range of alternative sites.	**RSA Section B.2.9 Alternatives:** Five alternative sites – Blythe Mesa, East of Lancaster, El Centro, Johnson Valley, and Chuckwalla Valley – were thoroughly evaluated for the project.
				In addition the agencies should compare the Palen and Blythe Solar Plants and their impacts with all other identified "fast-track" projects on BLM land in order to identify the least environmentally harmful projects among the applications that have been selected for expedited permitting.	**RSA Section B.2.9 Alternatives:** Staff evaluates each project individually. The 'no project' alternative allows decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. 14 § 15126.6(i)).
				The BLM must comply with all regulations requiring mitigation of impacts from solar energy development on individual resources and values, e.g. individual species under the Endangered Species Act and cultural resources under the National Historic Preservation Act.	**RSA Sections C.2 and C.3 Biological Resources/Cultural Resources:** The RSA includes regulations and mitigation measures for applicable issue areas. The Biological Resources section further contains species-specific mitigation measures for the desert tortoise, burrowing owl, and other special-status wildlife. The Cultural Resources section provides mitigation measures for known individual archaeological, ethnographic, and built-environment resources as well

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					as unanticipated discoveries.
				Because of the extremely limited ability to mitigate impacts from solar development on-site, the BLM should require off-site mitigation for impacts which cannot be mitigated on-site. Off-site mitigation should follow these guidelines: 1) a "no net loss" or a "net gain" requirement for resources and values; 2) requirements for project developers to fund mitigation efforts based on the amount and value of the land impacted from development; 3) a centralized body should be established to oversee the funds and maximize the effectiveness of their use; and 4) off-site mitigation should be required to take place in the same ecoregion (or, if involving water, the same groundwater basin) as the project site.	**RSA Sections C.2 Biological Resources:** The Biological Resources section discusses off-site mitigation in depth. It includes Conditions of Certification requiring offsite mitigation for the desert tortoise (**BIO-12**), burrowing owl (**BIO-18**), special-status plants (**BIO-19**), sand dunes/fringe-toed lizard (**BIO-20**), state waters (**BIO-22**), and Couch's spadefoot toad (**BIO-26**).
12/23/2009	TN-54956	Ileene Anderson, Biology/Public Lands Desert Director, Center for Biological Diversity	Group/Organization	CBD comments that thorough, seasonal surveys should be performed for all plant and wildlife species and that the proper resource agencies should be consulted for the proper methods. Also, full disclosure of the methods and results should be made available for public review to satisfy the requirements of NEPA and CEQA. CBD comments all plant and wildlife surveys should be performed following the applicable, agency-approved and recommended survey protocol. Additionally, all new rare species found during surveys must be reported to the California Natural Diversity Database (CNDDB).	**RSA Section C.2.11 Biological Resources** The Applicant conducted field surveys at the Blythe Project site following the applicable agency survey guidelines and survey protocols. Results of plant and wildlife surveys were made available for public review through several published means including the applicant's Application for Certification and Data Responses which are published and available on the Energy Commission's website. Survey methods and results for the Blythe Project were also discussed during several public meetings and workshops. Field surveys performed during 2009 were performed following the most current survey guidelines and protocols provided by the California Department of Fish and Game, U.S. Fish and Wildlife Service, and the California Native Plant Society. The applicant provided CNDDB forms for new species occurrences in the Application for Certification and/or Data Responses.

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				CBD comments that vegetation mapping should be provided on a map at a large enough scale to provide an accurate mapping and account of project impacts to vegetation and wetland communities.	**RSA Section C.2.11 Biological Resources** The applicant's assessment of the Project's impacts to vegetation communities and state waters was performed at an appropriate scale mapping unit. The majority of the impact assessment was performed in GIS which uses shapefiles and electronic data with the project/site plan overlaid that allows for an accurate assessment of impact acreages.
				CBD comments that the EIS/SA must evaluate all direct, indirect, and cumulative impacts to sensitive habitats, including impacts associated with the establishment of unpermitted recreational activities, the introduction of non-native plants, the introduction of lighting, noise, and the loss and disruption of essential habitat due to edge effect.	**RSA Section C.2.11 Biological Resources** Staff has provided a detailed analysis of impacts of direct, indirect and cumulative impacts to all sensitive biological resources, including those mentioned by CBD, in subsections C.2.4.2 and C.2.8. Staff conducted a detailed and quantitative cumulative effects analysis for biological resources affected by the project using GIS-based datasets for vegetation, landforms, soils, watersheds, CNDDB occurrences, and the USGS desert tortoise habitat model. The cumulative effects analysis also carefully considered cumulative indirect effects that are more difficult to quantify in a GIS-based analysis of habitat loss.
				CBD comments that several plant and wildlife species were identified by the applicant as either occurring or having a high potential to occur within the Blythe site and that the SA/EIS must address the impacts and propose effective ways to avoid, minimize, and mitigate the impacts to these resources including as assessment of on-site and off-site alternatives that would avoid or minimize impacts.	**RSA Section C.2.11 Biological Resources** All of the plant and wildlife species identified by the applicant were addressed in the RSA including their potential for occurrence in the Project area. Staff considered all sensitive habitats in the analysis, including plant communities identified by CNDDB as rare (CDFG 2003). The analysis of effects included the indirect effects of increased vehicle use, introduction and spread of non-native plants, fragmentation and other edge effects, and lighting and noise.
				CBD requests that staff look at ways to avoid impacts to desert tortoise by analyzing alternative sites and other measures, and recommends 5:1 mitigation for impacts to desert tortoise habitat. They also note that translocation does not have a proven track record of success, and specifies measures that must be taken for any translocation effort. CBD also comments that an aggressive raven predation plan is needed during project development and implementation.	**RSA Section C.2.11 Biological Resources** Staff assessed several alternative sites and alternative configurations to evaluate the impacts of those alternatives to desert tortoise and other sensitive resources in subsections C.2.75 through C.2.7. Staff has proposed mitigation at a 1:1 ratio for desert tortoise in Condition of Certification **BIO-12**, and has also proposed development of a detailed Desert Tortoise Translocation Plan (**BIO-10**) and a Raven Management Plan (**BIO-13**).

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				CBD suggests that since burrowing owls were observed during field surveys, alternatives should be analyzed that consider moving the project away from active burrows, and recommended that mitigation lands be acquired for burrowing owl and managed in perpetuity at a ratio of 5:1.	**RSA Section C.2.11 Biological Resources** Staff analyzed the potential impacts to burrowing owls from construction and operation of the project in subsection C.2.4.2, and staff's proposed Condition of Certification **BIO-18** recommends avoidance, minimization and compensation measures for burrowing owls in accordance with CDFG (1995) recommendations.
				CBD comments the acquisition of lands to be managed in perpetuity for conservation must be included as part of the strategy to avoid, minimize and mitigate impacts to the other species found on the Blythe site. Acquisition is particularly important for the rare and sensitive species in the Project area because the Blythe Project appears to have no compatibility with any type of on-site conservation of plant communities or wildlife.	**RSA Section C.2.11 Biological Resources** As discussed in subsection C.2.4.2, staff considers in-perpetuity protection of acquired compensation lands as a crucial element of compensatory mitigation.
				CBD states avoidance is the preferred method of mitigation for rare plants. If translocation is to be analyzed as a feasible means of minimizing rare plant impacts, a plan must be developed that identifies methods for transplanting, success criteria, and criteria for selecting lands for rare plant translocation.	**RSA Section C.2.11 Biological Resources** Staff has required in Condition of Certification **BIO-19** that special-status plants that cannot be feasibly avoided be mitigated through acquisition and protection of off-site occurrences (or buffer lands surrounding the occurrence) that are vulnerable to development. Staff also included, as an option, detailed performance standards and guidelines for mitigation through restoration of occurrences degraded by invasive plants, ORV, grazing, or altered hydrologic or geomorphic processes. Staff agrees that transplantation, or translocation, is not an acceptable method of mitigation based on previously demonstrated, overall high rates of failure.
				CBD comments that the SA/EIS evaluate the impact of the proposed permitted activities on locally rare species and not merely federal- and state-listed threatened and endangered species.	**RSA Section C.2.11 Biological Resources** Staff directed the Applicant to provide survey data for CNPS List 3 and 4 plant species and communities recognized as rare by the CNDDB, such as the galleta grass-dominant communities, even where not regulated by other LORS. These resources were analyzed and, where necessary to address significant impacts, mitigation measures were prescribed.
				The EIS/SAs must clarify the impacts to the jurisdictional Waters of U.S. and the Water of the State, and avoid, minimize and mitigate	**RSA Sections C.9 and C.2** Both the **Soils and Water Resources** and the **Biological Resources** sections of the RSA

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				any impacts. Any reroute of waters and drainage on the site must assure that downstream processes are not impacted.	provided a quantitative assessment of impacts to jurisdictional waters of the US and state. In addition, downstream impacts were analyzed and determined to be less than significant with implementation of conditions of certification.
				An evaluation of the effect of additional groundwater pumping (in conjunction with other groundwater issues [pumping, nitrate plume etc.] in the basin) on the water quality in the basin and surface water resources, and its effect on the native plant and animal species and their habitats need to be included in the EIS/SAs.	**RSA Section C.9 Soil and Water Resources** The RSA evaluated the effect of Project groundwater pumping on the water quality in the basin and surface water resources. Staff concluded that with implementation of Conditions of Certification (**SOIL&WATER-2** through **-6** and **-16**), direct and indirect impacts resulting from groundwater pumping would be less than significant and would not be cumulatively considerable. **RSA Section C.2 Biological Resources** The RSA evaluated the effect of groundwater pumping on groundwater dependent plant communities (e.g., mesquite groves or alkali sink scrubs) as well as ground-water dependent habitat features (e.g., seeps and springs) and the species that rely on them. Staff concluded that because no groundwater-dependent plant communities were present within the cone of depression that would surround the Project pumping well, and that the water table was measured at over 200 feet deep, that Project groundwater extraction would not affect plant communities. The projects effects would not be cumulatively considerable.
				The EIS/SAs must include a robust analysis of alternatives, including a private lands alternative and alternatives using other technologies including distributed generation.	**RSA Section B.2 Alternatives Evaluated** The RSA considered several site (i.e., public and/or private lands) and technology (e.g., solar technologies [utility-scale and distributed], wind, natural gas, etc.) alternatives. In addition, the resource-specific impacts of each alternative were evaluated within every issue area.
				Life-cycle greenhouse gas emissions attributable to construction and operation of the proposed project should be quantified and off-set. For mobile sources, since consistency with the AQMP will not necessarily achieve the maximum feasible reduction in mobile source greenhouse emissions, the EIS/SAs should evaluate specific mitigation measures to	**RSA Section C.1 Air Quality** Impacts from mobile sources were discussed in section C.1.4.2 of the **Air Quality** section of the RSA. Staff addressed life-cycle greenhouse gas emissions for the project in **Appendix Air-1 of** the **Air Quality** section of the RSA. Staff determined that no mitigation measures are necessary for greenhouse gas

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				reduce greenhouse emissions from mobile sources.	emissions because the proposed BSPP would have beneficial GHG impacts. Staff evaluated impacts from mobile sources and requires conditions of certification **AQ-SC1-5,** which will mitigate for fugitive dust, dust plumes and diesel-construction related emissions.
				Because the project will be creating high temperature liquids, fire prevention including best management practices must be addressed and clearly identified in the EIS/SAs.	**RSA SectionC.14 Workers Safety and Fire Protection** The RSA addresses the applicant's proposed construction and operation fire prevention plan. Staff found the plans adequate and required that the plans be provided to the CPM and Riverside County Fire Department for review and comment, pursuant staff proposed condition of certifications **Worker Safety -1** and **-2**.
				The EIS/SAs must identify and evaluate impacts to species and ecosystems from invasive exotics species.	**RSA Section C.2 Biological Resources** The RSA addressed indirect, direct and cumulative impacts from noxious weeds; see section C.2.4.2.
				The EIS/SAs must evaluate all direct, indirect, and cumulative impacts to wildlife movement corridors. The commenter provided detailed specifications for a desired analysis of wildlife movement corridors including what should be considered and the methodology.	**RSA Section C.2 Biological Resources** The RSA addressed indirect, direct and cumulative impacts on wildlife movement corridors. Section C.2.4.2 discusses impacts to wildlife movement corridors, in addition to Section C.2.8.7 (Analysis of Cumulative Effects to Biological Resources).
				A thorough analysis of the cumulative impacts from all of these projects on the resources needs to be included.	Cumulative impacts on resources are addressed in each resource section of the RSA and SA.
12/23/2009	TN-54782	Jeff Aardahl, Defenders of Wildlife	Group/Organization	The DEIS must include alternative project sites or locations, including those that may not fall under the jurisdiction of the BLM; project extent and electrical power generation that differ from the applicant's proposal; and the potential for different technology that may lead to lesser potential impacts on sensitive environmental resources.	**RSA Section B.2 Alternatives Evaluated** The RSA considered several site (i.e., public and/or private lands) and technology (e.g., solar technologies [utility-scale and distributed], wind, natural gas, etc.) alternatives. In addition, the resource-specific impacts of each alternative were evaluated within every issue area.
				Reduce the project size by excluding the proposed western half of the project area, which contains the majority of the sensitive habitats occupied by several species of concern.	The Reduced Acreage Alternative was fully analyzed in the RSA Section C. The Reduced Acreage Alternative includes half of the exclusion area suggested by the commenter; it would eliminate one of the two 250 MW western solar fields (Unit 3). However, this alternative would allow development of the other western solar field (Unit 2). The second western solar field was not incorporated into the Reduced Acreage Alternative because the

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					alternative had been designed to avoid the large desert wash at the southwestern portion of the site and the majority of the desert dry wash woodland which was achieved by eliminating the use of Unit 3.
				The commenter states that the BLM should take a closer look at the impacts of the Blythe Project's impacts to desert tortoise and provide more information on this species than the AFC does. Based on the amount of sign detected during field surveys, it appears the western portion of the site potentially has a higher viable desert tortoise population and the presence of several caliche cavities in ephemeral drainages could provide habitat for other undetected individuals.	**Biological Resources SSA** Staff agrees that the western portion of the site provides better desert tortoise habitat, as evidenced by the 2010 survey results which detected numerous sign of desert tortoise there (Solar Millennium 2010s). Staff analyzed the effects of the Project on desert tortoise in **Biological Resources** subsections C.2.4.2.
				The commenter states that the BLM must provide additional information on burrowing owl, bighorn sheep, and American badger and the use of the Blythe site for foraging and movement. The suitability of the site for burrowing owl and American badger should be re-evaluated given the amount of burrowing owl sign and burrow digs that were found.	**Biological Resources SSA** Staff analyzed the impact of the Project to burrowing owl, bighorn sheep, and American badger in **Biological Resources** subsection C.2.4.2, and also assessed the cumulative impact of the Blythe Project combined with other foreseeable projects on foraging habitat and movement.
				The commenter states the applicant has provided no avoidance measures to eliminate or reduce loss of habitat that supports special-status species. Direct mortality for some species of concern will be avoided through capture and release or other measures carried out under wildlife agency permit, but permanent loss of the lands that currently supporting habitat that supports these species is the most significant impact to biological resources. The BLM must use the NEPA process, to identify measures to avoid and mitigate impacts to special-status species occurring primarily on the western half of the project area including looking at alternate locations and a smaller project footprint.	**Biological Resources SSA** Staff's proposed conditions of certification have provided avoidance, minimization and compensation measures for special status species that would be impacted by the Project, including **BIO-9** through **BIO-12** (Desert Tortoise), **BIO-17** (Badger and Kit Fox); **BIO-19** (Special-Status Plants); **BIO-20** (Mojave Fringe-Toed Lizard); **BIO-21** (Bighorn Sheep); **BIO-24** (Golden Eagle) and **BIO-26** (Couch's Spadefoot Toad). Staff considered the impacts of alternative locations for the project (see the Alternatives Section) and in **Biological Resources** subsection C.2.5 through C.2.7, which provided an analysis of the Reconfigured and Reduced Acreage Alternatives.
				Groundwater and surface water impacts in the McCoy Wash region over the life of the project need to be analyzed. This analysis should be performed for each of the alternatives.	**RSA Section C.9Soil and Water Resources** The RSA analyzed impacts to groundwater and surface water over the life of the proposed project and for each alternative.
				Cumulative impacts to species and their habitats in the region that includes the McCoy Mountains to the McCoy Wash need to	**RSA Section C.2 Biological Resources** Cumulative impacts on biological resources, including the area within the McCoy Mountains

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				be analyzed.	to the McCoy Wash, are addressed C.2.8 of the **Biological Resources** section of the RSA.
				The DEIS must address the projected effects of global climate change on plants, species and their habitats throughout the McCoy Wash region as part of the future environmental baseline.	**RSA Section C.2 Biological Resources** The RSA considered and addressed the effects of climate change in the analysis of cumulative effects.
12/23/2009	TN-54789	Joan Taylor, Chair, Calif/Nev Desert Energy Committee	Group/Organization	Approval of the project requires the consideration of the appropriate level of renewable development for this portion of the Sonoran Desert as well as for the carrying capacity of the biological, cultural, scenic and other resources. Law and policy mandate that responsible agencies act conservatively and approve only those projects and alternatives that do not foreclose future conservation options and that do little or no harm. While portions of Riverside County have been designated for solar energy use, environmental organizations recommended solar development be located on disturbed lands and conjunctive use of private lands with undisturbed public lands adjacent to them. Feasible alternatives may include a reduced, yet viable, project or a project on an alternative site, but should not be so restricted by the applicant's purpose as to forego consideration of the protection of public land resources. The SA must address climate change in a broader context including consideration of connectivity, habitat loss, invasive species, and loss of ecosystem resources.	This is a general comment that is addressed in each issue area analysis. **RSA Section A, p. A-2**. The Introduction briefly describes the roles of responsible agencies in the project approval process. While the consideration of impacts to the environment must be made and this analysis must be provided to the public, the responsible agencies must consider a wide variety of issues in their approval process. **RSA Section B.2.7.2, p. B.2-20 Alternatives Evaluated** Comment is addressed in the description of the Blythe Mesa Alternative. **RSA Section B.2.6.2, p. B.2-14 Alternatives Evaluated** Comment is addressed in the description of the Reduced Acreage Alternative. **RSA Section C.2.11, p. C.2-156 Biological Resources** Staff considered the risks to biological resources associated with global climate change and, in consultation with BLM, USFWS, and CDFG, has identified a critical corridor for wildlife movement and connectivity between the lower elevations of the Chuckwalla DWMA and Critical Habitat Unit, and the higher elevations north of I-10. The areas are identified as priorities for both

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					acquisition and future solar exclusion; a detailed description of the strategy is included as Appendix B to the Biological Resources RSA.
				Allowing an applicant's purpose and need statement to dictate the project undermines a fair and full review of alternatives.	**RSA Section B.2.5, p. B.2-12 Alternatives Evaluated** The Summary of Scoping and Screening Results addresses this and wide variety of alternatives recommended during scoping.
				Failure to provide meaningful alternatives would result in an inadequate analysis.	**RSA Section B.2.6, p. B.2-13 Alternatives Evaluated** The Alternatives Evaluated Under CEQA/NEPA section describes a variety of meaningful alternatives that are evaluated at length in the issue area analysis sections.
				The SA must provide full and feasible mitigation for all identified impacts. After requiring avoidance of impacts to the maximum extent feasible, proposed mitigation must provide for compensatory mitigation.	**RSA Section C.2.11, p. C.2-156 Biological Resources** Staff describes their analysis and development of mitigation. Each issue area analysis also addresses this comment in their individual analyses.
				The SA must adequately identify and analyze cumulative and growth-inducing impacts and consider whether the projects would utilize disturbed lands or exacerbate urban sprawl.	**RSA Section C.2.11, p. C.2-157 Biological Resources** Staff describes their consideration of cumulative and indirect impacts. Each issue area analysis also addresses this comment in their individual analyses.
				Cumulative impacts to sensitive plant species must be analyzed across the range of these species and mitigation for the avoidance and minimization of impacts must be proposed. Mitigation must ensure that if avoidance is infeasible that species losses will be adequately compensated.	**RSA Section C.2.11, p. C.2-157 Biological Resources** Staff acknowledges the comment and indicates that the comment is addressed in Condition of Certification **BIO-19**.
				The scope of cumulative impact analysis should encompass the Sonoran/ transition desert areas of the California desert and address species migration that may be caused by climate change. Ecological processes such as sand flow to and from dunes need to be addressed.	**RSA Section C.2.11, p. C.2-157 Biological Resources** Staff acknowledges the comment and states that the cumulative effects analysis addressed the entire NECO planning area, which encompasses the entire Sonoran desert region in California. Staff also extended the cumulative impact analysis into the Sonoran

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					Desert region of Arizona.
				The applicant's biological survey data is unclear as to how many years of surveys were conducted and whether fall plant surveys were conducted. Use of inadequate surveys would result in an incomplete analysis.	**RSA Section C.2.11, p. C.2-158 Biological Resources**. Staff acknowledges the comment and responds that surveys for biological resources were conducted in spring of 2009 and again in spring 2010. Staff has also required a variety of preconstruction surveys in 2010, and a survey of the entire Project Disturbance Area in summer-fall 2010 for late season special-status plants.
				Analysis of decommissioning of the project must be performed.	This is a general comment that is addressed in each of the issue area analyses.
				Because the BLM has not categorized the baseline visual resources, the BLM should avoid impacting visually sensitive areas such as wildernesses.	**RSA Section C.12.2, p. C.12-2 Visual Resources**. The BLM agreed to use the Energy Commission's visual resources analysis methodology as baseline visual resources had not been categorized.
				Damage to intact desert soils, siltation, and their effects on habitat for desert tortoise, rare plants, and the crypto-biotic crust must be analyzed, minimized, and mitigated.	**RSA Section C.2.4.2, p. C.2-60, C.2-95 Biological Resources**. Indirect effects on desert tortoise were addressed and siltation and impacts to soils were specifically addressed for rare plants and biotic crust.
				The impacts of noise and vibration on wildlife must be considered.	**RSA Section C.2.4.2, p. C.2-76 Biological Resources**. Comment is directly addressed in an analysis of noise impacts on wildlife.
				The environmental review must include information on compliance with Section 106 of the NHPA and BLM's manual 8100, the methodology of archeological surveys, and the results of these surveys.	**RSA Section C.3 Cultural Resources**. As the BLM and the Energy Commission require, the applicant completed 100 percent surface pedestrian archaeological survey of all of the BSPP project areas, including those recently identified as affected by project description changes.
				Sites must be evaluated against the NRHP criteria and State Office of Historic Preservation recommendations and documentation provided.	**RSA Section C.3. Cultural Resources**. Comment is addressed in the discussion of NRHP and CRHR Evaluations of Cultural Resources in the APEs.
				NAHC consultation must be performed and concerns must be identified.	**RSA Section C.3 Cultural Resources** Comment is addressed in the discussion of

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					Native American Consultation.
				Cultural mitigation should depend upon the resource and include excavation, mapping, and compensation for buying like resources for replacement values.	**RSA Section C.3 Cultural Resources** Comment is addressed in the discussion of BLM and CEC Required Resolution of Significant Effects.
				The responsible agencies should require an alternative eliminating all major drainages and the western half or more of the Blythe Project. Moving the project out of the western and northern portion of the proposed Project footprint, and into these adjacent degraded areas, would reduce Project impacts and potentially retain the potential for a few 250MW units. Comments also included the attachment of scoping comments on the Desert Renewable Energy Conservation Plan (DRECP).	**RSA Section C.2.11, p. C.2-158 Biological Resources** Staff analyzed an alternative (Reconfigured Alternative, C.2.5.) that shifted the Project footprint to the south and east to avoid the western portion of the project. Staff conducted field surveys of the portion of the alternative that lay outside the ROW, including a delineation of washes. Comments on the DRECP will be addressed in the analysis of that project.
12/23/2009	TN-54781	Michael J. Conner, California Director, Western Watersheds Project	Group/Organization	The project will have significant direct, indirect and cumulative impacts on some of the desert's most sensitive resources including species listed under the ESA such as desert tortoise and on important cultural resources. Project Applicants for both the Palen and the Blythe Projects describe the project sites as having low tortoise densities. Additional surveys should be conducted to confirm this. The EIS should also consider the status of the tortoises in the affected recovery units. The latest reports from the Desert Tortoise Recovery Office cite a 37% in tortoise density between 2005 and 2007. The NEPA document should present the environmental impacts of the proposed action and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public. The EIS must consider alternatives that meet the project goals and not simply propose alternatives that can then be dismissed from further consideration.	**RSA Section C.2.4.2 and C.2.8 Biological Resources**. Staff has provided a detailed analysis of impacts of direct, indirect and cumulative impacts to desert tortoise in subsections. **RSA Section C.2.8 Biological Resources**. Staff believes that the desert tortoise surveys conducted by the applicant provide an adequate basis for assessing impacts of the project, and concurs with the characterization of the Project site as having low tortoise densities. Subsection C.2.8 provides a detailed and quantitative analysis of impacts of the Project to desert tortoise recovery units. **RSA Section B.2 Biological Resources** presents a discussion on all of the potential Alternatives to the proposed project and summarizes potential environmental impacts from the Alternatives chosen to be evaluated. 22 alternatives were evaluated and two alternatives were determined to be both reasonable for the BLM and feasible for the Energy Commission: the Reconfigured Alternative and the Reduced Acreage. Each

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					issue area section evaluates the project Alternatives and their potential impacts to each issue area.
				We suggest that the agencies consider the following reasonable alternatives in addition to any proposed action: (a) "No Action Alternative" as is required by NEPA. (b) Alternative sites on public lands with fewer resource conflicts. (c) Alternative that features technology that requires significantly less water. (d) A private lands alternative under which the project is built on private lands only. (e) A distributed energy alternative using "roof top" solar to avoid the need for construction of a power plant.	See response above
				The NEPA/CEQA documents must describe, clearly characterize and identify the desert tortoise population that will be impacted by each alternative.	**RSA Section C.2.4.1 Biological Resources** contains a full discussion and characterization of the existing desert tortoise population in the project area.
				The Project Applicants for both the Projects describe the project sites as having low tortoise densities. Additional surveys should be conducted to confirm this.	See response above
				Both Projects would disrupt connectivity between the Eastern Colorado Recovery Unit and the Northern Colorado Recovery Unit. This could reduce gene flow and impair desert tortoise recovery specifically as it relates to the Palen site which provides crucial connectivity between the 2 Recovery Units.	**RSA Section C.2.4.2 and C.2.8 Biological Resources**. Staff addressed this potential impact in subsections C.2.4.2 and C.2.8, and agrees that connectivity could be affected by the Project. Staff has developed mitigation for this impact in proposed Condition of Certification **BIO-12**.
				Use of the Palen project location is incompatible with the biological goals and objectives of the NECO Plan.	**RSA Section C.2.4.2 Biological Resources** discusses the project's biological impacts and compatibility within the NECO planning area.
				The NEPA/CEQA documents should provide a review of the direct, indirect and cumulative impacts of the proposed project on the tortoise of the Eastern Colorado and Northern Colorado Recovery Units, and all associated infrastructure including the roads and transmission lines.	**RSA Section C.2.4.2 and C.2.8 Biological Resources**. Staff provides a review of the potential direct, indirect and cumulative impacts in subsections C.2.4.2 and C.2.8, and provided mitigation for this impact in proposed Condition of Certification **BIO-12**.

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				The EIS must explain how this project could move forward without the agencies propelling a listing of this species under the Endangered Species Act.	These concerns will be shared with the decision-makers of the Project. Listing of species under the Endangered Species Act is outside the purview of the CEC.
				The EIS should carefully consider and an analyze impacts to all State protected species such as burrowing owl, sensitive species, rare plants and Unusual Plant Assemblages (UPA) that would be affected by the project. It should provide detailed vegetation and wildlife maps to facilitate public input into the process.	**RSA Section C.2.4.2 and C.2.8**. **Biological Resources**. Staff analyzed the impacts of the Project to burrowing owl, sensitive species, rare plants and sensitive plant communities in subsections C.2.4.2 and C.2.8, and provided avoidance, minimization and compensation measures for these impacts in the proposed conditions of certification. Detailed maps and figures on vegetation and wildlife records in and near the Project are available on the Energy Commission web page for this Project <http://www.energy.ca.gov/sitingcases/solar_ millennium_blythe/index.html. Public input has been solicited and addressed through noticed meetings, electronic mail listservers, and included descriptions of baseline conditions at the site.
				The disturbance to the soil and natural vegetation that will occur as a result of the construction and maintenance must not be allowed to establish a "weed corridor" across the landscape. The EIS should carefully consider how invasive plants and weeds will be managed and controlled.	Staff's proposed **Condition of Certification BIO-14 in Section C.2 Biological Resources** provides guidance for preparation and implementation of a Weed Management Plan to monitor and control noxious weeds
				The EIS should disclose any potentially toxic or hazardous wastes that may be associated with these projects during project construction, operation, and maintenance including pesticides and herbicides.	**RSA Section C.4** of the Revised Staff Assessment discusses safe handling of hazardous materials, use of heat transfer fluid (HTF), transportation of hazardous materials, and site security. **RSA Section C.5** analyzes potential public health and safety risks associated with construction and operation and **RSA Section C.13** presents an analysis of issues associated with wastes generated from the construction, operation and closure/decommissioning of the proposed project.
				The EIS should address the effects that each alternative for each project may have on wildfire risks	Fire potential is discussed in **RSA Section C.2 Biological Resources**. An extensive discussion of fire protection and fire response

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					is provided in **RSA Section C.14 -Worker Safety and Fire Protection**. Alternatives to the project are largely also located in desert areas with limited vegetation. A discussion of wildfire impacts is provided in **RSA Section B.2.7 Alternatives** for the Blythe Mesa Alternative site, which consists mostly of fallow agricultural fields and active orchards.
				The wash habitat impacted by each alternative should be evaluated and appropriate mitigations made for stream bed alterations.	**RSA Section C.2.4.2 and C.2.8**. **Biological Resources**. Staff addressed direct, indirect and cumulative impacts to desert washes and other waters of the state in subsections C.2.4.2 and C.2.8. This analysis also considered the effects of soil erosion, sedimentation and off-site impacts of these alterations. Staff provided mitigation for these impacts in proposed **Conditions of Certification BIO-19 and BIO-22**. Project alternatives focused on minimizing impacts to desert washes were considered in subsections C.2.5 through C.2.7.
				The EIS should discuss and analyze impacts to cultural and paleontological resources.	**SA/DEIS Section C.3 Cultural Resources and Native American Values** contains a full characterization of Cultural and Paleontological Resources as well as a discussion of impacts to those resources from the proposed Project and Alternatives.
				The agencies should use the recently released USGS desert tortoise habitat model to determine likely changes in desert tortoise habitat quality in the area and the importance of the desert tortoise habitat.	The recent USGS habitat model referenced as (Nussear et al. 2009) was used to determine likely changes in desert tortoise habitat quality in the area and the importance of the desert tortoise habitat.
				In addition to addressing climate change in the cumulative effects analysis, the EIS should address the carbon footprint of the project and any losses to carbon storage and sequestration it will engender	**RSA Section C.1 Air Quality**. Greenhouse Gas emissions from the proposed project are presented in Appendix Air-1. Appendix Air-1 presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements. Carbon storage and sequestration are also discussed in the Section C.2, Biological Resources, of the RSA.

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				The EIS should fully review the impacts of each alternative on visual resources.	**RSA Section C.12 Visual Resources** The RSA presents a discussion of Visual Resources and impacts related to the proposed Project and Alternatives.
				The EIS must provide information on the water needs of these power plants both in the construction and operation phases and the source of these waters. The EIS must fully analyze impacts to the local and regional water reserves.	**RSA Section C.9 Soil and Water Resources** The RSA presents a full discussion on Soil and Water Resources as it relates to the proposed Project and Alternatives.
				The EIS must considered the cumulative effects of this project in combination with all the other consumptive uses that are occurring on these public lands including livestock grazing, off road vehicle activity, and mining.	**RSA Subsection C.2.8 Biological Resources** The RSA provides a detailed and quantitative cumulative impact analysis for sensitive species and their habitat within the NECO planning area and the Chuckwalla Valley.
				The NEPA/CEQA documents must explain the monitoring programs that will be in place to monitor the short and long term impacts of the project. This should include the timelines, and estimated costs and sources of funding for the monitoring programs.	Conditions of Certification encompass monitoring requirements as discussed in Section E (General Conditions) of the RSA which requires a Compliance Monitoring and Closure Plan. This Compliance Plan includes conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure below a level of significance. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.
				BLM is required to consider measures to mitigate potential environmental consequences in its NEPA analysis.	See Response above
				The EIS should describe the restoration and rehabilitation activities that will be required for habitat disturbed during construction.	**RSA Section C.2.12 Biological Resources** The RSA discusses the Proposed Conditions of Certification which include measures to reduce, minimize or mitigate impacts to habitats disturbed by the proposed Project.
12/22/2009	TN-54949	Meg Grossglass, Off Road Business Association	Group/Organization	The Draft EIS/SA must evaluate the project's potential impacts on the recreational uses in the area including, but not limited to, off-highway vehicle (OHV) use, camping,	**RSA Section C.6 page C.6-4 Land Use, Recreation and Wilderness** The RSA addresses OHV use in designated open routes. Page C.6-5 notes that there are

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				photography, hiking, wildlife viewing and rockhounding. In order to conduct a proper analysis of the project's impacts on recreation, the BLM must first determine the number of users, the value of the affected land for recreational purposes, and the need to locate and acquire replacement venues for the recreational lands lost as a result of the project.	no designated wilderness areas or recreational areas within a five mile radius of the project site. Pages C.6-21 and 22 discuss impact on Recreational Activities.
				The Draft EIS/SA must evaluate the project's indirect impacts caused by displacing recreational users including, but not limited to: (1) the increased enforcement required at other sites when displaced recreational users seek out other areas that may be poorly identified as wildlife preserves or other resource rich areas; (2) the loss of biological resources or habitat at other sites that displaced recreational users may utilize;· (3) the loss of nature education; (4) the loss of outdoor recreation opportunity; (5) the loss of outdoor access and experiences for children in the community; (6) the loss of familial traditions, custom and culture of recreational and nature oriented activities in the region; (7) the loss of the region's history and traditions, specifically with respect to mining and recreational activities.	**RSA Section C.6 page C.6-1Land Use, Recreation and Wilderness** The RSA states that Indirect impacts on recreation would be less-than-significant. Pages C.6-21 and 22 discuss impact on Recreational Activities.
				The Draft EIS/SA must evaluate the cumulative losses of land available for OHV recreation, including, but not limited to, the cumulative closures or limitations on desert lands managed by BLM and on forest lands managed by the U.S. Forest Service.	**RSA Section C.6 Pages C.6-21 and 22 Land Use, Recreation and Wilderness** The RSA discuss cumulative and future impact on Recreational Activities.
				The Draft EIS/SA must evaluate the economic impacts caused by the project's construction, implementation, and operation. This evaluation must address (1) the economic impacts on the local community caused by the loss of commerce created by recreational users to the area including gasoline, grocery and equipment purchases; (2) the economic impacts on businesses that sell OHV's and OHV-related equipment -such as motorcycles, ATV's, UTV's, dune buggies, motorhomes, trailers and their associated tow vehicles.	**RSA Section C.6 page C.6-1Land Use, Recreation and Wilderness** Although no specific detail is provided on local economic impact, Staff states that indirect impacts on recreation would be less-than-significant.

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				The Draft EIS/SA must include a "reclamation plan" for the eventual return of these lands to public use. This plan needs to ensure that if the applicant, for any reason, chooses to abandon the project that the land will be returned to public use in as close to its original condition as possible. The "reclamation plan" should also include provisions for returning the land to public use after the term of the right-of-way has expired.	**RSA Section C.2 Biology Page C.2-212**. Condition of Certification **BIO-23**: Upon Project closure the Project owner shall implement a final Decommissioning and Reclamation Plan. The decommissioning and Reclamation Plan shall include a cost estimate for implementing the proposed decommissioning and reclamation activities, and shall be consistent with the guidelines in BLM's 43 CFR 3809.550 et seq., subject to review and revisions from the CPM in consultation with BLM, USFWS and CDFG.
				The Draft EIS/SA must evaluate the project's impact on available water supplies. Such an evaluation must; take into account water required for dust control, fire prevention and containment, vegetation management, sanitation, equipment maintenance, biological preserve land, construction, human consumption, and any other project uses.	**RSA Section C.9 Soil and Water Resources** Page C.9-3 outlines the significance criteria examined by staff in relation to impacts on water supply. Significance criteria are based on those listed in CEQA Appendix G
				The Draft EIS/SA must evaluate the project's aesthetic and visual impacts on the region, including the fact that visitors to the area will have a greatly reduced outdoor experience because of the project. The lands affected by the project are currently wild, open, .and undeveloped. That will change when the project is constructed, thus altering the landscape and diminishing the wilderness experience of visitors to this area.	**RSA Section C.12 Visual Resources** Staff has provided a detailed analysis of visual resources that take into consideration state and local criteria. Numerous settings and existing conditions were evaluated with summaries for viewer concern, viewer exposure and visual sensitivity provided.
				The Draft EIS/SA must evaluate the project's potential to create direct, indirect, and cumulative biological impacts, including, but not limited to impacts on endangered and threatened species.	**RSA Section C.2 Biological Resources** Staff has provided a detailed analysis of impacts of direct, indirect and cumulative impacts to all sensitive biological resources, in subsections C.2.4.2 and C.2.8. Staff conducted a detailed and quantitative cumulative effects analysis for biological resources affected by the project using GIS-based datasets for vegetation, landforms, soils, watersheds, CNDDB occurrences, and the USGS desert tortoise habitat model. The cumulative effects analysis also carefully considered cumulative indirect effects that are more difficult to quantify in a GIS-based analysis of habitat loss.
				The Draft EIS/SA must evaluate the project's consistency with existing land use and regulatory plans, including examination of	**RSA Section C.6 Land Use, Recreation and Wilderness** Staff's land use analysis focused on the

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				impacts of on those plans. This includes reviewing the project's consistency with the regulations set forth in Executive Order 11644, signed on February 8, 1972, which allows for use of off-road vehicles on the public lands.	project's consistency with existing land use resources, land use plans, ordinances, regulations, policies, and the project's compatibility with existing or reasonably foreseeable land uses. The majority of the proposed project site is located within the "Limited Use" category of the BLM's CDCA Plan Multiple Use Categories, and 320 acres of the private lands within the site are under Riverside County jurisdiction. **LAND USE Table 1** provides a general description of the land use LORS applicable to the proposed project and surrounding lands. The project's consistency with these LORS is discussed in **LAND USE Table 2**.
				The Draft EIS/SA must evaluate whether the project's environmental burdens (including diminished recreational access) are being placed disproportionately on individuals and/or groups who, due to their socio-economic status, have insufficient resources to challenge the proposed project.	**RSA Section C.8 Socioeconomics and Environmental Justice** Staff follows Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," which focuses federal attention on the environment and human health conditions of minority communities and calls on federal agencies to achieve environmental justice as part of this mission. Staff has considered the following 11 sections in the RSA: Air Quality, Hazardous Materials, Land Use, Noise, Public Health, Socioeconomics, Soils and Water, Traffic and Transportation, Transmission Line Safety/Nuisance, Visual Resources, and Waste Management. Over the course of the analysis for each of the 11 areas, staff considered potential impacts and mitigation measures and whether there would be a significant impact on an environmental justice population. Staff determined that the remaining technical areas did not involve potential environmental impacts that could contribute to a disproportionate impact on an environmental justice population, and so did not necessitate further environmental justice analysis.
				The Draft EIS must evaluate potential impacts on archeological, cultural, and historical resources in the vicinity of the project, including, but not limited to: (1) Native American resources, burial sites, and artifacts; and (2) historical mining operations and	**RSA Section C.8 Cultural Resources and Native American Values**. Numerous Native American resources and some potential historic mining resources were identified during surveys conducted by the Applicant. The RSA contains a detailed evaluation of

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				related artifacts.	how each of these resources will be impacted and outlines specific mitigation for these impacts. For those sites that will be destroyed by the proposed project, data recovery has been recommended.
12/11/2009	TN-54432	Ann McPherson, Environmental Review Office	Federal Agency	Clearly identify the underlying purpose and need to which BLM is responding in proposing the alternatives.	To be addressed in BLM FEIS and BLM Response to Comments
				Describe development, objectives, and implementation of each project alternative. Include a discussion of alternative sites, capacities, and generating technologies. Describe the benefits associated with the proposed technology.	**RSA Section B.2 Alternatives Evaluated** The Alternatives section includes discussion of development and objectives or each project alternative; alternative sites, capacities, and generating technologies; and benefits associated with the proposed technology.
				Discuss the feasibility of using residential and wholesale distributed generation, in conjunction with increased energy efficiency, as an alternative to the proposed project.	**RSA Section B.2 Alternatives Evaluated** Section B.2.8.2 includes an extensive discussion of distributed solar PV and thermal alternatives.
				Estimate the quantity of water required by the project. Describe the source and availability of this water and potential effects on other water users and natural resources. Depict cumulative impacts.	**RSA Section C.9 Soil & Water Resources** Section C.9.3.2 calculates that the project, once fully operational, would require 600 acre feet a year (afy) of groundwater from onsite wells. Sections C.9.3.3.6 through C.9.3.4.6 discuss beneficial uses, water quality, hydrology, and impacts to ground and surface water. Cumulative impacts are discussed in Section C.9.3.7.
				Identify the potentially-affected groundwater basin and analyze any potential for subsidence and impacts to springs and other water bodies.	**RSA Section C.9 Soil & Water Resources** The Palo Verde Mesa Groundwater Basin is identified. Impacts are discussed in Sections C.9.3.4.2 and C.9.4.3.3 (groundwater) and 9.3.4.5 (surface water).
				Analyze different technologies that can be used to minimize water use for the project. Also include an analysis of the potential for alternatives to cause adverse aquatic impacts.	**RSA Section B.2 Alternatives Evaluated** Alternative technologies are evaluated in Sections B.2.8.2, B.2.8.3, and B.2.8.4, with some discussion of water use in comparison to the proposed project.
				Include a description of all water conservation measures to reduce water demands.	**RSA Section C.9 Soil & Water Resources** Section C.9.2.8.3 states that the project would use dry-cooling and recycle process water. It refers to AFC Section 5.17.4 for additional water mitigation measures.
				Describe water reliability for the proposed project and clarify how existing and proposed sources would be affected by climate change.	**RSA Section C.9 Soil & Water Resources** Conditions **SOIL & WATER-2 and -16** have measures that address water reliability. Climate change effects on water sources are not specifically addressed.

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
				Address any potential effects of project discharges on surface and groundwater quality, If evaporation ponds would be used, discuss chemical characteristics of pond water, prevention of seepage into groundwater, storm design containment capacity, and overflow management in larger storm events.	**RSA Section C.9 Soil & Water Resources SOIL&WATER-7** and **SOIL&WATER-8** include regulations for the operation of the wastewater treatment systems. Evaporation ponds are discussed in detail in Section 9.3.4.4.2.
				Coordinate with the U.S. Army Corps of Engineers to determine if a Section 404 permit is required. Discuss all waters of the United States that could be affected by the project alternatives, and include maps and jurisdictional delineation identifying all waters within the project area.	**RSA Section C.9 Soil & Water Resources** Section C.9.8.1.1.1 discusses applicability of a Section 404 permit, pending 401 permitting.
				Any dredged or fill material discharged into WOUS would require permitting. The DEIS should discuss alternatives to avoid those discharges.	**RSA Section B.2 Alternatives** Section B.2.3 discusses regulations for dredged or fill material as part of Alternatives Screening and Development.
				Describe existing and project-modified drainage patterns in the project vicinity and identify whether any components of the proposed project are within a 50 or 100-year floodplain.	**RSA Section C.9 Soil & Water Resources** Surface water hydrology is discussed in Section C.9.3.3.6 and impacts in Section C.9.3.4.5. The Soil & Water Resources section contains multiple floodplain references, but does not specify whether the project would fall in the 50 or 100 year floodplain.
				Develop a list of impaired waters, establish priority rankings, and TMDLs.	**RSA Section C.9 Soil & Water Resources** There are no perennial streams in the McCoy Mountain watershed which impact the BSPP site. The vast majority of the time, the area is dry and devoid of any surface flow Anywhere.
				Identify and quantify petitioned and listed threatened and endangered species and habitat that might occur in the project area. Discuss impacts and, including base conditions, avoidance, mitigation, and conservation measures; and monitoring, reporting, and adaptive management efforts.	**RSA Section C.2 Biological Resources:** Staff has addressed all direct and indirect impacts associated with impacts to listed species (desert tortoise) and its critical habitat, and has also discussed impacts to other special concern species, in subsection C.2.4.2. Subsection C.2.4.12 provides detailed conditions of certification that includes avoidance, minimization and compensation measures for habitat loss and fragmentation, impacts of fence construction, and evaporation ponds.
				Describe the condition of the land for the proposed project and whether it is disturbed or impaired. Maximize options to protect habitat and minimize habitat loss and fragmentation.	**RSA Section C.2 Biological Resources** The SA/DEIS also discussed the baseline condition of habitat and biological resources within the proposed Project area in subsection

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					C.2.1.
				Discuss impacts from increase of shade in the desert environment.	**RSA Section C.2 Biological Resources** **T**he effect of shade is not addressed because this impact is not relevant to the kind of solar development proposed for this project.
				Discuss potential for ponded water to attract wildlife, and any mitigation measures.	**RSA Section C.2 Biological Resources** Subsection C.2.4.12 provides detailed conditions of certification that includes evaporation ponds.
				Include an invasive plant management plan to monitor and control noxious weeds.	**RSA Section C.2 Biological Resources** Staff's proposed Condition of Certification **BIO-14** provides guidance for preparation and implementation of a Weed Management Plan to monitor and control noxious weeds.
				Identify whether BSPP is within or in close proximity to solar energy study area.	**RSA Section** C**.2 Alternatives:** The section states that the BSPP is in an area identified as a solar energy study area.
				Consider cumulative impacts associated with multiple large-scale solar projects and impacts on various resources including water supply, endangered species, and habitat.	**RSA Section C.9 Soil & Water Resources/RSA Section C.2 Biological Resources:** Cumulative impacts are discussed in the Biological Resources Section C.2.8.7 and Soil & Water Resources Section C.9.7.
				Describe reasonably foreseeable land use and associated impacts that will result from the additional power supply. Provide growth estimates.	Power generated by the BSPP will enter the grid and will be delivered to the entities that have contracted for the power. Since there is adequate supply of electricity before BSPP is brought on line, BSPP will not be serving incremental load. Rather, BSPP will be displacing other sources of energy for each KWh delivered. Therefore, since no incremental load is served, no incremental power supply is created.
				Consider effects of the transmission interconnection and of cumulative effects associated with transmission needs for other foreseeable projects.	**RSA Section D.5 Transmission System Engineering** Section D.5.8 and TSE Appendix A discuss cumulative impacts to the transmission system.
				Consider adopting a formal adaptive management plan to evaluate and monitor impacted resources and implement mitigation measures.	**RSA Section C.2 Biological Resources** Many of staff's proposed conditions of certification include adaptive management components, including **BIO-13** (Raven Management Plan), **BIO-15** (Avian Protection Plan), **BIO-16** (Pre-Construction Nest Surveys), **BIO-19** (Special Status Plant Impact Avoidance and Minimization), **BIO-24** (Golden

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					Eagle Inventory and Monitoring), and **BIO-25** (Evaporation Pond Netting and Monitoring).
				Consider climate change effects on the project. Assess how impacts could be exacerbated by climate change.	**RSA Section C.2 Biological Resources:** Subsection C.2.4.2 discusses the impacts of the project on listed species and other sensitive resources, and incorporates an assessment of climate change in this analysis. The cumulative impact analysis in subsection C.2.8 also considered the effects of climate change.
				Quantify climate change benefits of solar energy and compare to other energy types.	**RSA Section B.2 Alternatives Evlauated** The discussion of alternative energy technologies in Section B.2 includes some general greenhouse gas comparisons, but not specific quantification for most technologies.
				Discuss whether trenching and other ground disturbance would affect carbon storage.	**RSA Section C.s Biological Resources** Disturbance to land and its impact on carbon storage is presented in the discussion of special-status plants.
				Provide a detailed discussion of ambient air conditions, NAAQS, and criteria pollutant nonattainment areas.	**RSA Section C.1 Air Quality:** This information is contained in Table 2 (national and state ambient air quality standards), Table 3 (project area attainment status), and Table 4 (criteria pollutants) of Section C.1.
				Estimate emissions of criteria pollutants; include timeframe.	**RSA Section C.1 Air Quality:** Construction emissions are listed in Air Quality Tables 6 and 7, and operations emissions in Tables 8 and 9. Section C.1.4.2 also provides construction and operation timeframes.
				Specify emission sources by pollutant from mobile sources, stationary sources, and ground disturbance.	**RSA Section C.1 Air Quality:** Section C.1.4.2 discusses and lists emissions (in Tables 6 through 9) from stationary versus mobile sources.
				Identify the need for an Equipment Emissions Mitigation Plan (EEMP), which has requirements for construction-related engines.	**RSA Section C.1 Air Quality:** An EEMP is not specifically identified. However, Section C.5.4.2 and related conditions include mitigations for construction-related engines.
				Identify the need for Fugitive Dust Control Plan.	**RSA Section C.1 Air Quality:** Condition AQ-SC-3 has measures for fugitive dust control.
				Consult and coordinate with tribal governments; describe processes, outcomes, and issues.	**RSA Section C.3 Cultural Resources and Native American Values:** Coordination is required per applicable LORS. Interaction with tribal governments takes place in a formal government-to-government consultation process. As representative of the federal government, BLM is the lead agency in this

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					consultation. As a state agency, the Energy Commission does not a have a role. BLM is currently in the process of consulting with local Native American groups regarding impacts and potential mitigation for the BSPP project area. The results of these negotiations- including a description of the processes, outcomes, and issues- will be formalized in a Programmatic Agreement (PA), as required by Section 106 of the National Historic Preservation Act, and included in the Bureau of Land Management's (BLM) Final Environmental Impact Statement (FEIS) for the BSPP
				Consult for tribal cultural resources per Section 106 of the NHPA	**SA Section C.3 Cultural Resources and Native American Values:** Coordination is required per applicable LORS. Interaction with tribal governments takes place in a formal government-to-government consultation process. As representative of the federal government, BLM is the lead agency in this consultation. As a state agency, the Energy Commission does not a have a role. BLM is currently in the process of consulting with local Native American groups regarding impacts and potential mitigation for the BSPP project area. The results of these negotiations- including a description of the processes, outcomes, and issues- will be formalized in a Programmatic Agreement (PA), as required by Section 106 of the National Historic Preservation Act, and included in the Bureau of Land Management's (BLM) Final Environmental Impact Statement (FEIS) for the BSPP
				Address EO 13007 to avoid adversely affecting the physical integrity of any Indian sacred sites.	**RSA Section C.3 Cultural Resources and Native American Values** Native American groups have not identified any specific sacred sites within the boundaries of the BSPP. However, at least one has been identified nearby. The applicant has demonstrated a good faith effort to avoid this site, and multiple other prehistoric sites by redesigning the proposed facility footprint and linear corridors.
				Evaluate environmental justice populations within geographic scope of project. Address potential for disproportionate adverse impacts.	**RSA Section C.8 Socioeconomics and Environmental Justice:** Environmental justice populations are evaluated in Section

Date Received	Docket #	Commenter	Commenter Type	Comment Summary	Location in RSA and Response
					C.8.4.1 and potential for impacts in Section C.8.4.2.
				Address hazardous waste types and streams, and storage, disposal, and management plans. Address mitigation and applicable LORS.	**RSA Section C.13 Waste Management:** Section C.13.4.2 discusses waste types, disposal, and mitigation. Waste Management Table 2 quantifies waste streams and provides management methods. Table 1 lists applicable federal, state, and local LORS.
				Discuss HTF characteristics, classification, management, and monitoring.	**RSA Section C.13 Waste Management:** HTF is discussed in the Heat Transfer Fluid subsection of Section C.13.4.2. Classification and management requirements are given in Condition **WASTE-8**.
				Describe disposal of solid waste residue from evaporation ponds.	**RSA Section C.13 Waste Management:** Table 2 of Section C.13.4.2 states that solid waste residue would be disposed at properly permitted facilities.
				Strive to address the full product life cycle of parabolic troughs, from raw material extraction to disassembly/recovery for reuse and recycling.	**RSA Section C.13 Waste Management:** The parabolic trough life cycle is not specifically addressed.
				Describe how the project would support or conflict with federal, state, tribal, and local land use plans, policies, and controls.	**RSA Section C.13 Land Use, Recreation, and Wilderness:** Table 2 lists applicable LORS and the basis for whether the project would be consistent with them.

COMMENTS REGARDING A POSSIBLE ENERGY COMMISSION FINDING OF OVERRIDING CONSIDERATIONS

Testimony of Terry O'Brien

Energy Commission staff has identified significant, unmitigable, adverse impacts in Land Use and Visual Resources. Staff has also concluded that the project will not conform with applicable laws, ordinances, regulations, or standards (LORS) in Visual Resources. Staff has been unable to reach a conclusion in Transmission System Engineering due to the lack of the pending Phase II study. There is no feasible mitigation that would reduce the impacts to a level that is less than significant given the scale of the project.

Notwithstanding the unmitigable impacts, consideration needs to be given to the fact that the project is a solar power plant that will help California meet its renewable portfolio standard (RPS) of 33 percent in 2020 and AB 32 greenhouse gas emission reduction goals. As such, it will provide critical environmental benefits by helping the state reduce its greenhouse gas emissions, and these positive attributes must be weighed against the project's adverse impacts. It is because of these benefits and the concerns regarding the adverse impacts that global warming will have upon the state and our environment, including desert ecosystems, that staff believes it would be appropriate for the Commission to approve the project based on a finding of overriding considerations, consistent with CEQA Guideline Section 15093 and section 1755 of the Commission's siting regulations, if the Commission adopts staff's proposed mitigation measures/conditions of certification. Additionally, staff believes it would be appropriate for the Commission to approve the project to find, pursuant to section 1752(k) that the project is required for public convenience and necessity and that there are no more prudent and feasible means of achieving such public convenience and necessity.

Staff's position on the Blythe project should not be read as a blanket endorsement of all solar projects, nor as an indication that we will consistently conclude that it is appropriate for the Commission to adopt overriding considerations for unmitigable significant environmental impacts or LORS nonconformance. Our determinations will be made on a case-by-case basis. As with all electricity infrastructure projects, site selection is a critical factor in determining impacts and staff's position on whether a Commission override is appropriate or warranted.

The fact that the Blythe project site is adjacent to, and in the vicinity of, extensive existing and planned development, (e.g., a state prison, Interstate 10, and existing electricity infrastructure, including major transmission lines, an existing natural gas-fired power plant and other proposed solar power projects), is a significant factor in reaching the conclusion that an override is appropriate in this case.

Energy Commission staff may not support an override for a project in a more remote location. As indicated in its November 19, 2008 Renewable Energy Transmission Initiative comments on the proposed competitive renewable energy zones, staff believes renewable energy development should occur in areas proximate to "existing transmission infrastructure and load centers" and recognizes that it is important to “protect the unique visual resources of the desert and to preserve the special qualities of remoteness and isolation that are inherent in the appeal of desert landscapes.”

One final observation is that, in the future, after several of the new solar power plants have been constructed and have been operational for an appropriate period of time, staff and others will have more information about their collective impacts to evaluate and compare the characteristics of the various solar thermal technologies. Based upon this information, staff will be better informed to determine whether some technologies are preferable from an environmental perspective and will factor that evaluation into our alternatives analysis. Important issues to analyze will include water use, land use (amount of land needed per megawatt of generating capacity), visual impacts, and ground disturbance.

In support of staff’s position for consideration by the Committee, staff requests that notice is taken of the following documents:

1) Climate Action Team Report to Governor Schwarzenegger and the Legislature. CalEPA, March 2006.
2) AB 32 Scoping Plan. CARB, December 2008.
3) Integration of Renewable Resources. CAISO, Nov. 2007.
4) 2007 Integrated Energy Policy Report. CEC, Nov. 2007.
5) 2009 Integrated Energy Policy Report. CEC. Nov. 2009.
6) Draft Final Opinion on Greenhouse Gas Regulatory Strategies: Joint Agency Proposed Final Opinion. CPUC/CEC 2008.
7) Framework for Evaluating Greenhouse Gas Implications of Natural Gas-Fired Power Plants in California. CEC (MRW and Associates). May 2009.

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

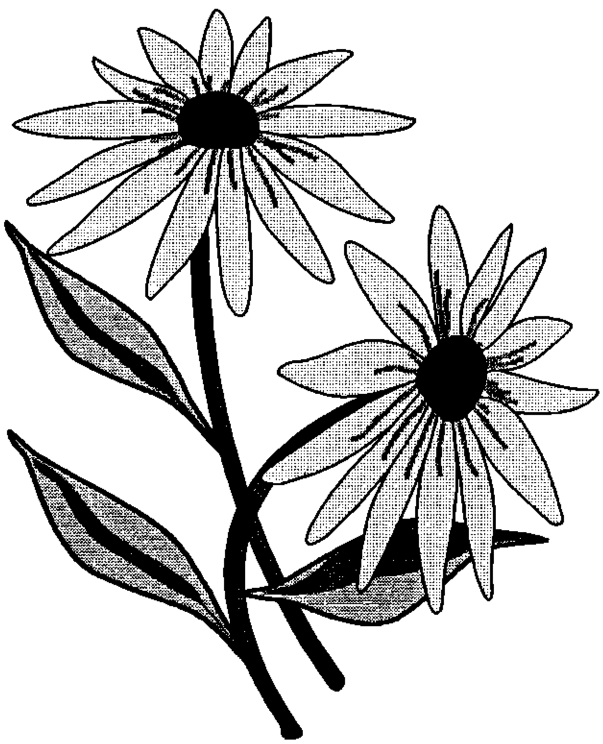
Docket Number: 09-AFC-6 Date: 7/7/10

Project Name: Blythe Solar Power Project

UPDATED STAFF EXHIBIT LIST

Exhibit	Witness	Brief Description	Stipulation	Offered	Admitted	Refused	CEC Use Only
200	Various	Revised Staff Assessment					
201	Various	Energy Commission Staff's Pre-Hearing Conference Statement and Rebuttal Testimony					
202	Various	Supplemental Staff Assessment					
203	Various	Revised Staff Assessment Part 2					
204	Carolyn Chainey-Davis	Special Status Plant Management – BLM Handbook 6840-1					
205	Carolyn Chainey-Davis	Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species					
206	Carolyn Chainey-Davis	NatureServe Conservation Status Assessments: Factors for Assessing Extinction Risk					

Special Status Plant Management



BLM Manual Handbook 6840-1

Table of Contents

H-6840-1 - SPECIAL STATUS PLANT MANAGEMENT

Illustrations

CHAPTER I

I. INTRODUCTION

This handbook provides direction on the management of special status plants. Special status plants are those plant species that are Federally listed as endangered or threatened, officially proposed for Federal listing as endangered or threatened, candidates for Federal listing as endangered or threatened, State listed as endangered, threatened, or rare, or listed as sensitive by the California State Director. The handbook expands on the policy elaborated in BLM Manual 6840 and California BLM Manual Supplement 6840.06 and establishes the procedures to be used in complying with that policy.

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CHAPTER II

II. PROCESS FOR DESIGNATING SENSITIVE PLANT SPECIES OR RECOMMENDING CHANGES IN STATUS

A. Designating Plant Species as Sensitive.

Pursuant to BLM Manual 6840 and California Manual Supplement 6840.06, the California State Director may designate plant species that do not fall into any of the other categories of special status species as sensitive species. Sensitive species are to be given the same level of protection as Federal candidate species. By policy (BLM Manual Supplement 6840.06) all plant species on List 1B (Plants Rare, Threatened, or Endangered in California and Elsewhere) of the most recent edition of the California Native Plant Society's *Inventory of Rare and Endangered Plants of California* that are on BLM lands or affected by BLM actions and that do not fall into one of the other categories of this section are designated as sensitive species in California. Exceptions are any such List 1B species that the State Director has specifically removed from the sensitive species list (see II.B. below). Other plant species may be designated as sensitive in accordance with the following procedure.

1. Requests to add plant species to the sensitive species list must be submitted in writing to the State Director. The requests must demonstrate clearly that designation of the species as sensitive is warranted. The request must be based on biological information for the species and its habitat and should detail threats or potential threats to the species and its habitat. The request must also detail how the special management afforded by designation will help the species.

2. Following review by the State Director the species is either designated as sensitive through Instruction Memorandum or California Manual Handbook Supplement or the request for designation is denied, in which case the State Director documents the reasons for denial in a memorandum to the District or Area Manager who initiated the request.

B. Removing Plant Species from the Sensitive Species List.

1. District and Area Managers may request that a plant species be removed from the sensitive species list. Such requests must be accompanied by evidence that demonstrates the species clearly does not merit sensitive species status. Requests must be based on biological information on the species and its habitat.

2. Following review by the State Director the species is either removed from the sensitive species list through Instruction Memorandum or California Manual Handbook Supplement or the request for removal is denied, in which case the State Director documents the reasons for denial in a memorandum to the District Manager or Area Manager who initiated the request.

C. Recommending Other Changes in Status.

1. Petitions to the Fish and Wildlife Service (FWS) to list or delist plant species.

a. Guidelines for petitioning the FWS to list or delist species are found in BLM Manual 6840.22B.

b. Only the State Director may submit petitions to FWS. District and Area Managers may request the State Director to submit a petition to list or delist a species. This request must be based solely on biological information on the species and its habitat and must address the five factors for listing included in section 4 of the Endangered Species Act (ESA). These factors are:

1). The present or threatened destruction, modification, or curtailment of its habitat or range.

2). Overutilization for commercial, recreational, scientific, or educational purposes.

3). Disease or predation.

4). The inadequacy of existing regulatory mechanisms.

5). Other natural or manmade factors affecting its continued existence.

c. Following review by the State Director the petition is either submitted to the FWS, with a copy of the transmittal memorandum forwarded to the District or Area Manager who submitted the request, or the request for petition is denied, in which case the State Director documents the reasons for denial in a memorandum to the District or Area Manager who initiated the request.

2. Requests to FWS to add or remove species from the list of candidate species.

a. The FWS periodically publishes in the *Federal Register* lists of species that are candidates for listing as threatened or endangered. This list changes depending on new information received by the FWS. The BLM may submit information on the status of candidate species and request that species be added to or removed from the candidate list as appropriate.

b. Only the State Director may submit requests to the FWS to add or remove species from the list of candidate species. District and Area Managers may request the State Director to submit a memorandum to the FWS to add or remove a species from the candidate species list. This request must be based solely on biological information on the species and its habitat and must address the five factors for listing included in section 4 of the Endangered Species Act and listed under II.C.1.b., above.

c. Following review by the State Director the request is either submitted to the FWS, with a copy of the transmittal memorandum forwarded to the District or Area Manager who submitted the request, or the request for change in candidate status is denied, in which case the State Director documents the reasons for denial in a memorandum to the District or Area Manager who initiated the request. The procedure for revising critical habitat designation is similar to the procedure for listing or delisting species.

3. Petitions to the State of California, Fish and Game Commission, to list or delist species.

a. Pursuant to the California Endangered Species Act, the BLM may submit petitions to the State of California, Fish and Game Commission, to list or delist a species.

b. Only the State Director may submit petitions to the Fish and Game Commission. District and Area Managers may request the State Director to submit a petition to list or delist a species. This request must include information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors deemed relevant.

c. Following review by the State Director the petition is either submitted to the Fish and Game Commission, with a copy of the transmittal memorandum forwarded to the District or Area Manager who submitted the request, or the request for petition is denied, in which case the State Director documents the reasons for denial in a memorandum to the District or Area Manager who initiated the request.

CHAPTER III

III. INVENTORY

A. Policy.

It is BLM policy to conduct inventories to determine the occurrence and status of all special status plant species on lands managed by BLM or affected by BLM actions. This includes pro-active inventories directed toward developing plans or determining the status of plant species, as well as inventories conducted to determine the impacts of BLM planned or authorized actions on any special status plants that might be within the area of a proposed project. Such inventories are to be conducted at the time of year when such plant species can be found and positively identified.

B. Definition and Purpose.

1. Inventory is the periodic and systematic collection of data on the distribution, condition, trend, and utilization of special status plant species (BLM Manual 6600).

2. Inventories are conducted for many reasons, including:

a. To determine the conservation status of a plant species.

b. To develop plans, including resource management plans, recovery plans, species management guides, habitat management plans, coordinated resource management plans, and others.

c. To ensure compliance with the National Environmental Policy Act and the Endangered Species Act by having sufficient information available to adequately assess the effects of proposed actions on special status plants. Assessments of the effects of these actions are documented in biological assessments (if the project involves Federally listed species and qualifies as a "major construction activity" as defined by the ESA) or biological evaluations (for projects involving other special status species and/or not qualifying as a major construction activity). See Section V. (Biological Assessments and Biological Evaluations).

d. To serve as a baseline for monitoring.

3. The specific objectives of an inventory can vary depending on the purpose for the inventory. For example, an inventory may seek to:

a. Locate all populations of a single rare plant species. This would be a logical objective if the purpose of the inventory is to determine the conservation status of a plant species or to develop a species management guide or habitat management plan.

b. Locate all populations of all special status plant species in one location. This would be the objective if the purpose of the inventory is to prepare a biological assessment or biological evaluation on the effects of a proposed action on all of the special status species in the project area.

c. Provide some measure of the viability of each population of a special status plant, either throughout the species' range or in a smaller area such as a proposed project area. For example, the inventory may seek to determine:

1). Numbers of genets or ramets of the special status plant within each population.

2). Numbers of plants by age or reproductive class (vegetative, flowering, fruiting).

3). Associated species.

4). Associated habitat features.

5). Visual disturbances/Current and potential threats.

C. Timing and Intensity of Inventory.

1. Prior to conducting inventories, two valuable sources (RareFind and the California Native Plant Society Electronic Inventory) should be researched to see if special status species are already known from the area. Inventories must be timed so that target plant species can both be located in the field and positively identified. Inventories conducted to determine the conservation status of individual species or to develop activity plans for individual species can easily be scheduled in advance. Inventories to determine the occurrence of *all* special status plant species in a given area (e.g., project area, planning area) are more problematic. Ideally the inventory can be scheduled in such a way that it will detect all such species present. There may be situations, however, when a single inventory at one point in time will not suffice (for example, when one special status plant species suspected of occurring in the area to be inventoried can only be found and identified in April, and another can only be located and identified in August). In these cases a second inventory effort must be scheduled. The second inventory, however, may be facilitated by the first, if potential sites for the late-flowering species are flagged during the

first inventory. If sufficient information is available on the habitat requirements of potentially occurring species (substrate, plant community, etc.), and the site in question is believed to be unsuitable for those species, a field visit should still be conducted to verify and document the reasons for believing the species to be absent. Ideally, prior to inventory known populations of the target species that occur in similar habitat conditions should be visited to determine growth conditions and phenology. The absence of certain species in the pre-survey may indicate that those species would not be apparent in the project area survey.

2. Intensity of inventory should be tied to the objectives of the inventory. If the objectives are to determine the conservation status of a single species, the inventory would likely focus on finding as many occurrences of the species as possible. Inventory efforts could be focused in only those areas and those habitats with the highest probability of finding the target species. If many occurrences are found through such an inventory effort, searching less likely habitat would be unnecessary. If, however, few occurrences are located, the decision might be made to expand the inventory to areas considered less likely to harbor the species. Intensity of inventories conducted to assess the impacts of BLM initiated or authorized actions must be based on both the probability of a special status plant occurring within the project area and the degree of habitat disturbance expected to result from the action. This is covered under III.E., below.

D. Qualifications of Personnel Conducting Inventories.

1. Ideally, all personnel conducting inventories for special status plants should have strong backgrounds in plant taxonomy, plant ecology, field sampling design and methods, and knowledge of the floras of the area to be inventoried. Such qualifications help to ensure that all special status plants occurring in the area to be inventoried will be located, including those that were not predicted to occur at the start of the inventory.

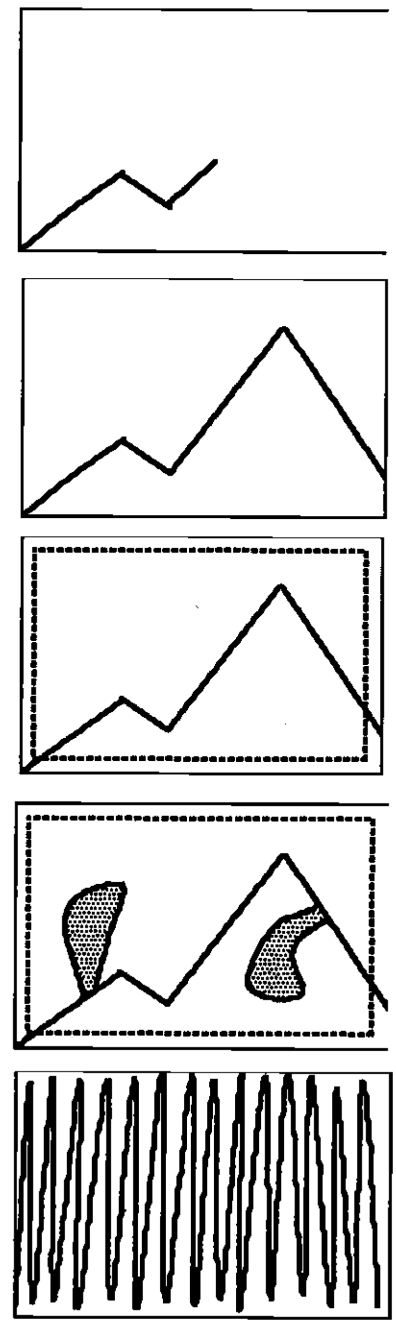
2. Focused inventories for one or a few species may be conducted by personnel not possessing all of the qualifications discussed above, as long as these personnel are adequately trained in the identification of the target species.

3. Non-BLM personnel conducting inventories on the public lands must meet the qualifications outlined in III.D.1., above. This is particularly important for inventories conducted to evaluate the impacts of projects on special status plants (see III.E., below).

E. Inventories to Ensure Compliance with the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), and BLM Policy.

1. Five intensity levels of inventory are recognized for the purpose of complying with NEPA, the ESA, and BLM policy. These are described and illustrated in Figure III-1.

Figure III-1. Plant Inventory Intensity Levels



1. Field Check. The surveyor gives the area a quick "once-over" but does not walk completely through the project area. The entire project area has not been examined.

2. Cursory. The surveyor gives the area a quick "once-over" by walking through the project area. The entire project area has not been examined.

3. General. The surveyor gives the area a closer look by walking through the project area and perimeter or by walking more than once through the area. Most of the project area is examined.

4. Intuitive Controlled. The surveyor has given the area a closer look by conducting a complete inventory of a specific area after walking through the project area and perimeter or by walking more than once through the area. Most of the project area is examined.

5. Complete. The surveyor has walked throughout the project area until all of the area has been examined.

2. The minimum level of inventory required is a function of two factors: 1) the probability of occurrence of special status plants in the project area and 2) the level of habitat disturbance associated with the proposed action. Both of these factors are ranked as "Low," "Medium," or "High," based on the criteria given in Figure III-2. and Table III-1. The minimum level of inventory required is then determined by Table III-2.

Note that these are *minimum* levels of inventory. A more intensive inventory may be performed. If special status plant species are located during the inventory, a complete inventory must be conducted of the plant location(s) and potential habitat areas.

Also note that for Federally listed plant species, the minimum levels of inventory given above may not be adequate to make a "no effect" determination. Only if the BLM has determined that there is no probability of a listed plant occurring within the project area or has performed either a complete or intuitive controlled inventory with negative results can a "no effect" determination be made. A finding of "no probability" can be based on the project area's lying outside the known range of a listed plant species or on the fact that there is absolutely no suitable habitat for the species in the project area. Otherwise, the BLM must obtain the concurrence of the FWS that the minimum inventory level for a listed plant is adequate for a specific project.

Figure III-2. Probability of occurrence of special status plant species.

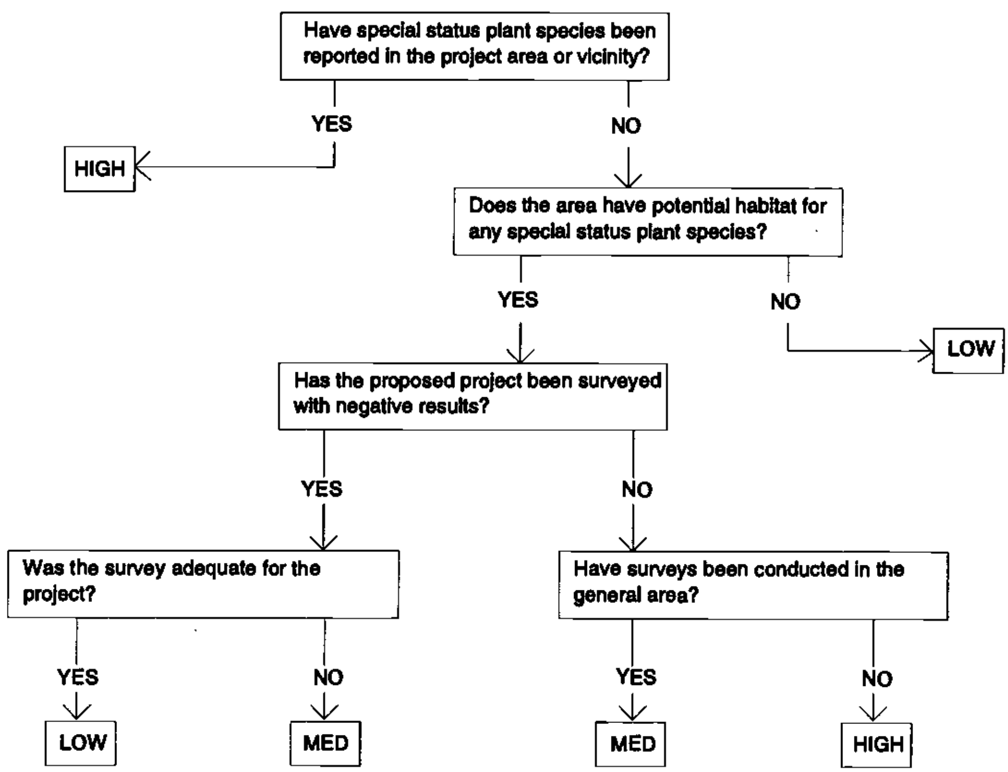


Table III-1. Potential for site disturbance from various actions.

Type of Project	Habitat Disturbance Level
Forest Management	
Large green sales (>500 mbf)	High
Small green sales (<500 mbf)	Medium to High
Salvage sales	Low to High depending on intensity
Commercial thinning sales	Medium to High
Rotary axe cutting (low ground pressure)	Low to Medium
Chainsaw cutting site prep & release	Low
Tractor piling	High
Chemical site prep & release (spot spray)	Low
Vegetation treatment (brush spraying, burn, etc.)	Medium to High
Ripping site prep	High
Cutting and grubbing release (normally 24" spot around tree)	Low
Planting	Low
Hand Piling	Low
Pile burning	Low
Broadcast or underburning	Low to Medium
Firewood cutting/green	Low to Medium
Firewood cutting/dead	Low to Medium
Road Construction and Maintenance	
Road construction	High

Type of Project	Habitat Disturbance Level
Road maintenance	Low
Grazing Management	
Grazing permits/leases	Low to High depending on vulnerability of particular plant species
Fences	Low
Cattleguards	Low
Seedings	High
Vegetation treatments	Medium to High
Windmills	Low (for project construction; concentrated grazing that may result in vicinity of troughs Medium to High)
Water pipelines	Low to Medium (for project construction; concentrated grazing that may result in vicinity of troughs Medium to High)
Spring developments	Low to High
Reservoirs	High
Recreation Management	
OHVs - play use	Medium to High
OHVs - ancillary use	Low
Facility construction	High
Back country use (hiking, mountain biking, horseback riding, hunting, river running, etc.)	Low
Facility maintenance	Low
Toilet or minor facility placement	Low

Type of Project	Habitat Disturbance Level
Cultural Resource Management	
Subsurface data recovery - sampling	Low (coring) to Medium (trenching)
Subsurface data recovery - 100 percent	High
Public Land Disposals	High
Rights-of-Way Permits	
Gas/Oil pipelines	Medium to High
Buried cables	Medium to High
Transmission lines	Medium to High
Wind energy development	High
Hydro development	Medium to High
Communication sites	High
Access/with road construction	High
Access/existing road	Low
Desert land entries	High
Fire Management	
Fire breaks - Tractor	High
Fuel breaks - Shaded (cut & burn)	Low to Medium
Prescribed burning	Low to High
Fire rehabilitation	Low to High
Retardent drops	Low to Medium

Type of Project	Habitat Disturbance Level
Mineral Resource Management	
Fluids (Oil and Gas and Geothermal)	
Surface use plans for applications for permits to drill (APDs)	High
Surface use plan amendment	High
Sundry notices	Low to High
Geophysical exploration	Low to High
Pipelines	Low to High
Transmission lines	Medium to High
Power plant site	High
Solids	
Mining notices (43 CFR 3809)	Medium to High
Mining plans of operation (includes all forms of hardrock exploration and development)	Medium to High
Exploration plan for mineral material (43 CFR 3600)	Low to Medium
Exploration plan for hardrock leasing	Medium to High
Exploration plan for acquired lands (43 CFR 3500)	Medium to High
Soil Sampling	Low (coring) to High (trenching)

Type of Project	Habitat Disturbance Level
Wildlife Management	
Guzzlers	Low
Wildlife reintroductions	Low
Chaining	Low to High
Stream restoration	Low to High
Wetland restoration	Low to High

Table III-2. Determining minimum intensity of inventory based on habitat disturbance level and probability of occurrence of special status plants.

Habitat Disturbance Level	Probability of Occurrence	Minimum Intensity of Inventory
High	High	Complete or Intuitive Controlled
Medium	High	Complete or Intuitive Controlled
High	Medium	General
Low	High	General
High	Low	Field Check
Medium	Medium	Cursory
Low	Medium	Cursory
Medium	Low	None
Low	Low	None

3. Many special status plant inventories of public lands conducted to assess the impacts of a project are performed by consultants hired by project proponents. These inventories must meet or exceed the intensity level demanded by the project (III.E.2., above). Personnel conducting the inventory must meet the qualifications outlined in III.D.1., above. In order for the BLM to adequately determine the quality of such third party inventories the following information is required from the consultant or project proponent (these are adapted from the recommendations of the California Native Plant Society [CNPS] and the California Department of Fish and Game as given in CNPS's *Inventory of Rare and Endangered Vascular Plants of California*, Fourth Edition, February, 1994):

a. Project description, including a detailed map of the project location and study area.

b. A written description of the biological setting, referencing the plant community nomenclature used and a vegetation map.

c. A detailed description of the inventory methodology, including maps showing areas actually searched.

d. The dates of field visits.

e. The results of the inventory, including detailed maps.

f. An assessment of potential impacts.

g. A discussion of the importance of any special status plant occurrences found, with consideration for other nearby occurrences, and the distribution of the species as a whole.

h. Recommended mitigation measures to reduce impacts.

i. A complete list of *all* plant species (not just special status species) identified within the project area.

j. Copies of all Field Survey Forms, for all special status plant occurrences found, or Natural Community Field Survey Forms, for any unusual communities found (these forms are discussed in detail under III.F., below).

k. The name(s) and qualifications of the persons conducting the inventory.

l. A list of references cited, persons contacted, and herbaria visited.

m. Note whether voucher specimens (where their collection will not adversely impact special status plants) of special status species were deposited in a major herbarium.

F. Documenting the Results of Inventory.

1. The results of special status plant inventories should be well documented. This documentation must include, as a minimum, the completion and submission of Field Survey Forms and mapped occurrences on xeroxed 7.5' topos for all special status plants found by BLM personnel or consultants. Occurrences are defined by CNDDB as being separated from other plant locations by 1/4 mile. These forms are submitted to the California Natural Diversity Data Base (CNDDB) at the following address:

California Department of Fish and Game
Natural Heritage Division
Natural Diversity Data Base
1416 9th Street
Sacramento, CA 95814

Copies of the Field Survey Form are available from the CNDDB at the same address. They will also provide xeroxed parts of topo maps if needed. An example of the form is given as Illustration 1.

2. If the inventory discovers any unusual plant communities, a Natural Community Field Survey Form must be completed for each such community and sent to the CNDDB at the above address. Illustration 2. is an example of this form.

3. A written report documenting results should be prepared for most inventories. Such a report should include the following:

a. Detailed maps of the areas inventoried and the special status plants and unusual plant communities found. Base maps used should be 7½ minute USGS quadrangles. Such information should be entered into a geographical information system (GIS) at the earliest opportunity. Global positioning systems, if available, can be used to accurately determine locations of occurrences and to record these for input into GIS.

b. Written descriptions of the areas inventoried, including the plant communities present.

California Native Species Field Survey Form

ILLUSTRATION 1

Mail to:
Natural Diversity Data Base
California Department of Fish and Game
1416 Ninth Street, 12th Floor
Sacramento, California 95814

For office use only

Source Code ____________ Quad Code ____________

Elm Code ____________ Occ # ____________

Copy to ____________ Map Index # ____________

Date of field work ____ mo ____ day ____ year

Scientific Name:

Common Name:

Species Found? ☐ yes ☐ no ____________ *If not, why?*

Total # Individuals ______ Subsequent visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? ______ Yes, Occ. # ☐ no ☐ unk.

Collection? If yes: ______ number ____________ Museum/Herbarium

Reporter: ____________

Address: ____________

Phone: ( ) ____________

Plant Information

Phenology: ______ % vegetative ______ % flowering ______ % fruiting

Animal Information

Age Structure: ______ # adults ______ # juveniles ______ # unknown

☐ nesting ☐ breeding ☐ foraging ☐ wintering ☐ roosting ☐ burrow site ☐ other

Location (Please also attach or draw map on back.)

County: ____________ Landowner/Mgr: ____________

Quad Name: ____________ Elevation: ______ UTM: ____________

T ____ R ____ ¼ of ____ ¼ Sec ____ T ____ R ____ ¼ of ____ ¼ Sec ____

Habitat Description (Plant communities, dominants, associates, substrate/soils, aspects/slope)

Other rare spp.?

Site Information Overall site quality: ☐ Excellent ☐ Good ☐ Fair ☐ Poor

Current/surrounding land use:

Visible disturbances, possible threats:

Comments:

Determination: (Check one or more, fill in the blanks)
___ Keyed in a site reference: ____________
___ Compared with specimen housed at: ____________
___ Compared with photo/drawing in: ____________
___ By another person (name): ____________
___ Other: ____________

Photographs: (Check one or more)	Slide	Print
Plant/animal	___	___
Habitat	___	___
Diagnostic Feature	___	___

May we obtain duplicates at our expense? ☐ Yes ☐ No

California Natural Community Field Survey Form

ILLUSTRATION 2

Mail to:
Natural Diversity Data Base
California Dept. of Fish and Game
1416 Ninth Street
Sacramento, CA 95814
(916) 324-6857

For office use only

Source Code________ Quad Code________

Community Code________ Occ #________

Map Index #________ Update Y______ N______

Please provide as much of the following information as you can. Please attach a map (if possible, based on the USGS 7.5 minute series) showing the site's location and boundaries. Use the back if needed.

Community name:________

Reporter:________ Phone________

Affiliation and Address________

Date of field work:________ County:________

Location:________

Quad name:________ T____ R____ ____ ¼ of____ ¼ sec____ Meridian________

UTM Zone __ __ Northing __ __ __ __ __ __ __ Easting __ __ __ __ __ __

Landowner/Manager:________ Photographs: Slide ☐ Print ☐

Elevation:________ Aspect:________ Slope (indicate % or °)________ Drainage:________

Site acreage:________ Evidence of disturbance/threats:________

Current land use:________

Substrate/Soils:________

General description of community:________

Any Special Plants or Animals present:________

Successional status/Evidence of regeneration of dominant taxa:________

Overall site quality: Excellent____ Good____ Fair____ Poor____ Comments:________

Basis for report: Remote image____ Binocular/Telescopic survey________

Windshield survey____ Brief walk-thru____ Detailed survey____ Other________

Relevé: In the space below, indicate each species cover % within the following growth form categories:

Trees	Shrubs	Herbs/Graminoids

Continue on back if needed. Thank you for your contribution.

CHAPTER IV

IV. MONITORING.

A. Monitoring Priority

1. Although all species should be monitored at some level, some species require more intensive monitoring than others. Decisions on prioritizing sensitive species for monitoring should be based upon degrees of rarity, existing threats, and potential conflict. Existing threats include management actions, declining or widely fluctuating populations, and poor or changing habitat. Potential conflict should take into account future management actions and Bureau/public interest.

2. The following rating system is for determining monitoring priority for listed and proposed plant species. If a species is included in an existing activity plan that calls for a certain level of monitoring, then its rank should be increased as needed. Note that these are minimum monitoring standards. More intensive and/or more frequent monitoring may be required for particular plant species and situations.

Level of existing threats on BLM land

2 pts	high
1 pt	medium
0 pts	low

Number of known occurrences on BLM land

2 pts	< 5 occurrences
1 pt	6-20 occurrences
0 pts	> 20 occurrences

Degree of potential conflict

2 pts	high
1 pt	medium
0 pts	low or absent

RATING	MINIMUM MONITORING LEVEL
5 or 6 points	Annual quantitative monitoring*
3 or 4 points	Quantitative monitoring every three years*
1 or 2 points	Fill out Field Survey Form every five years

* Quantitative monitoring is more time-consuming and expensive than qualitative monitoring, but is usually appropriate for high priority listed and proposed plant species. In some cases, however, qualitative monitoring may not be appropriate even for these high priority species. There may be situations, for example, where the physical act of quantitative monitoring may have unacceptable adverse effects on a population. Decisions not to conduct quantitative monitoring on these high priority plant species should be documented in writing and approved by the State Director.

Demographic monitoring is the most intense level of monitoring because it involves marking and tracking the fate of individuals through time. For those high priority plant species that are amenable to demographic monitoring (these are typically perennial plants without long-lived seedbanks), the use of demographic techniques should be strongly considered because they allow for more powerful evaluations of the effects of management decisions on the viability of these plants.

B. Quantitative Monitoring Studies

1. Quantitative monitoring studies require that some attribute of the target plant species be *measured*. Often this means that the number of individuals is counted (either in total or by size class), but it can also mean that the size (height, cover, or both) of individual plants is measured or that the number of flowers and or seeds is counted.

2. It is possible to take *all* of the possible measurements at a given site (for example, the observer is interested in determining the change over time in the number of plants at a site and *all* of the plants at the site are counted each time the site is monitored). In this case no statistical analysis is required and any change observed is real (assuming no measurement errors occur).

3. Often it is not feasible or efficient to take all of the possible measurements and *sampling* is required. When this is the case, some form of *random* sampling must be used and

the data subjected to statistical analysis.

4. It is vital that a monitoring study plan be developed for each plant species monitored. The study plan, at a minimum, needs to include the following components:

a. Species and sites to be monitored

b. Management objectives

c. Monitoring objectives

d. Actions to be taken if management objectives are not met.

e. Study design

f. Method of analysis

5. The study plan should be circulated for review among co-workers, managers, other botanists, and other interested parties prior to conducting the monitoring.

6. The results of each monitoring study should be documented in periodic (ideally annual) reports. A non-technical summary report should be prepared for managers and the public. A technical report should be prepared and circulated to botanists and other interested specialists.

7. Refer to the BLM Technical Reference on Monitoring Special Status Plants for critical information on designing effective monitoring studies.

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CHAPTER V

V. BIOLOGICAL ASSESSMENTS AND BIOLOGICAL EVALUATIONS.

A. Biological Assessments.

A Biological Assessment is required for "a construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in the National Environmental Policy Act." (50 CFR 402.02). A Biological Assessment is a document that evaluates the potential effects of the action on listed and proposed species and designated or proposed critical habitat. The primary purpose of the Biological Assessment is to determine whether any listed species or designated critical habitats are likely to be adversely affected by the action and whether formal Section 7 consultation or conference is necessary. If only proposed species or proposed critical habitat occur in the project area then formal consultation is not required, although conference may be required. Guidance concerning the subjects to be addressed in the Biological Assessment is provided in 50 CFR 402.12(f). A species list is required for all Biological Assessments. The species list for the project area can be obtained from the Service, or a list of species may be provided to the Service for written concurrence. The Assessment must identify and evaluate effects on all listed and proposed species that may occur in the project area. The Biological Assessment should be initiated within 90 days after receipt of the species list, and completed within 180 days after receipt. If this timeframe is exceeded, an updated species list should be requested or submitted.

B. Biological Evaluations

Biological Evaluations are similar to Biological Assessments, however there is no 180 day timeframe and the Evaluation can be in the form of a report or other document. Biological Evaluations are prepared for any actions that are not major construction activities but are within the range of listed or proposed species or designated critical habitats. They are also prepared to evaluate the effects of actions on other special status plant species. The only difference between these two types of Biological Evaluation is that Biological Evaluations concluding that an action may affect a listed or proposed species (or critical habitat) are forwarded to the FWS as part of a Section 7 consultation or conference, whereas Biological Evaluations concluding that an action may affect other special status plants are not part of a formal consultation or conference with the FWS. Biological Evaluations that conclude that an action is likely to adversely affect a candidate plant species must be sent to the FWS as part of a request for technical assistance (see BLM Manual 6840.06C3) in order to receive FWS concurrence that the action will not contribute to the need to list. For actions affecting Federally listed or proposed species, Biological Evaluations should contain the same level of detail as Biological Assessments. For other special status plants Biological Evaluations may not require the same level of detail depending on the nature of the action, but the information described below should be used as a guide.

C. General

The documentation of project effects on special status plant species that is normally provided in a separate and distinct document (Biological Assessment or Biological Evaluation) may be consolidated into a NEPA document, provided that (for listed or proposed plants or critical habitat) all of the substantive and information requirements of Section 7 of the ESA are met. See 50 CFR 402.06 for details concerning how the consultation, conference, and biological assessment procedures may be coordinated with other environmental reviews. While there are no strict requirements for Biological Assessments and Evaluations, the following information should be included. For more guidance concerning the contents of Biological Assessments, refer to 50 CFR 402.12(f). See Figure V-3. for information on the steps required for Biological Assessments/Evaluations.

1. Description of Proposed Action

This should include the project location, a map of project area, and a description of the project and when it will occur.

2. Prefield Review

This section should include a list of all potential special status plant species in the project area and their potential habitat areas, the identification and description of any occupied habitats or potential habitats that are unoccupied, and a discussion of any past reports or surveys of the project area.

3. Field Reconnaissance

Describe the survey methods and results.

4. Analysis and Recommendations

Give an analysis of the effects of the action (or of each project alternative) that would directly, indirectly, or cumulatively affect the species, plus an analysis of the effects of interdependent actions (e.g. construction of a road and maintenance of the road) on listed species and critical habitat.

Findings of "no effect" do not require written concurrence from FWS, but a copy of the Biological Assessment or Biological Evaluation should still be provided.

Findings of "beneficial effect" must have written concurrence from FWS and possible formal consultation.

Findings of "not likely to adversely affect" require the written concurrence of FWS and usually an informal consultation.

Findings of "may adversely affect" require formal section 7 consultation with FWS unless the proposed action can be modified before consultation is initiated.

For proposed species or critical habitat, findings of "may adversely affect" require a "conference" with FWS.

5. Recommendations

Specific recommendations for eliminating or compensating for any adverse effects (for each project alternative) should be included, such as timing or access restrictions. These recommendations may be developed with the help of FWS in an informal consultation.

6. References

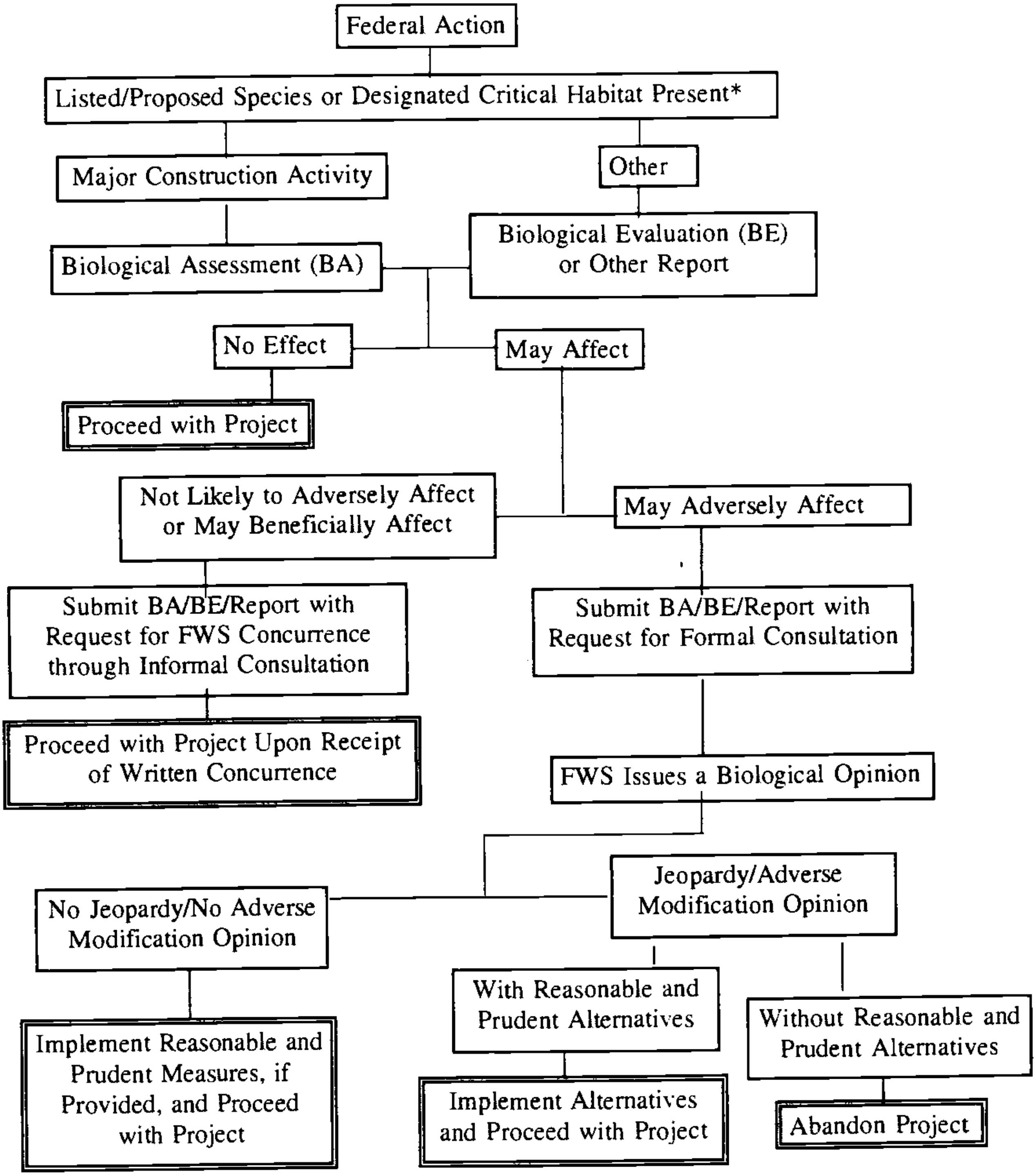
Include all contacts, contributors, literature, etc.

D. Biological Opinions

After receiving and analyzing the Biological Assessment or Biological Evaluation FWS will issue a Biological Opinion as to whether there will be "jeopardy" to the species or "adverse modification" to critical habitat. Most findings of "jeopardy" are accompanied by reasonable and prudent alternatives that would allow the project to proceed. If no reasonable and prudent alternatives can be agreed upon, the proposed project must be abandoned. While Federal agencies, the Governor, or a permit or license applicant may apply for an exemption for an agency action, this has rarely been done in the past.

FWS often includes Conservation Recommendations with a Biological Opinion that concludes there will be no jeopardy to the species. Although these are not binding, it is BLM policy to implement all of these recommendations unless there are compelling reasons not to do so. These reasons should be committed to writing and a copy forwarded to the State Director. Unlike animals, there are no incidental take provisions for plants under the ESA.

Figure V-3. Flow chart for Biological Assessments/Evaluations



*Assume the species is present if its habitat is present. Remember that for many plant species, especially annuals, surveys can only prove presence - not absence. Always consider potential impacts to a species if its habitat is present.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

California State Office

Release 6-25	Date 4/15/96

Subject H-6840-1 - Special Status Plant Management

1. Explanation of Material Transmitted: The material contained in this Handbook complements Manual 6840 and gives guidance for the management of Special Status Plants in California.

2. Reports Required: None.

3. Material Superseded: None.

4. Filing Instructions: File as directed below.

REMOVE:	INSERT:
None	H-6840-1
	(Total: 18 sheets, double-sided)

Al Wright
ASSOCIATE STATE DIRECTOR

Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species

Policy

It is BLM policy to conduct inventories to determine the occurrence and status of all special status plant species on lands managed by BLM or affected by BLM actions. This includes pro-active inventories directed toward developing plans or determining the status of plant species, as well as inventories conducted to determine the impacts of BLM planned or authorized actions on any special status plants that might be within the area of a proposed project. Such inventories are to be conducted at the time of year when such plant species can be found and positively identified.

Definition and Purpose

Inventory is the periodic and systematic collection of data on the distribution, condition, trend, and utilization of special status plant species (BLM Manual 6600).

Inventories are conducted for many reasons; however, for the purpose of this document only one inventory “reason” is addressed:

> To ensure compliance with the National Environmental Policy Act and the Endangered Species Act by having sufficient information available to adequately assess the effects of proposed actions on special status plants. Assessments of the effects of these actions are documented in biological assessments (if the project involves Federally listed species and qualifies as a "major construction activity" as defined by the ESA).

Special status plants include plant taxa that are Federally listed as threatened and endangered, proposed for Federal listing, candidates for Federal listing, State listed as rare, threatened, or endangered, or BLM sensitive species. All plant species that are currently on List 1B of the California Native Plant Society’s Inventory of Rare and Endangered Plants of California (http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi), are BLM sensitive species, along with others that have been designated by the California State Director. BLM is party to a Memorandum of Understanding with the California Department of Fish and Game to collect information for inclusion in the California Natural Diversity Data Base. Therefore, in addition to inventorying for plants formally recognized as special status species by BLM, contractors must also inventory for all plant, lichen, and fungi species recognized as “special” by the California Natural Diversity Data Base (http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPPlants.pdf). Although the following discussion uses the term “special status plants,” it should be interpreted to mean all of the plant taxa discussed above.

The inventory requirements below apply to energy rights-of-way applications on Federal lands managed by the BLM in California and northwestern Nevada. Projects that include State or private lands or require State approval will likely also require conformance with the rare plant survey guidelines of the California Department of Fish and Game (http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/guideplt.pdf).

Timing and Intensity of Inventory

Before conducting inventories, contractors for BLM or energy companies should research three valuable sources to see if BLM special status species are known from the project area: the California Natural Diversity Data Base (CNDDB), CALFLORA, and the Biogeographic Information & Observation System (BIOS). However, CNDDB and BIOS are positive occurrence databases only, the lack of data should not be used as verification that the species does not exist in a given location. Inventories must be timed so that contractors can both locate and positively identify target plant species in the field. Inventories must be scheduled so that they will detect all special status species present. A single inventory on a single date will seldom suffice. For example, when one special status plant species suspected to be in the inventory can only be found and identified in April and another species can only be located and identified in August, at least two inventories are necessary. The first inventory can facilitate the second and/or third inventory, however, if potential sites for the late-flowering species are flagged during the first inventory. If sufficient information is available on the habitat requirements of potentially occurring species (substrate, plant community, etc.), and the site in question is believed to be unsuitable for those species, a field visit should still be conducted to document and validate the assumptions for believing that the species to be absent. In advance of the project site inventory, contractors should visit known populations of the target species in similar habitat conditions to determine current-year growth conditions and phenology. If, based on these visits to known populations, it appears likely that the project site inventory will fail to detect occurrences because of drought conditions (as may be the case for annual plant species or geophytic plants), BLM may require contractors to perform additional inventories in the following year.

Field Survey - Methodology

Field surveys will be floristic in nature, i.e., the contractor identifies every plant taxon observed in the project area to the taxonomic level necessary to determine rarity and listing status. Surveys will be conducted so that they will ensure a high likelihood of locating all the plant taxa in the project area. Depending on the size of the project area and the heterogeneity of the habitats within the project area, surveys will involve one or a combination of the following survey methods.

Complete Survey

A complete survey is a 100 percent visual examination of the project area (Figure 1) using transects. The length of the transect and distance between transects might change as the topography changes throughout the project area. Transects should be spaced so that all of the area between transects is visible and so that the smallest rare plant expected to occur is visible. The surveyor (1) compiles a species list while traversing the project area and keeps track of the plant community or habitat type where each taxon occurs; (2) maps the locations of all rare taxa encountered using a GPS unit, and (3) fills out a CNDDB Native Species Field Survey Form for each location of each rare taxon encountered.

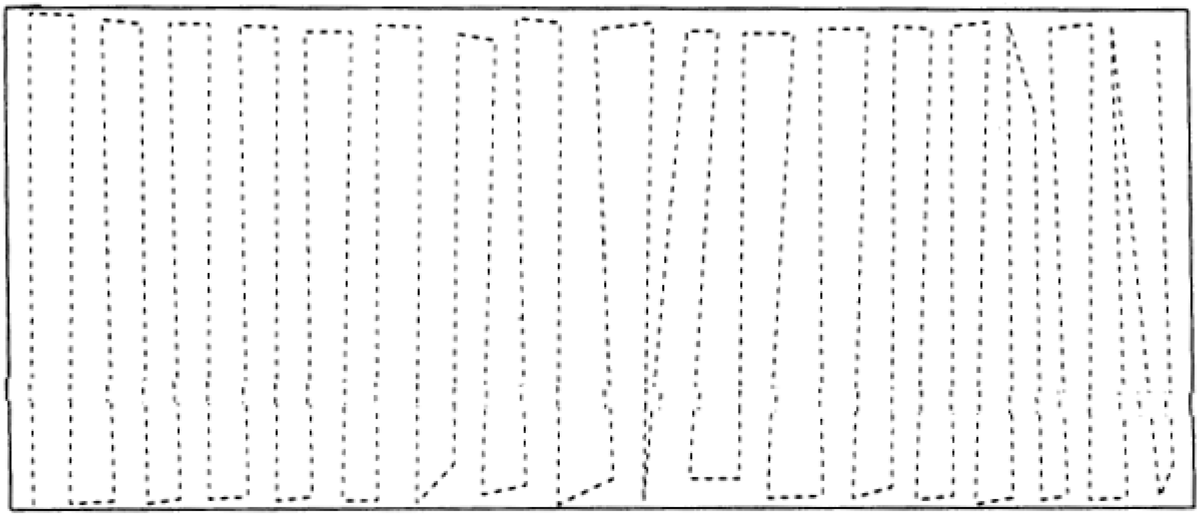


Figure 1. **Complete survey.**

Intuitive Controlled Survey

An intuitive controlled survey is a complete survey of habitats with the highest potential for supporting rare plant populations and a less intense survey of all other habitats present (Figure 2). This type of survey can only be accomplished by botanists familiar with the habitats of all the plant species that may reasonably be expected to occur in the project area. The botanist traverses through the project area enough to see a representative cross section of all the major plant habitats and topographic features. During the survey, the botanist compiles a species list of all plant taxa seen en route and keeps track of the plant community or habitat type where each taxon occurs. The surveyor maps the locations of all rare taxa encountered using a GPS unit and fills out a CNDDB Native Species Field Survey Form for each location of each rare taxon encountered. When the surveyor arrives at an area of "high potential" habitat, s/he surveys that area completely as described above and shown in Figure 1. High potential habitat areas include areas defined in a pre-field review of potential rare plants and habitat and other habitats where a rare species appears during the course of initial field work traversing the project area. Areas within the project area that are not the focus of a complete survey must be surveyed sufficiently so that is the botanist and BLM reasonably believe that few if any additional species would be added to the complete species list for the project area. The report must justify why the botanist did not consider these areas to have a high potential for supporting rare plant species and thus did not subject the area to a complete survey.

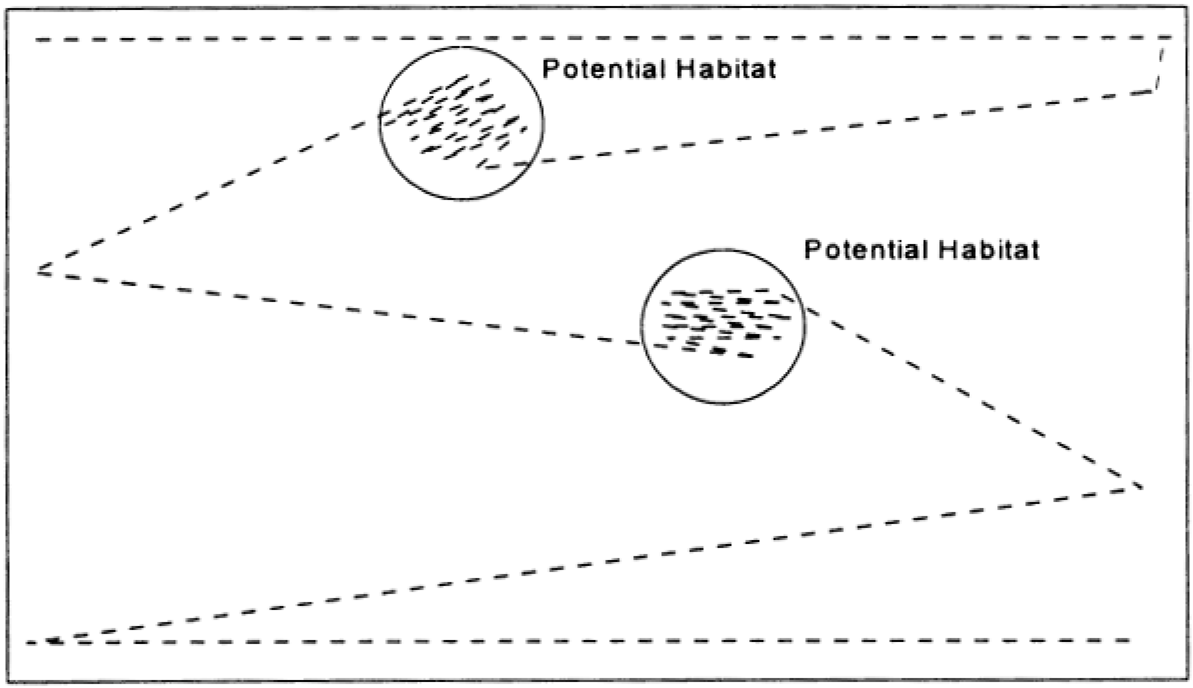


Figure 2. Intuitive Controlled Survey.

Documenting the Results of Inventory

The results of special status plant inventories should be well documented. This documentation must include as a minimum the completion and submission of Field Survey Forms and shapefiles/geodatabases of all special status plants found by BLM personnel or consultants. CNDDB defines occurrences as being separated from other plant locations by 0.25 mile. These forms are submitted to the BLM State Botanist and to the California Natural Diversity Data Base (CNDDB) at the following address:

CNDDB - Dept. of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811

Forms can be submitted electronically at: CNDDB@dfg.ca.gov
Copies of the Field Survey Form are available from the CNDDB at the same address. They will also provide photocopied parts of topo maps if needed.

If the inventory discovers any rare or unusual plant communities,[1] a Natural Community Field Survey Form must be completed for each such community and sent to the CNDDB at the address above.

[1] Rare or unusual plant communities includes those communities marked with asterisks in the most current list of California plant communities recognized by the California Natural Diversity Data Base, available at: http://www.dfg.ca.gov/biogeodata/vegcamp/pdfs/natcomlist.pdf, and Unusual Plant Assemblages as defined in

Most special status plant inventories of public lands conducted to assess the impacts of a project are performed by consultants hired by project proponents. These inventories must meet or exceed the intensity level required for the project by BLM. Personnel conducting the inventory must meet the qualifications outlined in this document. For BLM to adequately determine the quality of third party inventories, the following information must appear in a detailed report to BLM from the consultant or project proponent:

a. Project description, including a detailed map of the project location and study area.

b. A written description of the biological setting, including descriptions of the plant communities found in the project area and a vegetation map. Plant communities should be described and mapped to at least the alliance level using the vegetation classification system of the California Department of Fish and Game (CDFG). A list of the alliances currently recognized by CDFG can be found at: http://www.dfg.ca.gov/biogeodata/vegcamp/pdfs/NaturalCommunitiesList_Oct07.pdf. When the Manual of California Vegetation is published in 2009, the alliances recognized in that document should be used.

c. A detailed description of the inventory methodology, including techniques and intensity of the inventory and maps showing areas actually searched. This will also include areas searched but no special status plants found.

d. The results of the inventory.

e. The dates of the inventory.

f. An assessment of potential impacts and recommended mitigation measures to reduce impacts.

g. Recommended management actions to conserve any special status plants encountered should include both actions the BLM might take, as well as actions that might be taken by the FWS (listing or delisting of T/E plants, changes in candidate status, etc.).

h. A discussion of the significance of any special status plant occurrences found, with consideration for other nearby occurrences, and the distribution of the species as a whole.

i. Assessments of the health, population size, and protective status of any special status plants found.

j. A complete list of *all* plant species (not just special status species) identified within the project area, and a discussion of any range extensions discovered as a result of the inventory

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the California Desert Conservation Area Plan (http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/cdd/cdcaplan.Par.15259.File.dat/CA_Desert_.pdf) or shown on Map 6 of the California Desert Conservation Area Plan, as amended (copies on file at the BLM California State Office, the California Desert District, and each of the field offices in the California Desert District).

k. Copies of all Field Survey Forms, for all special status plant occurrences found, or Natural Community Field Survey Forms, for any unusual communities found.

l. The name(s) and qualifications of the persons conducting the inventory.

m. A list of references cited, persons contacted and herbaria visited.

n. Additional data needs.

o. Other information as appropriate such as vegetation maps and photographs (see below).

Voucher specimens of special status plants should be collected if necessary to conclusively document the occurrence of the species and if the collection will not adversely affect the health of the population at the site. Collection of Federally listed plants on Federal lands requires a permit from the FWS. If voucher specimens are collected, they should be deposited in major recognized herbaria for future reference, preferably The University of California, Berkeley (UC), The Jepson Herbarium (JEPS), The California Academy of Sciences (CAS), or Rancho Santa Ana Botanic Garden (RSA).

Photographs should be taken of the areas inventoried, of all special status plants found, and of the habitat associated with each special status plant occurrence.

Data Collection – Data Submission

Data should be collected using a Mapping Grade GPS Receiver with an accuracy of < 3 meters Horizontal Root Mean Squared (HRMS).

All positions should be logged according to the following specifications:

- Maximum PDOP of 6
- Minimum of 5 Satellites
- Minimum elevation mask of 15 degrees
- Datum: NAD83
- Coordinate System: UTM Zone 10 or Zone 11, depending on where in California or northwestern Nevada the data is collected.
- ESRI compliant formats (Geodatabase, Coverage or Shapefile)

Metadata must be included with the data. The following must be included in the metadata:

- Project Name
- Purpose – Summary of the intentions with which the data set was developed
- Abstract Information – Brief narrative summary of the data set
- Location – What area(s) does your data cover? ie., list statewide, regions, city, county?
- Developer – Who collected the data?

Data Dictionary – A data dictionary must be used for all projects. The dictionary should include the data that is requested on the CNDDB forms. This ensures that the botanist is collecting (electronically) the same data as is requested by DFG. This also ensures that all inventories are collecting the same level/standard of data.

GIS Support Data: BLM California State Office Downloadable Data Sources

Index Page with BLM Data Naming Rules
http://www.blm.gov/ca/pa/gis/Data_Page/Data%20Page.html

Geospatial Data Downloads
http://www.blm.gov/ca/gis/index.html

All data collected in and referenced to the public land survey are required to conform to this version of PLSS published on the California BLM data download page.

In addition to the local Field Office; a copy of the Data (DVD or CDROM) must be submitted directly to:

BLM California State Office
Geographic Services, W1939
Attention: Chief Mapping Sciences
2800 Cottage Way
Sacramento, CA 95825

GIS Questions: Please Call
(916) 978-4343

Qualifications of Personnel Conducting Inventories

All personnel conducting special status plant inventories must have the following:

- strong backgrounds in plant taxonomy and plant ecology
- strong background in field sampling design and methods
- knowledge of the floras of the inventory area including the special status plant species
- familiarity with natural communities of the area

These qualifications help ensure that all special status plants in the inventory area will be located, including taxa that BLM or project proponents did not predict at the start of the inventory. All survey efforts must be coordinated with the responsible BLM Field Office botanist or biologist

NatureServe Report · April 2009

NatureServe Conservation Status Assessments:

Factors for Assessing Extinction Risk

NatureServe

A Network Connecting Science With Conservation

NatureServe is a non-profit organization dedicated to providing the scientific basis for effective conservation.

Citation: Master, L., D. Faber-Langendoen, R. Bittman, G. A. Hammerson, B. Heidel, J. Nichols, L. Ramsay, and A. Tomaino. 2009. NatureServe Conservation Status Assessments: Factors for Assessing Extinction Risk. NatureServe, Arlington, VA.

Cover photo: Polar bear (*Ursus maritimus*) © Larry Master (www.MasterImages.org)

NatureServe
1101 Wilson Boulevard, 15th Floor
Arlington, Virginia 22209
703-908-1800
www.natureserve.org

NatureServe Conservation Status Assessments:

Factors for Assessing Extinction Risk

Lawrence L. Master, Don Faber-Langendoen,
Roxanne Bittman, Geoffrey A. Hammerson, Bonnie Heidel,
Jennifer Nichols, Leah Ramsay, and Adele Tomaino

NatureServe

April 2009

Acknowledgments

This 2009 revision of guidance for documentation of NatureServe conservation status was developed in consultation with the Element Ranking Work Group: Larry Master, Don Faber-Langendoen, Adele Tomaino, Kristin Snow, Jennifer Nichols, Larry Morse, Leah Ramsay, Steve Rust, Bonnie Heidel, Roxanne Bittman, Geoff Hammerson, Troy Weldy, Paul Hendricks, Bryce Maxell, and Ben Wigley. More recently, Bruce Young has joined as a co-chair and commented on revisions to this draft. Most recently, the draft has been reviewed by the NatureServe network of natural heritage programs and conservation data centers.

This revision draws heavily from the Standards and Petitions Working Group of IUCN SSC Biodiversity Assessments Sub-Committee and from the IUCN-CMP alliance to develop standard taxonomies of threats and actions. Alan Weakley and Larry Morse were key NatureServe staff who, for many years, contributed their ideas to this document. Previous revisions were done in consultation with Syd Cannings, Gwen Davis, Kathy Goodin, Kat Maybury, Leah Oliver, Donna Reynolds, Dale Schweitzer, and Steve Taswell of NatureServe; participants at the National Center for Ecological Analysis and Synthesis (NCEAS) workshops (2000-2004) on methods for assessing extinction risk; and NatureServe ecologists at a workshop in November 2000.

The ideas presented also draw upon discussion with and input from staff of the member programs of the NatureServe network. In addition, external data users and agency staff have provided much useful input. Some of the concepts incorporated here draw from draft invasiveness assessment factors (Randall et al. 2001).

Funding for the most recent revisions has been generously provided by the National Council for Air and Stream Improvement (NCASI), Office Depot, U.S. Fish and Wildlife Service, U.S. Forest Service, and the Sarah K. de Coizart Article TENTH Perpetual Charitable Trust. Marta VanderStarre edited, designed and produced this publication.

Contents

Ursus maritimus (Polar Bear)	
RARITY	
Range Extent	>2,500,000 sq km
Area of Occupancy	> 20,000 sq km
Number of Occurrences	19 occurrences
Population Size	20,000–25,000 individuals
Environmental Specificity	Narrow – specialist, key requirement polar sea ice
TRENDS	
Short-term Trend	Decline of <30% to relatively stable
THREATS	
Intrinsic Vulnerability	Highly vulnerable
Primary Threat	Global warming
Threat – Scope	Pervasive – affects 71-100% total population or occurrences
Threat – Severity	Serious – likely to reduce total population by 31-70% within 3 generations
Threat - Impact	High
Overall Threat	Substantial, imminent
NatureServe Conservation Status Rank: G3 - Vulnerable	

Photo: © Larry Master (www.MasterImages.org)

Executive Summary

The primary purpose of Conservation Status Assessments is to evaluate the potential extinction or extirpation risk to elements of biodiversity, including regional extinction or extirpation. NatureServe and its member programs and collaborators use a suite of factors to assess the conservation status of species of plants, animals, and fungi, as well as ecosystems—ecological communities and systems. Conservation status is summarized as a series of ranks from “critically imperiled” to “secure,” and these ranks may be derived at global, national, or subnational (state/provincial) levels. This document details the factors that are used to assess extinction risk.

NatureServe’s methods, which have been evolving since 1978, are used by its network of natural heritage programs and conservation data centers throughout North America. The NatureServe network compiles the data and information needed to assess extinction risk both subnationally and globally. In recent years, NatureServe has worked with the International Union for the Conservation of Nature (IUCN) to standardize the ratings for shared information fields, such as “Range Extent,” “Area of Occupancy,” “Population Size,” and “Threats.” This standardization permits the sharing of information between organizations and countries, and allows the information to be used in IUCN as well as NatureServe assessments. NatureServe has also developed a “rank calculator” to increase the repeatability and transparency of its ranking process. Ten status factors are grouped by **rarity**, **threats**, and **trends** categories, and information is recorded for each of the status factors, insofar as is possible. The rank calculator then computes a numeric score, based on weightings assigned to each factor and some conditional rules, which is translated to a calculated status rank. This calculated rank is reviewed and adjusted if deemed appropriate, with documentation of the reasons for adjustment, before it is recorded as the final assigned conservation status rank.

NatureServe conservation status assessment methodology contains a number of features, most notably that it

1. Considers all of the status factor data collectively in assigning a status;
2. May produce “range-ranks” (e.g., G1G3 = globally critically imperiled to vulnerable) to transparently reveal the degree of uncertainty in a status when the available information does not permit a single status rank;
3. Explicitly considers threats in the assessment;
4. Assesses conservation status for both species and ecosystems; and
5. Is sufficiently complete for North American species[1] that global, national, and subnational ranks are routinely linked to facilitate setting conservation priorities.

1 More than 50,000 species and ecological communities are tracked and ranked at global and subnational levels by NatureServe and its network of natural heritage programs and conservation data centers.

Introduction

The primary purpose of Conservation Status Assessments is to evaluate potential extinction risk of elements of biodiversity—species, communities, and systems—including regional extinction or extirpation risk. Extinction risk is an essential piece of information to inform biodiversity conservation; however, it must be used with other information (e.g., genetic distinctness, importance of area, immediacy of threats, inclusive benefits, feasibility) to guide conservation planning, priority setting for reserve selection, inventory, official national and subnational listings, and recovery and management planning (see Appendix D).

NatureServe and its member programs and collaborators use a suite of factors to assess the conservation status of species of plants, animals, and fungi, as well as ecosystems—ecological communities and systems. The outcome of researching and recording information on the conservation status factors is the assignment of a conservation status (rank) with supporting documentation. (A summary of the conservation status categories is provided in Appendix A.) Data gathered on these status factors form the backbone of information used to assess extinction risk.

This document provides an overview of each of the status factors used in NatureServe conservation status assessments. Along with the detailed status factor descriptions, definitions of key terms are provided, and some guidance is offered on how to assign values to each of the factors. Procedures for how to combine the status factor values into a conservation status rank are provided in Faber-Langendoen et al. (2009a).

A Brief History of NatureServe Conservation Status Assessment

This edition of the NatureServe Conservation Status Assessments document is the latest version in a series of substantive changes to the conservation status factors since the early 1980s, when NatureServe's conservation status assessment process was first developed.

- 1978 – System initially developed, combining global and local considerations into one "rank" (A1, A2, B1, B2, B3, C); used only for species.
- 1982 – Current system of global, national, and subnational "ranks;" eight factors considered and scored; used for both species and ecosystems; qualitative in its application (The Nature Conservancy 1988, Master 1991).
- 1994 – Guidance on how to apply conservation status assessments to communities; release of a list of G1 and G2 community types in the U.S.
- 2000 – Eight factors subdivided into eleven factors, each "scored" into a larger number of ranges to better coincide with International Union for the Conservation of Nature (IUCN) Red List break points (see Appendix B), and to facilitate development of a quantitative ranking process.
- 2003 – Separation of Conservation Status (risk of extinction or extirpation) from Distribution Status (origin, regularity, currency, and confidence of presence) for national and subnational status assessments.
- 2009 – Revisions to data structure needed for application in Red List assessments, and to better match break points, weightings, and definitions for factors that are used for both NatureServe and Red List assessments. Note that the coded rating values for a number of the factors are exponential, especially at the higher ends (i.e., Population Size, Range Extent, and Area of Occupancy). Exponential scaling at the high ends for these values helps to reasonably distinguish one to two categories used for species and communities at lower risk of extinction (the LC and G4-G5 ranks used by IUCN and NatureServe, respectively), while a finer subdivision helps to distinguish

three to four categories used for species and communities that are at some risk of extinction (the CR-NT and G1-G3 ranks), respectively.

In addition to changes made to status factors in 2000 and 2007 related to compatibility with IUCN Red List methodology (IUCN 2001, IUCN Standards and Petitions Working Group 2008, Mace et al. 2008), NatureServe is seeking to improve element conservation status ranking by increasing the transparency, repeatability, consistency, and trainability of the assessment process. To achieve this, the current "black box" ranking method is being replaced with a set of rules and point weightings structured to utilize status factor information to assign one to five ranks and range rank categories for indicating conservation status. To that end, a "rank calculator" has been developed that automates and standardizes the process, computing a numeric score from factor ratings, which is automatically translated to a calculated status rank. This calculated rank is reviewed, and adjusted if deemed appropriate (with reasons for adjustment documented), before it is recorded as the final assigned conservation status rank. A companion document describes the calculator (Faber-Langendoen et al. 2009a).

Revisions to Fields since 1999

- "Abundance" is separated into "Population Size" (species only) and "Area of Occupancy."
- "Area of Occupancy" is measured for species using a grid system (4 km^2). As a result, "Linear Distance of Occupancy" is no longer needed as a coded field.
- A companion field named "Percent Area with Good Viability/Ecological Integrity" has been provided for the "Number of EOs with Good Viability" field. The minimum coded value of the two fields is used, if both are completed.
- Trends are divided into "Long-term Trend" and "Short-term Trend."
- "Overall Threat" now has a comprehensive list of general and specific threats, each of which can be evaluated independently based on scope, severity, and timing. The impact of each threat is calculated based on scope and severity. Overall impact of threat is then calculated based on the impacts of the individual threats.
- "Fragility" is redefined somewhat and renamed as "Intrinsic Vulnerability," but is only used as a factor when information on threat impact is not available.
- "Environmental Specificity" is added as a formal factor, but is only used when values for rarity factors are not available.
- "Number of Protected and Managed Occurrences" is no longer used as a status factor, although this information may still be of interest for status assessments.

Revisions to Field Values

- Adjustments to match all IUCN (2001) breakpoints to improve compatibility in both documentation of status and exchange of information, as well as to more readily permit conversion of existing NatureServe network program data. See Appendix B for the IUCN categories and a summary of the criteria, and Appendix C for a comparison of NatureServe, IUCN, and COSEWIC (Canada only) statuses.
- Finer division of value choices to more readily permit the use of a rule/point-based status assessment algorithm.
- Zero distinguished as a separate value where pertinent (e.g., for extinct or extirpated or possibly extinct species or extirpated ecosystems, i.e., ecological communities and systems).

The NatureServe Network

NatureServe is a non-profit conservation organization whose mission is to provide the scientific basis for effective conservation action. NatureServe represents an international network of biological inventories—known as natural heritage programs or conservation data centers—operating in all 50 U.S. states, Canada, Latin America and the Caribbean. The NatureServe network is the leading source for information about rare and endangered species and threatened ecosystems. Together with these network member programs, we not only collect and manage detailed local information on plants, animals, and ecosystems, but also develop information products, data management tools, and conservation services to help meet local, national, and global conservation needs.

- Changes in C-, D-, and E-level values for the "Number of Occurrences" factor address the long-recognized need to have the C-level cutoff lower than 100 to provide a better breakpoint for species and communities that are vulnerable versus those that are apparently secure. This change to a breakpoint at 80 then led to another breakpoint at 300 (based on roughly a four-fold increase at each level), which may be helpful in distinguishing apparently secure versus secure species or ecosystems (i.e., ecological communities and systems).

Revisions to Weightings of Status Factors

Traditionally, much weight was given to rarity status factors when assigning conservation status rank. In particular, the Number of Occurrences, and either "Area of Occupancy" (communities) or "Population Size" (species), were considered the primary factors that established the possible range of ranks. Final determination of the overall status rank was then based on consideration of the remaining status factors. Past and ongoing long- and short-term trends and projected trends (i.e., threats) were given insufficient weight relative to their importance in most other analyses of extinction risk factors and in other conservation status assessment methodologies (e.g., IUCN 2001, COSEWIC 2006, Musick 2004, Andelman et al. 2004, O'Grady et al. 2004).

Within the cluster of rarity factors, NatureServe ranking has traditionally given special weight to the Number of Occurrences. But an analysis of this factor indicates that it should be used cautiously and not weighted as much as other rarity factors in determining conservation status, for several reasons, including:

- There are substantial inherent difficulties in delineating populations and stands or patches;
- For some groups of taxa (e.g., large-ranging carnivores, long-distance migrants), the delineation of the occurrences is arbitrary and would not correspond to populations or subpopulations (see Occurrence definition on page 5);
- Occurrences are typically not recorded for species that are not at risk;
- Only exemplary occurrences are recorded for ecosystems that are not at risk;
- Occurrences are frequently delineated inconsistently between jurisdictions and across the range of a species or ecosystem;
- The number of occurrences increases as a species' or community's range becomes more fragmented and the species or ecosystem becomes more at risk (not less at risk, as is implied by an increase in the number of occurrences).

The first four of these considerations also apply to the "Number of Occurrences or Percent Area with Good Viability/Ecological Integrity." For species at risk, the number of good occurrences typically decreases as the species becomes more imperiled. However, see footnote on page 21 regarding widespread and ubiquitous (e.g., euryecious) species, which may have very few large occurrences.

Through development of the rank calculator, it is now suggested that **rarity** status factors be given a weight of 50%, **trends** (both the Long-term and Short-term Trend factors) weighted 30%, and **threats** factors 20%. Within the set of rarity factors, the Number of Occurrences is weighted less than the other factors, namely, 1) Population Size, 2) Number of Occurrences or Percent Area with Good Viability/Ecological Integrity, and 3) Area of Occupancy, such that the number of occurrences now will contribute less to the overall rank if other rank factor information is available.

Some General Definitions

Definitions, for purposes of this document, are provided below for several terms that are used generally in the conservation status factors descriptions and discussions found in this document. A few additional, more specialized terms are defined in the discussions of particular factors. In general, these definitions are consistent with those used by IUCN (2001).

Extinction Risk: Extinction risk indicates the likelihood that a species or ecosystem will totally vanish or die out. The time frame should fall within the scope of human planning and policy setting, including the ability to judge the success of restoration efforts. Extinction risk is assessed for species using ten years or three generations, whichever is longer, up to a maximum of 100 years (IUCN 2001). For ecosystems, extinction (or extirpation) risk is assessed using a 30-year time period (Rodriguez et al. 2007).

Geographical Level (Global, National, Subnational): NatureServe conservation status assessments have been developed primarily at three geographical levels. Global status, along with the corresponding individual factors, pertains to a species or ecosystem over its entire range (i.e., globally). A particular species or ecosystem can have only a single NatureServe global conservation status. National status applies to a portion of a species or ecosystem range that occurs in a specified nation or comparable geographically distinct area (e.g., a disjunct portion of a nation that is customarily treated separately for biogeographic or conservation purposes, such as Puerto Rico). Subnational status applies to a principal subdivision of a nation, such as a state or province, but sometimes a nonpolitical region customarily treated as a subnational unit (e.g., insular Newfoundland is treated separately from mainland Labrador, but together they form the Canadian province of Newfoundland and Labrador). NatureServe conservation status may also be used for other clearly bounded geographic areas (e.g., national parks). For long-distance migrants, the subnational status may apply to a breeding, non-breeding, or migratory population within the jurisdiction.

Occurrence: An occurrence is an area of land and/or water in which a species or ecosystem is, or was, present. An occurrence should have practical conservation value for the species or ecosystem as evidenced by historical or potential continued presence and/or regular recurrence at a given location. For further discussion of the species or ecosystem occurrence concept, see NatureServe's "Element Occurrence Data Standard" (NatureServe 2002).

For species, the occurrence often corresponds with the local population, but when appropriate may be a portion of a population (e.g., long-distance dispersers) or a group of nearby populations (e.g., metapopulation). *For many taxa, occurrences are similar to "subpopulations" (but considered to be 'populations' in this document and in much of the conservation biology literature) as defined by IUCN* (2001): "Subpopulations are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less)."[1]

For ecosystems, the occurrence may represent a stand or patch of a type, or more typically, a cluster of stands or patches, that can range in size from a few to many thousands of hectares.[2] This definition applies primarily to terrestrial ecosystems, but in principle can also be used for freshwater-aquatic and marine occurrences (NatureServe 2006).

1 Note that IUCN (2001) also uses the somewhat different concept of "location" referring to "…a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations."

2 Note that counting the number of plots sampled for an ecosystem rarely equates directly to the number of occurrences, as multiple plots can fall within a single large occurrence.

Population: A population is a geographically or otherwise distinct group of individuals of a particular species between which there is little demographic or genetic exchange (equivalent to the IUCN definition above for a "subpopulation"). For animals, metapopulation structure may arise when habitat patches are separated by distances that the species is physically capable of traversing, but that exceed the distances most individuals move in their lifetime (that is, the patches support separate subpopulations, or "demes"). If habitats are sufficiently close together that most individuals visit many patches in their lifetime, the individuals within and among the patches will tend to behave as a single continuous population.

Viability and Ecological Integrity: Estimated viability indicates the likelihood that a species will persist for a number of generations or over a designated period of time. However, viability is a term that is generally used to describe species, not ecosystems. A somewhat analogous term that can be applied to ecosystems is ecological integrity, which is "an assessment of the degree to which, under current conditions, an occurrence of an ecosystem matches reference conditions for structure, composition, and function, operating within the bounds of natural or historic disturbance regimes, and is of exemplary size" (Faber-Langendoen et al. 2008; see also Parrish et al. 2003).

Relative viability and ecological integrity are dependent on the size, condition (both biotic and abiotic), and landscape context of the species or ecosystem occurrence. For species, population size has been demonstrated to be of paramount importance in assessing viability (e.g., O'Grady et al. 2004, Reed 2005), while for ecosystems, all three factors are of comparable importance for maintaining integrity. Ecosystems with the greatest integrity—i.e., with native species structure and composition unchanged, and natural ecosystem processes intact—have the highest likelihood of retaining integrity over time.

Entities Eligible for Assessment

Ecological communities and ecological systems are collectively referred to as "ecosystems" in a generic sense. **Ecological communities** are assemblages of species and growth forms that co-occur in defined habitats at certain times and that have the potential to interact with each other (McPeek and Miller 1996). They are typically classified using ecologically based vegetation classifications, at multiple scales, from formations (biomes) to alliances and associations, based on the International Vegetation Classification (Grossman et al. 1998, Faber-Langendoen et al. 2009b, Faber-Langendoen et al. in prep.). **Ecological systems** are defined by integrating multiple ecological criteria at meso-scales, including vegetation composition and structure, driving processes, and local environmental setting. They are classified using the International Terrestrial Ecological Systems Classification (Comer et al. 2003, Josse et al. 2003). Currently, conservation status assessments use the association as the unit of assessment (which is similar in scale to the "natural community" scale of various NatureServe network program community classifications), but future applications will include types at multiple scales (see also Nicholson et al. 2009). Note that while ecosystem types include terrestrial, freshwater, and marine types, the above-referenced standard classifications are primarily terrestrial. Conservation status assessments will be applied to freshwater and marine types as standard classifications become available.

Plants, animals, fungi, and other organisms are **species** (in contrast to ecological communities or systems). In this document, the term "species" includes all entities at the taxonomic level of species (including interspecific hybrids), as well as all subspecies and plant varieties. (Subspecies and varieties are sometimes collectively termed "infraspecific taxa.") Other subsets of species (e.g., geographically distinct and evolutionarily significant population segments) may also be assessed, as well as recurrent, transient, mixed species animal assemblages (e.g., shorebird concentration areas).

Species in this document includes both single species as well as these multiple species assemblages.

While native, naturally occurring populations are the primary targets for conservation, in some cases other populations comprised of individuals not native and/or naturally-occurring at a location should also be considered. Such ‘other’ populations can be described using definitions from the *IUCN Guidelines for Re-Introductions* (IUCN 1998):

- **Benign introduction** – an attempt to establish a species, for the purpose of conservation, outside its recorded distribution but within an appropriate habitat and eco-geographical area.
- **Re-introduction** – an attempt to establish a species in an area which was once part of its historical range, but from which it has been extirpated or become extinct.
- **Translocation** – deliberate and mediated movement of wild individuals or populations from one part of their range to another.

Following IUCN (2008), conservation status assessments should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions. However, under some circumstances re-introduced and translocated populations may be included in the concept of ‘wild populations within their natural range’ and should then be assessed. To be included in an assessment, re-introduced, translocated, and benignly introduced populations should be established and have produced viable offspring, thus providing evidence of persistence at that location with probable future reproduction. However, such populations should not be included if there are no data to support the persistence of viable progeny.

In cases where individuals have been used to supplement wild populations, these individuals and their naturally produced offspring should be included as part of the population being assessed, provided these individuals are predicted to have a positive impact on that population. However, individuals re-introduced or translocated for short-term sporting or commercial purposes without intention of establishing a viable population should be excluded from the population being assessed.

In many cases, species have successfully expanded their natural ranges outside their historical ranges. Indeed, it will be critical for many species to move beyond their historical ranges to cope with climate change. In these instances, the expansion areas should be considered part of the species’ natural range as they were not intentionally introduced.

If the only remaining individuals of a species exist in a naturalized population (i.e., resulting from human introduction outside the natural range), in a benignly introduced population, or in a re-introduced population not yet established, then the species should be considered “Presumed/Possibly Extinct in the Wild” but extant in these populations (global conservation status = GXC or GHC). If a species’ assessed status is GXC or GHC but a naturalized population of the species exists within a region (nation or state/province), this regional population should be considered to have resulted from a benign introduction and, thus, should be assigned a national or subnational conservation status based on assessment of the factors described in this document. The rationale for this exception is that when a species is extinct over its entire natural range, its presence within a region must be considered important to highlight and preserve, despite its location outside the species’ natural range.

Populations undergoing natural **hybridization** are eligible for inclusion in species assessments, but hybridization also can be a direct or indirect consequence of human activities. As described in Hutchings et al. (2008):

"Where human-mediated hybridization occurs, F1 hybrids and their introgressed progeny should generally be considered a loss to the species and a threat to its persistence; hybrids do not represent either original taxonomic group, and they do not contribute to the evolutionary lineage of either group. If introgression is known or suspected, one should consider whether it is likely to negatively affect the conservation of the species. A negative impact is one predicted to result in a reduction in the average fitness of individuals of the species being assessed (reflected, for example, by a reduced probability of survival, reduced population growth rate, and/or reduced ability to adapt to environmental change). Under these circumstances, F1 hybrids, if identifiable, and their progeny would not be included in the assessment. Where introgression in a population is considered extensive, it may be prudent to exclude the entire population from the species being assessed. Exceptions may exist where the gene pool of a species is so small that inbreeding depression is evident, and genetic variability cannot be increased using individuals from the same genetic pool. In such situations, it may be prudent to interbreed the species with another closely related population of the same species to increase genetic variability and benefit from hybrid vigour, particularly where the species in question is otherwise expected to go extinct. This will at least preserve some of the genetic composition of the species and may restore its ecological role. However, the resultant recombinant population may be assessed as a separate population, with the original one considered extinct. Furthermore, this recombinant population would only be eligible for assessment if it is not dependent on continued introductions to persist and it does not pose a threat to the donor species contributing to the interbreeding efforts."

See Hutchings et al. (2008) for more details on hybridization issues.

Deriving Conservation Status from the Status Factors

Conservation status factors guide the consistent and rigorous recording of information to facilitate the assignment of a conservation status. This process of assigning a conservation status has been qualitative to date due to the challenges of assessing many thousands of species and ecosystems in a timely fashion. This qualitative approach to status assessment has led to issues with consistency, repeatability, and transparency of the status assessments. Extensive training and review have been used to minimize these problems, but subjective assessments are nonetheless influenced by personal judgments, perceptions of risk, and systemic biases. The effort to minimize these biases and inconsistencies has led to clearer guidance on the definitions of the status factors (this report) and to a more transparent, repeatable, and objective approach—a "rank calculator" that utilizes rules and point weightings to calculate conservation status based on information recorded for status factors (Faber-Langendoen et al. 2009a).

As NatureServe transitions to using the newly refined status factors and rank calculator, there are several considerations to keep in mind:

- The current conservation status ranks (available at www.natureserve.org/explorer) will not be in synchrony with the revised conservation status factors until those factors are evaluated for each species and ecosystem type, and the status rank is reassessed using the calculator. A new data field for recording the method that was used to assign conservation status will be utilized as a means of tracking how the status rank was determined.

- In the absence of sufficient data to use the calculator, some status ranks will remain temporarily subjective, although the assignment of range ranks helps to mitigate some of these unknowns.
- As has always been the case, some status assessments are based on less information than others (e.g., an assessment may be based simply on a review of published distribution, habitat, or museum collection information). Because the assessment is made on the known, available data, it may not necessarily reflect current status.
- In the absence of better information, some NatureServe global conservation status assessments have been based on review of national or subnational statuses, and some national status assessments have been based on review of subnational statuses.

Summary of the Status Factors and their Conditional Use

Table 1 summarizes the conservation status factors used by NatureServe, its member programs, and their collaborators to assess the conservation status of species and ecosystems. The factors are organized into three broad categories—**rarity**, **trends**, and **threats**—and a series of conditions (rules) are specified for whether, and how, each status factor should be used.

TABLE 1
Summary of NatureServe Conservation Status Factors.

Factor Category	Factor	Condition (Rule)
Rarity	Range Extent	Always use, if available
	Area of Occupancy	Always use, if available
	Population	Always use, if available (species only)
	Number of Occurrences	Always use, if available
	Number of Occurrences or Percent Area with Good Viability/Ecological Integrity	Always use, if available
	Environmental Specificity	Only use if both the Number of Occurrences ***and*** Area of Occupancy are Unknown or Null
Trends	Long-term Trend	Always use, if available
	Short-term Trend	Always use, if available
Threats	Threats	Always use, if available
	Intrinsic Vulnerability	Only use if Threats is Unknown or Null

Factor Data Types

The ten conservation status factors are each represented by at least two types of data fields, as follows.

- Coded value field(s) with associated words or short phrases; values can be expressed as either single capital letters (e.g., A, B) or as combinations to indicate an estimated range of uncertainty (e.g., AB, BD)
- Text comment field.

Additional Information of Interest

In addition to the ten NatureServe conservation status factors, several types of information may be recorded that could potentially influence the assignment of a conservation status. These information fields, described in more detail later in this document, are summarized in Table 2.

Definitions and guidance for use are provided individually for each factor in the "Conservation Status Factors" section beginning on page 11. See also "Some General Definitions" on page 5 for terms used in the discussion of multiple factors.

TABLE 2
Other Information Useful for Assessing Conservation Status.

Information of Interest	Description
Other Considerations	Optional text field for recording potentially relevant information, such as the results of a PVA analysis.
Number of Protected and Managed Occurrences	No longer used as a status factor, but may be used to record information potentially relevant to threats.
Rescue Effect	Used only at national and subnational (e.g., state/provincial) levels to potentially up-rank or down-rank a species.
Comparison of Global and National/Subnational Rank Information	Useful when assigning conservation status, especially when the national/subnational information is more current or detailed than the global information, or vice versa. A subnational rank cannot imply that a species or ecosystem is more secure at the state/province level than it is nationally or globally (e.g., a rank of G1S3 is invalid), and similarly, a national rank cannot exceed the global rank. Subnational ranks are assigned and maintained by state or provincial NatureServe network programs.

Picking a Coded Value

Assessors should adopt a moderate attitude, taking care to identify the most likely plausible range of values, excluding extreme or unlikely values. This is also the approach endorsed by the IUCN Standards and Petitions Working Group (2008). In many cases this will mean picking a code range (e.g., BC, BD) as the factor rating. Note that the "U = Unknown code" cannot be included in an estimated range of uncertainty.

■ ■ ■

This section details the Conservation Status Factors used by NatureServe, its member programs, and their collaborators to assess the conservation status of species and ecosystems (ecological community or system). Along with the detailed status factor descriptions, some guidance may be offered on how to assign values to each of the factors.

Range Extent

A Rarity Factor

Range extent for taxa can be defined as (modified from the International Union for the Conservation of Nature 2001):

> Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary that can be drawn to encompass all the known, inferred, or projected sites of present occurrence of a taxon or ecosystem, excluding cases of vagrancy. While this measure may exclude discontinuities or disjunctions within the overall distribution of a taxon or type (e.g., large areas of obviously unsuitable habitat), such exclusions are discouraged except in extreme cases because these disjunctions and outlying occurrences accurately reflect the extent to which a large range size reduces the chance that the entire population of the taxon will be affected by a single threatening process. Risks are spread by the existence of outlying or disjunct occurrences irrespective of whether the range extent encompasses significant areas of unsuitable habitat. (emphasis added) (See also Area of Occupancy.)

The range extent criterion measures the spatial spread of areas currently occupied by a species or ecosystem, however it "is not intended to be an estimate of the amount of occupied or potential habitat, or a general measure of the taxon's range" (IUCN 2001). The rationale behind the use of this parameter in assessing conservation status is to determine the degree to which risks from threatening factors are spread spatially across the geographic distribution of the species or ecosystem.

While range extent can be measured by a minimum convex polygon (or "convex hull")—that is, the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence—there can be inaccuracies with the resulting estimates of range extent. When there are significant discontinuities or disjunctions in a species distribution, a minimum convex polygon yields a boundary with a very coarse level of resolution on its outer surface, resulting in a substantial overestimate of the range, particularly for irregularly shaped ranges (Ostro et al. 1999). The bias associated with range estimates based on convex hulls, and their sensitivity to sampling effort, may also cause problems when assessing trends if outliers are detected at one time and not another. To avoid either significantly overestimating range extent when there are sizeable disjunctions or discontinuities in a distribution, or misrepresenting the extent to which a taxon or type may be affected by a threat by reducing range size through exclusion of disjunctions and discontinuities, using a method such as the α-hull is recommended as it may substantially reduce the biases that can result from the spatial arrangement of occurrences.

The α-hull technique involves first drawing lines between all known or inferred points of occurrence for the species or ecosystem (i.e., drawing the convex hull). Next, any lines longer than a multiple, typically twice the average line length, are deleted from the first polygon (i.e., lines joining points that are relatively distant are deleted), such that the total range may be subdivided into more than one polygon. The final step is to calculate the range extent by summing the areas of all remaining triangles. For more

Conservation Status Factors

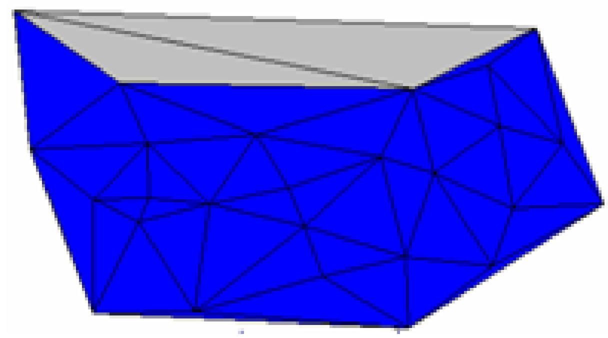


FIGURE 1.
Illustration of α-hull.
The lines show the Delauney triangulation (the intersection points of the lines are the species' or ecological community's occurrence locations). The sum of the areas of darker triangles is range extent based on the α-hull. The two lighter colored triangles that are part of the convex hull are excluded from the α-hull. (IUCN Standards and Petitions Working Group 2008)

details, see guidance provided by the IUCN Standards and Petitions Working Group (2008) and Burgman and Fox (2003). When using a GIS to measure the area of a polygon, it is important that the polygon is projected using an equal-area projection (e.g., Albers) for an accurate calculation.

Note that the use of α-hulls for determining range extent for a taxon or type with only one or two occurrences is not warranted as there are no disjunctions or discontinuities. For a single occurrence, the range extent may equal, or be slightly larger than, the area of known, inferred, or projected occupancy. Additional guidelines for the use of α-hulls will be forthcoming as additional tests are completed.

In the case of migratory species, range extent should be based on the minimum size of either the breeding or non-breeding (wintering) areas, whichever is smallest. For freshwater species and ecosystems, the extent of occurrence can be estimated by summing the areas of the eight-digit U.S. Geological Survey hydrologic units or watersheds of equivalent scale in which extant occurrences are located. This procedure is used by the IUCN Freshwater Species Specialist Group and is acceptable when the species range is the size of a watershed or larger.

Range Extent Fields

Enter the estimated range extent (a range is acceptable): ________ sq km. Also enter the rating code that best describes the estimated current range of the species or ecosystem in the area of interest (globe, nation, or subnation). See Figure 1 for a comparison with Area of Occupancy. Use only rating values pertinent to the size of the area of interest; for example, only the A, B, C, or D values would be used in the subnational status assessment for Delaware (area = 5,004 km^2) or for Prince Edward Island (area = 5,657 km^2). Use a value range (e.g., DE) to indicate uncertainty. (See "Picking a Coded Value" on page 10.)

Select from the following values:

Z = Zero (no occurrences believed extant; species presumed extinct or ecosystem believed eliminated throughout its range)[1]

A = <100 km^2 (less than about 40 square miles)

B = 100–250 km^2 (about 40–100 square miles)

C = 250–1,000 km^2 (100–400 square miles)

D = 1,000–5,000 km^2 (400–2,000 square miles)

E = 5,000–20,000 km^2 (2,000–8,000 square miles)

F = 20,000–200,000 km^2 (8,000–80,000 square miles)

G = 200,000–2,500,000 km^2 (80,000–1,000,000 square miles)

H = >2,500,000 km^2 (greater than 1,000,000 square miles)

1 Use a range rating that includes Z (e.g., ZA) when the species or ecosystem may be possibly extant.

U = Unknown

Null = Factor not assessed

Range Extent Comments

Discuss any uncertainties in estimating the Range Extent.

TABLE 3
Examples of Land Areas Approximating Each Range Extent Value Threshold.

<table>
<tr><th>Rating Values</th><th>Threshold (km²)</th><th>Threshold (miles²)</th><th>Examples</th><th>Approx. Area (km²)</th><th>Approx. Area (miles²)</th></tr>
<tr><td colspan="6">North America</td></tr>
<tr><td rowspan="2">A/B</td><td rowspan="2">100</td><td rowspan="2">~40</td><td>Montserrat</td><td>98</td><td>38</td></tr>
<tr><td>Nantucket, MA</td><td>121</td><td>47</td></tr>
<tr><td>B/C</td><td>250</td><td>~100</td><td>Martha's Vineyard, MA</td><td>250</td><td>96</td></tr>
<tr><td>C/D</td><td>1,000</td><td>~400</td><td>Rocky Mountain National Park, CO</td><td>1,077</td><td>416</td></tr>
<tr><td rowspan="2">D/E</td><td rowspan="2">5,000</td><td rowspan="2">~2,000</td><td>Delaware</td><td>5,004</td><td>1,932</td></tr>
<tr><td>Prince Edward Island</td><td>5,657</td><td>2,184</td></tr>
<tr><td rowspan="2">E/F</td><td rowspan="2">20,000</td><td rowspan="2">~8,000</td><td>New Jersey</td><td>19,342</td><td>7,468</td></tr>
<tr><td>Massachusetts</td><td>20,264</td><td>7,824</td></tr>
<tr><td>F/G</td><td>200,000</td><td>~80,000</td><td>Nebraska</td><td>198,507</td><td>76,644</td></tr>
<tr><td></td><td></td><td></td><td>Minnesota</td><td>206,028</td><td>79,548</td></tr>
<tr><td>G/H</td><td>2,500,000</td><td>~1,000,000</td><td>Combined area of Ontario and Quebec</td><td>2,609,271</td><td>1,007,500</td></tr>
<tr><td colspan="6">Latin America</td></tr>
<tr><td rowspan="2">A/B</td><td>10</td><td>4</td><td>Old growth forest of La Selva Biological Station, Costa Rica</td><td>11.7</td><td>4.5</td></tr>
<tr><td>100</td><td>~40</td><td>Monteverde Cloud Forest Preserve, CR</td><td>105</td><td>41</td></tr>
<tr><td>B/C</td><td>250</td><td>~100</td><td>St. Kitts and Nevis</td><td>269</td><td>104</td></tr>
<tr><td rowspan="2">C/D</td><td>1,000</td><td>~400</td><td>Kalakmul Biosphere Reserve, Mexico</td><td>998</td><td>385</td></tr>
<tr><td>2,000</td><td>~800</td><td>Cotacahi-Cayapas Natural Reserve, Ecuador</td><td>2,044</td><td>789</td></tr>
<tr><td rowspan="3">D/E</td><td>5,000</td><td>~2,000</td><td>Trinidad and Tobago</td><td>5,130</td><td>1,981</td></tr>
<tr><td rowspan="2">10,000</td><td rowspan="2">~4,000</td><td>Puerto Rico</td><td>9,104</td><td>3,515</td></tr>
<tr><td>Jamaica</td><td>10,990</td><td>4,243</td></tr>
<tr><td rowspan="4">E/F</td><td>20,000</td><td>~8,000</td><td>Belize</td><td>22,960</td><td>8,865</td></tr>
<tr><td>50,000</td><td>~20,000</td><td>Costa Rica</td><td>51,100</td><td>19,730</td></tr>
<tr><td rowspan="2">100,000</td><td rowspan="2">~40,000</td><td>Guatemala</td><td>108,890</td><td>42,042</td></tr>
<tr><td>Cuba</td><td>110,860</td><td>42,803</td></tr>
<tr><td rowspan="2">F/G</td><td>200,000</td><td>~80,000</td><td>Uruguay</td><td>176,220</td><td>68,038</td></tr>
<tr><td>1,000,000</td><td>~400,000</td><td>Venezuela</td><td>912,050</td><td>352,142</td></tr>
<tr><td rowspan="2">G/H</td><td rowspan="2">2,500,000</td><td rowspan="2">~1,000,000</td><td>Mexico</td><td>1,972,550</td><td>761,602</td></tr>
<tr><td>Argentina</td><td>2,766,890</td><td>1,068,296</td></tr>
</table>

Area of Occupancy

A Rarity Factor

Area of occupancy for taxa can be defined as (modified from the International Union for the Conservation of Nature 2001):

> "...the area within its 'extent of occurrence', which is occupied by a taxon or ecosystem type, excluding cases of vagrancy. The measure reflects the fact that a taxon or type will not usually occur throughout the area of its extent of occurrence, which may contain unsuitable or unoccupied habitats. In some cases, (e.g., irreplaceable colonial nesting sites, crucial feeding sites for migratory taxa) the area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon. The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological or ecological aspects of the taxon or type, the nature of threats and the available data."

Distribution or habitat maps can be derived from interpretation of remote imagery and/or analyses of spatial environmental data, using either simple combinations of GIS data layers or by more formal statistical models. These maps can provide a basis for directly estimating area of occupancy and range extent for ecosystems, provided an accuracy assessment shows the map to be of sufficient reliability for the purpose of estimating area. Distribution and habitat maps can also provide an indirect estimate of area of occupancy (and range extent) for species; however, the following conditions must be met (IUCN Standards and Petitions Working Group 2008):

1) Maps must be justified as accurate representations of the habitat requirements of the species, and validated by a means that is independent of the data used to construct them.
2) The mapped area of suitable habitat must be interpreted (e.g., using an estimate of the proportion of habitat occupied) to produce an estimate of the area of occupied habitat.
3) The estimated area of occupied habitat derived from the map must be scaled to the grid size that is appropriate for the area of occupancy of the species (described below).

Estimating Area of Occupancy for Ecosystems

For ecosystems, measure or estimate area of occupancy based on the best available information. In linear habitats (e.g., riverine shorelines, riparian habitats, or cliffs), estimate the length of all currently occupied habitat segments. The area can be estimated by multiplying the length by the average width.

When assessing area of occupancy, consider what the typical spatial pattern of the type is across its range (i.e., its patch type), whether small patch, large patch, or matrix (if variable, choose the larger spatial pattern; see Table 4). The spatial pattern of the type may affect the relative role of the area of occupancy rating scale in assessing extinction risk. For example, extensive matrix types may require greater minimal areas than the current values for A and B ratings codes, whereas small patch types may require very little overall area and still be considered abundant. Observations related to how spatial patterns may affect the rating for this field should be recorded in the Comments field.

Patch Type	Definition
Matrix	Ecosystems that form extensive and contiguous cover, occur on the most extensive landforms, and typically have wide ecological tolerances. Disturbance patches typically occupy a relatively small percentage (e.g., <5%) of the total occurrence. In undisturbed conditions, **typical occurrences range in size from 2,000 to 10,000 ha (100 km^2) or more**.
Large Patch	Ecosystems that form large areas of interrupted cover and typically have narrower ranges of ecological tolerances than matrix types. Individual disturbance events tend to occupy patches that can encompass a large proportion of the overall occurrence (e.g., >20%). Given common disturbance dynamics, these types may tend to shift somewhat in location within large landscapes over time spans of several hundred years. In undisturbed conditions, **typical occurrences range from 50 to 2,000 ha**.
Small Patch	Ecosystems that form small, discrete areas of vegetation cover, typically limited in distribution by localized environmental features. In undisturbed conditions, **typical occurrences range from 1 to 50 ha**.
Linear	Ecosystems that occur as linear strips. They are often ecotonal between terrestrial and aquatic ecosystems. In undisturbed conditions, **typical occurrences range in linear distance from 0.5 to 100 km**.

TABLE 4
Definitions of Various Patch Types that Characterize the Spatial Patterning of Ecosystems.

Estimating Area of Occupancy for Species

> "Classifications of risk based on the area of occupancy are complicated by problems of spatial scale. There is a logical conflict between having fixed range thresholds and the necessity of measuring range at different scales for different taxa. The finer the scale at which the distributions or habitats are mapped, the smaller the area that they are found to occupy and the less likely that range estimates … exceed the thresholds specified in the criteria. Mapping at finer scales reveals more areas in which the taxon is unrecorded. The choice of scale may thus influence the outcome of the assessments and could be a source of inconsistency and bias." (IUCN Standards and Petitions Working Group 2008)

For species, the coded value for the area of occupancy should be obtained by "counting the number of occupied cells in a uniform grid that covers the entire range of a taxon and then tallying the number of occupied cells" (IUCN Standards and Petitions Working Group 2008). A grid of size 2 km (a cell area of 4 km^2) appears to provide a satisfactory grid scale as the basis for an estimate or index of area occupied. Thus, in line with IUCN, a scale of 2 km (grid of 4 km^2 cells) is recommended in order to ensure consistency and comparability of results. Ideally, the grid should be "moved" around and the minimum number of grid cells used in calculating area of occupancy.

The following two documents developed by NatureServe network program staff describe processes currently being tested which provide guidance for using a GIS to both create a grid, and then utilize the grid to calculate the area of occupancy automatically for use in conservation status assessments.[2]

- Using a GIS to Calculate Area of Occupancy Part 1: Creating a Shapefile Grid (R. Elliott, California Natural Diversity Database)
- Using a GIS to Calculate Area of Occupancy Part 2: Automated Calculation of Area (E. Prescott, British Columbia Conservation Data Centre)

2 Technical guidance on use of the grid is available from NatureServe upon request.

In the case of migratory species, estimates of area of occupancy (as with range extent) should be based on the minimum size of either the breeding or non-breeding (e.g., wintering, migratory stopover) areas, whichever is smallest. That is, the smallest area essential at any stage to the survival of existing populations of a taxon should be used for estimating area of occupancy.

For species occurring in and confined to linear habitats (e.g., shorelines, streams) and for which one has relatively precise locations and a relatively complete inventory, the Chair of the IUCN Standards and Petitions Working Group states (pers. comm.) that a 1x1 km grid can be used for estimating area of occupancy, rather than a 2x2 km grid or a measure of length x average breadth, as are used for ecosystems. Thus, for species, the linear distance of occupancy previously used as a status factor will no longer be needed in the assessment calculation. A 1 km^2 grid may be employed as described above instead of the 4 km^2 grid or, more simply (unless the linear features are meandering or densely dendritic), the length of occupied stream miles can be estimated and multiplied by 1 km.[3]

Area of Occupancy Fields

Enter the estimated area of occupancy (a range is acceptable): ________ km^2.

Enter the estimated linear distance of occupancy if appropriate: ________ km.

Enter the scale used for species (4 km^2 or 1 km^2 recommended): ________ km^2.

Also enter the rating code for the estimated current area of occupancy of the species or ecosystem in the area of interest (globe, nation, or subnation). Use a value range (e.g., DE) to indicate uncertainty (see "Picking a Coded Value" on page 10).

Select from the rating values for Area of Occupancy shown below, using Table 5a codes for species assessments and Table 5b codes for assessing ecosystems.

TABLE 5a
Species Area of Occupancy Codes Based on the Number of Occupied Grid Cells.

Species Area of Occupancy		
Code	**Number of 4 km^2 grid cells**	**Number of 1 km^2 grid cells**
Z	0	0
A	1	1–4
B	2	5–10
C	3–5	11–20
D	6–25	21–100
E	26–125	101–500
F	126–500	501–2,000
G	501–2,500	2,001–10,000
H	2,501–12,500	10,001–50,000
I	>12,500	>50,000
U	Unknown	Unknown

3 In addition to occurrences in linear habitats, the use of a 1 km^2 grid is also appropriate when occurrences are relatively well inventoried with relatively precise locational information and are confined to discrete well-mapped habitat patches (e.g., rock outcrops).

TABLE 5b

Ecosystem Area of Occupancy Codes Based on the Number of Km^2, Hectares or Acres.

Ecosystem Area of Occupancy			
Code	Number of km^2	Number of hectares	Number of acres
Z	0	0	0
A	<1	<100	<250
B	1–4	100–400	250–1,000
C	4–10	400–1,000	1,000–2,500
D	10–20	1,000–2,000	2,500–5,000
E	20–100	2,000–10,000	5,000–25,000
F	100–500	10,000–50,000	25,000–125,000
G	500–2,000	50,000–200,000	125,000–500,000
H	2,000–20,000	200,000–2,000,000	500,000–5,000,000
I	>20,000	>2,000,000	>5,000,000
U	Unknown	Unknown	Unknown

Note: The Z rating code implies the species is presumed extinct or the ecosystem is believed to be extirpated throughout its range. A range rank that includes Z (e.g., ZA) should be used for species or ecosystem where the only known occurrences have not been verified as extant, but they are still possibly extant (i.e., they are considered historical).

Area of Occupancy Comments

Discuss any uncertainties in estimating the Area of Occupancy.

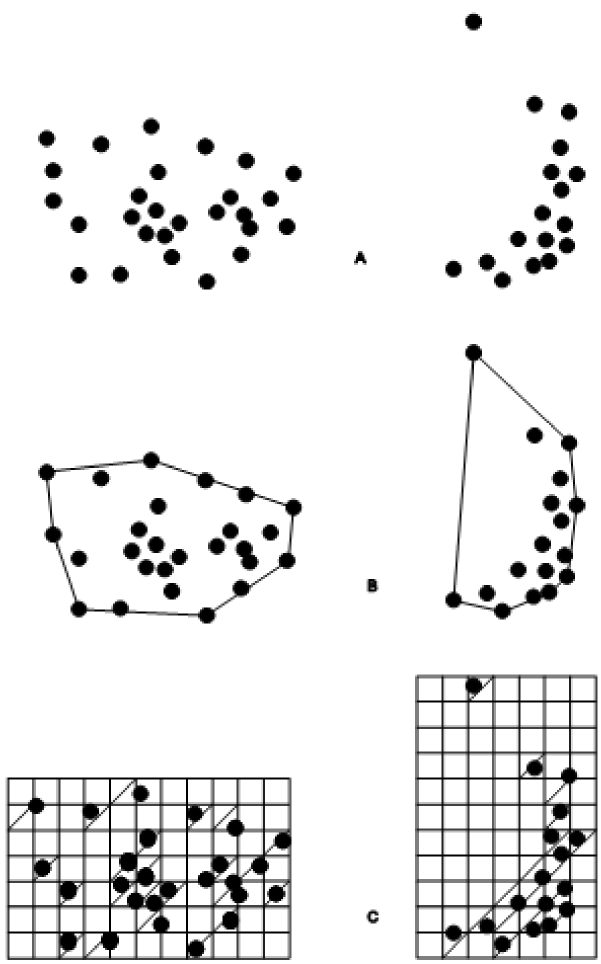


FIGURE 2.

Illustration of the Distinction Between Range Extent and Area of Occupancy.

(A) Is the spatial distribution of known, inferred, or projected sites of present occurrence.

(B) Shows one possible boundary to the Range Extent, which is the measured area within this boundary using a minimum convex hull or, preferably, an α-hull to avoid significant overestimates (right side of example B) in range.

(C) Shows one measure or index of Area of Occupancy, which can be achieved by the sum of the occupied grid squares.

For species, IUCN recommends that area should be estimated using 2 x 2 km grid cells. (IUCN Standards and Petitions Working Group 2008)

For ecological communities and systems estimates of absolute area are preferred for area of occupancy, given the greater accuracy in mapping stands.

(IUCN 2001)

Population Size

A Rarity Factor, Used Only for Species

Population size is the estimated current total population of the species which is naturally occurring and wild within the area of interest (globe, nation, or subnation), and that is of reproductive age or stage (at an appropriate time of the year), including mature but currently non-reproducing individuals, which should be included in counts or estimates.

As guidance, consider the following points (from IUCN 2001) when estimating population numbers (see also IUCN Standards and Petitions Working Group 2008):

- Juveniles, senescent individuals, and individuals in subpopulations whose densities are too low for fertilization to occur and who will never produce new recruits should not be counted as mature individuals. (See note below regarding clones.)
- In the case of populations with biased adult or breeding sex ratios, it is appropriate to use lower estimates for the number of mature individuals, which take this into account (e.g., the estimated effective population size).
- Where the population size fluctuates, use a lower estimate. In most cases this will be much less than the mean.
- Reproducing units within a clone should be counted as individuals, except where such units are unable to survive alone (e.g., corals).
- In the case of taxa that naturally lose all or a subset of mature individuals at some point in their life cycle, the estimate should be made at the appropriate time, when mature individuals are available for breeding.
- Re-introduced individuals must have produced viable offspring before they are counted as mature individuals.

In addition, consideration should also be given to the following:

- For species that produce more than one generation per year, use the size of the smallest annual reproducing generation in estimations.
- For organisms that are only intermittently countable, consider population size to be the number of mature individuals in a typical 'good' year, but not a 'poor' year or an extraordinarily productive year. Although data will rarely be available, population size for such species should be conceptually considered as the median of the population over a ten-year or three-generation time span, whichever is longer.
- For seed-banking annual plants, consider whether number of individuals in a population is a potentially misleading factor; if so, this should be discussed in comments and the coded value left as null.[4]
- For clone-forming organisms that persist or spread locally but rarely, if ever, reproduce, consider the population size to be the number of distinct, self-maintaining clonal patches (approximating the number of genets), rather than the number of physiologically separate individuals (ramets).

4 For some types of organisms, such as some annual plants and invertebrates, for which thousands to millions of individuals typically may occur in a very small area, a coded value for the number of individuals should be left as null and the reason for this noted in the Population Size Comments field. This is because the number of individuals is used in calculating a conservation status, and a large number of individuals indicate a sense of security that is not warranted in this situation.

Population Size Fields (for Species)

Enter the population size (a range is acceptable): ________.

Select also from the following rating values. Use a value range (e.g., DE) to indicate uncertainty (see “Picking a Coded Value” on page 10).[4]

Z = Zero, no individuals believed extant (i.e., species presumed extinct)[5]

A = 1–50 individuals

B = 50–250 individuals

C = 250–1,000 individuals

D = 1,000–2,500 individuals

E = 2,500–10,000 individuals

F = 10,000–100,000 individuals

G = 100,000–1,000,000 individuals

H = >1,000,000 individuals

U = Unknown

Null = Factor not assessed

Population Size Comments

Discuss any difficulties or peculiarities in the assessment of population size. Note and justify a decision not to calculate a coded value for population size.[4]

Number of Occurrences

A Rarity Factor

An occurrence is an area of land and/or water in which a species or ecosystem is, or was, present. They represent “on-the-ground” locations where an element of biodiversity is found (i.e., the occurrence is extant or known to have recently occurred at a given location). (See detailed definition on page 5.) Guidance on how to delineate an occurrence is provided in NatureServe’s “Element Occurrence Data Standard” (NatureServe 2002).

The significance of the Number of Occurrences factor relates to additional risks faced by taxa or ecosystems where the species or ecosystem is either fragmented into many small occurrences (units), or where most individuals are concentrated into one occurrence (unit). Issues regarding the viability or integrity of the occurrences are assessed separately in the Number of Occurrences or Percent Area with Good Viability/Ecological Integrity factor that follows.

For many taxa, information on number of populations, rather than occurrences, will be more available and can be used in addition to or instead of occurrence information. For purposes of this factor (as well as the Number of Occurrences or Percent Area with Good Viability/Ecological Integrity factor) and as related to species, the two terms are interchangeable. For more information, see the definitions of both occurrence and population in “Some General Definitions” on page 5.

5 Use a range including Z (e.g., ZA) where there may be extant individuals even though none are currently known.

Number of Occurrences Fields

Enter the estimated number of occurrences (a range is acceptable): ________.

Enter also the coded rating value for the estimated, inferred, or suspected number of occurrences believed extant for the species or ecosystem in the area of interest (globe, nation, or subnation). Use a value range (e.g., DE) to indicate uncertainty (see "Picking a Coded Value" on page 10). Select from the following values:

Z = 0 (zero) (i.e., species presumed extinct or ecosystem believed eliminated throughout its range)[6]

A = 1–5

B = 6–20

C = 21–80

D = 81–300

E = >300

U = Unknown

Null = Factor not assessed

Number of Occurrences Comments

Discuss any uncertainties in estimating the number of occurrences.

Number of Occurrences or Percent Area with Good Viability/Ecological Integrity

A Rarity Factor

For species, an occurrence with at least good (i.e., excellent-to-good) viability exhibits favorable characteristics with respect to population size and/or quality and quantity of occupied habitat; and, if current conditions prevail, the occurrence is likely to persist for the foreseeable future (i.e., at least 20–30 years) in its current condition or better. See Hammerson et al. (2008) for more details. For ecosystems, an occurrence has excellent-to-good ecological integrity when it exhibits favorable characteristics with respect to reference conditions for structure, composition, and function, operating within the bounds of natural or historic disturbance regimes, and is of exemplary size (Faber-Langendoen et al. 2008). One would expect only minor to moderate alterations to these characteristics for an occurrence to maintain good ecological integrity.

For many occurrences, viability or ecological integrity assessments or ranks have been applied by biologists and ecologists throughout the NatureServe network. For species, these Element Occurrence (EO) ranks estimate the probability of persistence of the occurrence. For ecosystems, the rank is a succinct assessment of the degree to which, under current conditions, an occurrence of an ecosystem matches reference conditions for that system, without any presumptions made about future status or persistence. Ranks for species and ecosystems are based on a set of "occurrence rank factors," namely size (including population size and/or occupied area), abiotic and biotic condition, and landscape context. These factors may be further refined to specific indicators or metrics. The overall ranks range from A = Excellent viability/integrity, to D = Poor viability/integrity.

6 Use a range including Z (e.g., ZA) where there may be extant occurrences even though none are currently known.

Occurrences ranked A or B indicate excellent or good viability/ecological integrity, respectively. Future threats are not used to 'downgrade' an occurrence rank, but ongoing events (e.g., successional changes, periodic unfavorable management) that are resulting in inexorable degradation of occurrence quality should be considered. See NatureServe's "Element Occurrence Data Standard" (NatureServe 2002 and subsequent revisions), Brown et al. (2004), Hammerson et al. (2008), and Faber-Langendoen et al. (2008) for additional explanation of occurrence viability and ecological integrity assessments.

For many taxa, information on number of 'populations' with good viability, rather than occurrences, will be more available and can be used in addition to or instead of occurrence information. For purposes of this factor (as well as the Number of Occurrences factor) and as related to species, the two terms are interchangeable. For more information, see the definitions of occurrence and of population on page 5.

As an alternative to using the estimated number of good occurrences, a companion field is provided based on "percentage of area with excellent or good viability or ecological integrity." This does not require knowledge of the number of occurrences (or populations). Instead, the total area occupied is recorded (see the Area of Occupancy status factor), and an estimate is made of the percentage of that area which has excellent-to-good viability/ecological integrity.

Number of Occurrences or Percent Area with Good Viability/Ecological Integrity Fields

Complete one or both of the following:

- Enter the estimated number of occurrences with excellent-to-good viability or ecological integrity (a range is acceptable): ________.
- Enter the estimated percentage of area occupied with excellent-to-good viability or ecological integrity (a range is acceptable): ________.

Select also from either or both of the following coded rating fields. As confidence in particular occurrence ranks will degrade with the passage of time, consider using a value range (e.g., BC, BD) to indicate the range of uncertainty in the fields below (see "Picking a Coded Value" on page 10).[7] Note that when both the Number of Occurrences with Good Viability/Ecological Integrity and Percent Area with Good Viability/Ecological Integrity fields below have assigned rating values, the more restrictive of the two values (i.e., indicating greater rarity) will be used for calculating conservation status.

Number of Occurrences with Good Viability/Ecological Integrity

A = No occurrences with excellent or good (assessed as A or B) viability or ecological integrity

B = Very few (1–3) occurrences with excellent or good viability or ecological integrity

C = Few (4–12) occurrences with excellent or good viability or ecological integrity

7 Widespread and ubiquitous (e.g., euryecious) species may have very few occurrences and, as with the Number of Occurrences, the number of occurrences with excellent or good viability may increase as the species habitats are fragmented. For these species, a coded value for the Number of Occurrences with Good Viability/Ecological Integrity should be left as null and the reason for this noted in the Comments field. This is because the number of occurrences with good viability is used in calculating a conservation status, and a small number of occurrences with good viability indicate a sense of concern that is not warranted in this situation.

D = Some (13–40) occurrences with excellent or good viability or ecological integrity

E = Many (41–125) occurrences with excellent or good viability or ecological integrity

F = Very many (>125) occurrences with excellent or good viability or ecological integrity

U = Unknown number of occurrences with excellent or good viability or ecological integrity

Null = Factor not assessed

Percent Area with Good Viability/Ecological Integrity

A = No area with excellent or good (assessed as A or B) viability or ecological integrity

B = Very small percentage (<5%) of area with excellent or good viability or ecological integrity

C = Small percentage (5–10%) of area with excellent or good viability or ecological integrity

D = Moderate percentage (11–20%) of area with excellent or good viability or ecological integrity

E = Good percentage (21–40%) of area with excellent or good viability or ecological integrity

F = Excellent percentage (>40%) of area with excellent or good viability or ecological integrity

U = Unknown percentage of area with excellent or good viability or ecological integrity

Null = Factor not assessed

Number of Occurrences or Percent Area with Good Viability/Ecological Integrity Comments

Discuss specific details and provide additional information, such as the number of occurrences with fair or poor viability or ecological integrity.

Environmental Specificity

A Rarity Factor

Note that this status factor is only used if information on other Rarity factors is not available. (See Table 1.)

Environmental Specificity is the degree to which a species or ecosystem depends on a relatively scarce set of habitats, substrates, food types, or other abiotic and/or biotic factors within the overall range. Relatively narrow requirements are thought to increase the vulnerability of a species or ecosystem. This factor is most important when the number of occurrences, and the range extent or area of occupancy, are largely unknown.

Environmental Specificity Fields

Select from the following values:

A = Very Narrow. Specialist or ecosystem with key requirements scarce. For species, specific habitat(s), substrate(s), food type(s), hosts, breeding/non-breeding microhabitats, or other abiotic and/or biotic factor(s) are used or required by the species or ecosystem in the area of interest, with these habitat(s) and/or other requirements furthermore being scarce within the generalized range of the species or ecosystem within the area of interest, and the population (or the number of breeding attempts) expected to decline significantly if any of these key requirements become unavailable. For ecosystems, environmental requirements are both narrow and scarce (e.g., calcareous seepage fens).

B = Narrow. Specialist or ecosystem with key requirements common. Specific habitat(s) or other abiotic and/or biotic factors (see above) are used or required by the species or ecosystem, but these key requirements are common and within the generalized range of the species or ecosystem within the area of interest. For ecosystems, environmental requirements are narrow but common (e.g., floodplain forest, alpine tundra).

C = Moderate. Generalist or community with some key requirements scarce. Broad-scale or diverse (general) habitat(s) or other abiotic and/or biotic factors are used or required by the species or ecosystem, but some key requirements are scarce in the generalized range of the species or ecosystem within the area of interest. For ecosystems, environmental requirements are broad but scarce (e.g., talus or cliff forests and woodlands, alvars, many rock outcrop communities dependent more on thin, droughty soils per se than specific substrate factors).

D = Broad. Generalist or community with all key requirements common. Broad-scale or diverse (general) habitat(s) or abiotic and/or biotic factors are used or required by the species or ecosystem, with all key requirements common in the generalized range of the species or ecosystem in the area of interest. For animals, if the preferred food(s) or breeding/non-breeding microhabitat(s) become unavailable, the species switches to an alternative with no resulting decline in numbers of individuals or number of breeding attempts. For ecosystems, environmental requirements are broad and common (e.g., forests or prairies on glacial till, or forests and meadows on montane slopes).

U = Unknown

Null = Factor not assessed

Environmental Specificity Comments

Describe the reasons for the value selected to indicate Environmental Specificity, such as how and why Environmental Specificity affects vulnerability of the species or ecosystem. Fields in the Characterization Abstracts files in the NatureServe Biotics 4 data management system should be used to record detailed habitat requirements; specifically, for species use the "Global Habitat Comments" field on the Habitat tab, and for ecosystems, use the "Key Environmental Factors" field on the Environmental Summary tab.

Long-term Trend

A Trends Factor

Long-term Trend Fields

Enter the rating code that best describes the observed, estimated, inferred, or suspected degree of change in population size, extent of occurrence (range extent), area of occupancy, number of occurrences, and/or number of occurrences or percent area with good viability or ecological integrity over the long term (ca. 200 years) in the area of interest (globe, nation, or subnation). Use a value range (e.g., DE) to indicate uncertainty (see "Picking a Coded Value" on page 10).

A = Decline of >90%

B = Decline of 80–90%

C = Decline of 70–80%

D = Decline of 50–70%

E = Decline of 30–50%

F = Decline of 10–30%

G = Relatively Stable (≤10% change)

H = Increase of 10–25%

I = Increase of >25%

U = Long-term trend unknown

Null = Factor not assessed

Enter the estimated Long-term Trend (a range is acceptable): _________.

Long-term Trend Comments

Specify the time period for the change noted, as well as a longer-term view (e.g., back to European or Polynesian exploration) if information is available. If there are data on more than one aspect, specify which aspect is most influential.

Short-term Trend

A Trends Factor

Short-term Trend Fields

Enter the rating code that best describes the observed, estimated, inferred, or suspected degree of change in population size, extent of occurrence (range extent), area of occupancy, number of occurrences, and/or number of occurrences or percent area with good viability or ecological integrity over the short term, whichever most significantly affects the conservation status assessment in the area of interest (globe, nation, or subnation). Consider short-term historical trend within ten years or three generations (for long-lived taxa), whichever is the longer (up to a maximum of 100 years), or, for communities and systems, typically 30 years, depending on the characteristics of the type.

The trend may be recent or current, and the trend may or may not be known to be continuing. Trends may be smooth, irregular, or sporadic. Fluctuations will not normally count as trends, but an observed change should not be considered as merely a fluctuation rather than a trend unless there is evidence for this.

In considering trends, do not consider newly discovered but presumably long existing occurrences, nor newly discovered individuals in previously poorly known areas. Also, consider fragmentation of previously larger occurrences into a greater number of smaller occurrences to represent a decreasing area of occupancy as well as decreasing number of good occurrences or populations.

Select from the following rating values. Use a value range (e.g., DE) to indicate uncertainty (see "Picking a Coded Value" on page 10).

A = Decline of >90%

B = Decline of 80–90%

C = Decline of 70–80%

D = Decline of 50–70%

E = Decline of 30–50%

F = Decline of 10–30%

G = Relatively Stable (≤10% change)

H = Increase of 10–25%

I = Increase of >25%

U = Short-term trend unknown

Null = Factor not assessed

Enter the estimated Short-term Trend (a range is acceptable): ________.

Short-term Trend Comments

Specify what is known about various pertinent trends, including trend information for particular factors, more precise information, regional trends, etc. Also comment, if known, on whether the causes of decline, if any, are understood, reversible, and/or have ceased. If there is knowledge that a trend is not continuing, that should also be specified.

Threats: Severity, Scope, Impact, and Timing

A calculation of overall Threat impact indicates the degree to which a species or ecosystem is observed, inferred, or suspected to be directly or indirectly threatened in the area of interest (globe, nation, or subnation). Direct threats are defined as "the proximate (human) activities or processes that have caused, are causing, or may cause the destruction, degradation, and/or impairment of biodiversity and natural processes" (Salafsky et al. 2008). For example, a direct threat may be trawling or logging. The term is synonymous with sources of stress and proximate pressures (Salafsky et al. 2008) or with "stressors" as used by the U.S. Environmental Protection Agency (Young and Sanzone 2002). In the categorization of Threats and the calculation of overall Threat, what may be called "indirect threats" are not included. Synonymous with drivers or root causes, indirect threats are "the ultimate factors, usually social, economic, political, institutional, or cultural, that enable or otherwise add to the occurrence or persistence of proximate direct threats (e.g., a factory [indirect threat] discharges heavy metals [direct threat] into a stream). There is typically a chain of contributing factors behind any direct threat" and the negative contributing factors are indirect threats (Salafsky et al. 2008).

For the most part, direct threats are related to human activities, but they may be natural. The impact of human activity may be direct (e.g., destruction of habitat) or indirect (e.g., invasive species introduction). Effects of natural phenomena (e.g., fire, hurricane, flooding) may be especially important when the species or ecosystem is concentrated in one location or has few occurrences, which may be a result of human activity. Strictly speaking, these natural phenomena may be part of natural disturbance regimes, but they need to be considered a Threat if a species or habitat is damaged from other threats and has lost its resilience, and is thus vulnerable to the disturbance (Salafsky et al. 2008). In the absence of information on Threats, characteristics of the species or ecosystem that make it inherently susceptible to threats should be considered under the NatureServe status factor Intrinsic Vulnerability (on page 33).

For purposes of status assessment, Threat impact is calculated considering only present and future threats. Past threats are recorded under "timing" but are not used in the calculation of threat impact. For conservation status assessment purposes, effects of past threats (if not continuing) are addressed indirectly under the Long-term Trend and/or Short-term Trend factors. (For species or ecological communities and systems known only historically in the area of interest but with significant likelihood of rediscovery in identifiable areas, current or foreseeable threats in those areas may be addressed here where appropriate if they would affect any extant [but unrecorded] occurrences of the species or ecosystem.)

Threats may be observed, inferred, or projected to occur in the near term, and they may be characterized in terms of scope, severity, and timing. Threat "impact" is calculated from Threat scope and severity (see below). The draft[8] scheme presented here for characterizing scope, severity, and timing (immediacy) is being developed by IUCN-CMP (Conservation Measures Partnership), and is very loosely derived from a scheme used by Birdlife International.

Scope

Scope is defined herein as the proportion of the species or ecosystem that can reasonably be expected to be affected (that is, subject to one or more stresses) by the Threat within ten years with continuation of current circumstances and trends (Table 6). Current circumstances and trends include both existing as well as potential new threats. The ten-year time frame can be extended for some longer-term threats, such as global warming, that need to be addressed today. For species, scope is measured as the proportion of the species' population in the area of interest (globe, nation, or subnation) affected by the Threat. For ecosystems, scope is measured as the proportion of the occupied area of interest (globe, nation, or subnation) affected by the Threat. If a species or ecosystem is evenly distributed, then the proportion of the population or area affected is equivalent to the proportion of the range extent affected by the Threat; however, if the population or area is patchily distributed, then the proportion differs from that of range extent.

TABLE 6
Proposed IUCN-CMP Scoring of the Scope of Threats.

IUCN-CMP [draft] Scope of Threats Scoring	
Pervasive	Affects all or most (71–100%) of the total population or occurrences
Large	Affects much (31–70%) of the total population or occurrences
Restricted	Affects some (11–30%) of the total population or occurrences
Small	Affects a small (1–10%) proportion of the total population or occurrences

Note: Scope is typically assessed within a ten-year time frame.

8 This IUCN-CMP threat characterization and impact calculation scheme is expected to be finalized in 2009.

Severity

Within the scope (as defined spatially and temporally in assessing the scope of the Threat), severity is the level of damage to the species or ecosystem from the Threat that can reasonably be expected with continuation of current circumstances and trends (including potential new threats) (Table 7). Note that severity of Threats is assessed within a ten-year or three-generation time frame, whichever is longer (up to 100 years).

For species, severity is usually measured as the degree of reduction of the species' population. Surrogates for adult population size (e.g., area) should be used with caution, as occupied areas, for example, will have uneven habitat suitability and uneven population density. For ecosystems, severity is typically measured as the degree of degradation or decline in integrity (of one or more key characteristics).

TABLE 7
Proposed IUCN-CMP Scoring of the Severity of Threats.

IUCN-CMP [draft] Severity of Threats Scoring	
Extreme	Within the scope, the Threat is likely to destroy or eliminate the occurrences of an ecological community, system or species, or reduce the species population by 71–100%
Serious	Within the scope, the Threat is likely to seriously degrade/reduce the effected occurrences or habitat or, for species, to reduce the species population by 31–70%
Moderate	Within the scope, the Threat is likely to moderately degrade/reduce the effected occurrences or habitat or, for species, to reduce the species population by 11–30%
Slight	Within the scope, the Threat is likely to only slightly degrade/reduce the effected occurrences or habitat or, for species, to reduce the species population by 1–10%

Note: Severity is assessed within a ten-year or three-generation time frame, whichever is longer (up to 100 years).

Impact

Threat impact (or magnitude) is the degree to which a species or ecosystem is observed, inferred, or suspected to be directly or indirectly threatened in the area of interest (globe, nation, or subnation). The impact of a Threat is based on the interaction between assigned scope and severity values, and includes categories of Very High, High, Medium, and Low. Details on calculating impacts from both individual Threats and all Threats collectively are provided in the Threats Assessment Process described below.

Threat impact reflects a reduction of a species population or decline/degradation of the area of an ecosystem. As shown in Table 8, the median rate of population reduction or area decline for each combination of scope and severity corresponds to the following classes of Threat impact: Very High (75% declines), High (40%), Medium (15%) and Low (3%).

TABLE 8
The Relationship of Threat Impact and Population Reduction or Ecosystem Decline or Degradation.

		Scope (%)			
		Pervasive	Large	Restricted	Small
Severity (%)	Extreme	50–100	22–70	8–30	1–10
	Serious	22–70	10–49–	3–21	1–7
	Moderate	8–30	3–21	1–9	0.1–3
	Slight	1–10	0–7	1–3	<1

Very High
High
Medium
Low

For species, these impacts should correspond to ongoing and projected population reductions resulting from combinations of scope and severity. Impacts to ecological communities and systems should represent ongoing and projected declines or degradation of area.

Timing

Although timing (immediacy) is recorded for Threats to the area of interest (globe, nation, or subnation), it is not used in the calculation of Threat impact.

TABLE 9
Birdlife International and Proposed IUCN-CMP (and NatureServe) Scoring of Threat Timing.

IUCN-CMP [draft] Timing of Threats Scoring	
High	Continuing
Moderate	Only in the future (could happen in the short term [less than ten years or three generations]), or now suspended (could come back in the short term)
Low	Only in the future (could happen in the long term), or now suspended (could come back in the long term)
Insignificant/ Negligible	Only in the past and unlikely to return, or no direct effect but limiting

Recording Threats and Calculating Threat Impacts

The scope, severity, and timing of any individual Threats observed, inferred, or suspected to be directly or indirectly affecting a species or ecosystem are recorded using the IUCN-CMP Classification of Threats presented in Table 14 on page 31 (see also Salafsky et al. 2008). There are 11 broad ("Level 1") categories of Threats, and each of these Level 1 Threats includes 3–6 more specific, finer ("Level 2") Threats. The process for recording the Threats identified for a species or ecosystem and calculating the impacts of these Threats is described below as a series of steps. Table 13 (page 31) summarizes the values (including value ranges to express uncertainty) to be used for recording scope, severity, impact, and timing.

Threats Assessment Process

1. Record in the Classification of Threats (Table 14) an estimate of the scope, severity, and timing for applicable individual Threats to the species or ecosystem that are either:

- Level 2 Threats; or
- Level 1 Threat categories for which Level 2 Threats will not be recorded.

Note: If only Level 1 Threat categories are being recorded for the species or ecosystem, skip step 3 below.

2. Apply the scope and severity values recorded in step 1 to the matrix below (Table 10) to calculate and record the impact (i.e., magnitude) for each assessed Threat. If the assigned scope or severity value is a range, evaluate the highest values in the range for scope with the highest for severity and then evaluate the pair of lowest values to determine the range of Threat impact.

TABLE 10
Calculation of Threat Impact.

		Scope			
		Pervasive	Large	Restricted	Small
Severity	Extreme	Very High	High	Medium	Low
	Serious	High	High	Medium	Low
	Moderate	Medium	Medium	Low	Low
	Slight	Low	Low	Low	Low

3. Record an estimate of scope, severity, and impact for each Level 1 Threat category that contains one or more assessed Level 2 Threats, based on the values of these Level 2 Threats as follows:

- If there is only one Level 2 Threat recorded in the Level 1 category, assign the scope, severity, impact, and timing values of this Level 2 Threat to the Level 1 Threat in which it is included;
- If there are multiple Level 2 Threats recorded in the Level 1 category, evaluate their degree of overlap:
  - » If the Level 2 Threats overlap, identify which of them has the highest impact and assign the scope, severity, and impact values of this Level 2 Threat to the Level 1 category in which it is included;
  - » If the Level 2 Threats are substantially non-overlapping, then higher scope and severity values may be justified for the Level 1 category in which they are included, and best professional judgment should be used to assign scope, severity, impact, and timing values to that Level 1 Threat.

Range values may be appropriate for a Level 1 Threat category when one or more of the Level 2 Threats contained within have an assigned range value.

4. After impact has been recorded for all applicable Level 1 Threat categories, use these impact values to calculate an overall Threat impact for the species or ecosystem according to the guidelines in Table 12. These guidelines were developed by taking the midpoint range of a particular impact rating and determining how many additional independent Threats would be needed to increase the overall impact to the midpoint of the next level (see Table 11).

TABLE 11
Median Impact Values for Each Matrix Cell, and the Resulting Midpoint of Each Threat Impact Level.

		Scope (%)				Impact Level Midpoints	
		Pervasive	Large	Restricted	Small		
Severity (%)	Extreme	75.0	46.0	19.0	5.5	75.0%	Very High
	Serious	46.0	29.5	12.0	4.0	40.5%	High
	Moderate	19.0	12.0	5.0	1.6	15.5%	Medium
	Slight	5.5	3.5	2.0	0.5	3.4%	Low

Note: Median values are based on the population reduction or ecosystem decline or degradation percentages shown in Table 8.

Using the above table, for example, four Threats with Low impact ratings (thus each with midpoint of 3.4%) would be estimated to have an overall impact of 14%, which is very near the midpoint of the Medium impact level (15%). Note that if the value for one or more Level 1 impacts is a range, evaluate the highest (single and range) values for every Level 1 Threat using Table 12 and then evaluate the lowest values to determine the range of overall Threat impact. For example, three Medium–Low Threat impacts indicate an overall Threat impact of High–Low, and four Medium–Low impacts indicate an overall Threat impact of High–Medium.

Table 12 provides general guidance for determining overall impact, and values resulting from its use should be considered first approximations. For example, these guidelines may be too liberal if the Level 1 Threat categories mostly overlap geographically, or too conservative if the scope and severity ratings for Level 1 Threats are mostly greater than the median value for each range and thus mostly greater than the median values shown in Table 11 for Threat impact. Best professional judgment should always be applied when assigning the final overall Threat impact.

TABLE 12
Guidelines for Assigning Overall Impact Value.

Impact Values of Level 1 Threat Categories	Overall Threat Impact
≥1 Very High, ***or*** ≥2 High, ***or*** 1 High + ≥2 Medium	Very High
1 High, ***or*** ≥3 Medium, ***or*** 2 Medium + 2 Low, ***or*** 1 Medium + ≥3 Low	High
1 Medium, ***or*** ≥4 Low	Medium
1–3 Low	Low

Once calculated, record the assigned overall impact value or value range in the Overall Threat Impact field, and add notes to the Threat Comments field, particularly if the overall Threat impact value was adjusted.

Note that for long-distance migratory animals, the calculation of overall Threat impact should be based on the combination of highest impact Level 1 Threat categories at any one season (e.g., breeding, wintering, migration) rather than an aggregation of all the Level 1 impacts that occur throughout the different seasons. Use the Threat Comments field to discuss the Threats at different seasons.

Threats Fields

At a minimum, the Overall Threat Impact and Threat Comments fields should be recorded for a species or ecosystem, as well as the scope, severity, impact, and timing of applicable Level 1 Threat categories in the Classification of Threats (Table 14).

Record information on specific Threats and the calculated Threat impacts in the IUCN-CMP Classification of Threats provided in Table 14 (see also Salafsky et al. 2008) according to the Threats Assessment Process described above. Values to be assigned for scope, severity, impact, and timing in the Threats classification table are provided in Table 13, along with plausible ranges of values that can be used to indicate uncertainty. For definitions of the scoring values, see Table 6 for scope, Table 7 for severity, and Table 9 for timing. See Table 10 for the calculation of impact.

Note that value ranges should not be used to indicate an estimated range of variation, but rather to indicate uncertainty. In cases where there is a range of variation, an average should be used instead of a value range (e.g., if the severity of a Threat varies across its scope, an average severity should be used instead of a range).

TABLE 13
Values Proposed by IUCN-CMP for Scoring Individual Threats.

Proposed IUCN-CMP Individual Threats Scoring Values			
Scope	**Severity**	**Impact**	**Timing**
Pervasive Large Restricted Small	Extreme Serious Moderate Slight	Very High High Medium Low	High Moderate Low Insignificant/ Negligible
Value ranges that can be used to express uncertainty			
Pervasive–Large Pervasive–Restricted Large–Restricted Large–Small Restricted–Small	Extreme–Serious Extreme–Moderate Serious–Moderate Serious–Slight Moderate–Slight	Very High–High Very High–Medium High–Medium High–Low Medium–Low	High–Moderate High–Low Moderate–Low Moderate–Insignificant/ Negligible Low–Insignificant/Negligible

In transitioning from the pre-2009 NatureServe conservation status assessment process to that described in this document, the proposed IUCN-CMP values for scope and severity are sufficiently close to those used by NatureServe that no conversion will be necessary. However, the IUCN-CMP values for timing differ enough that it is recommended that the NatureServe data recorded for immediacy be discarded and new timing values recorded.

TABLE 14
Classification of Threats (adopted from IUCN-CMP, Salafsky et al. 2008).

Threat No.	Threat Description	Scope	Severity	Impact	Timing
1	Residential & Commercial Development				
1.1	Housing & Urban Areas				
1.2	Commercial & Industrial Areas				
1.3	Tourism & Recreation Areas				
2	Agriculture & Aquaculture				
2.1	Annual & Perrenial Non-Timber Crops				
2.2	Wood & Pulp Plantations				
2.3	Livestock Farming & Ranching				
2.4	Marine & Freshwater Aquaculture				
3	Energy Production & Mining				
3.1	Oil & Gas Drilling				
3.2	Mining & Quarrying				
3.3	Renewable Energy				
4	Transportation & Service Corridors				
4.1	Roads & Railroads				
4.2	Utility & Service Lines				
4.3	Shipping Lanes				
4.4	Flight Paths				

TABLE 14 (cont.)

Threat No.	Threat Description	Scope	Severity	Impact	Timing
5	Biological Resource Use				
5.1	Hunting & Collecting Terrestrial Animals				
5.2	Gathering Terrestrial Plants				
5.3	Logging & Wood Harvesting				
5.4	Fishing & Harvesting Aquatic Resources				
6	Human Intrusions & Disturbance				
6.1	Recreational Activities				
6.2	War, Civil Unrest & Military Exercises				
6.3	Work & Other Activities				
7	Natural System Modifications				
7.1	Fire & Fire Suppression				
7.2	Dams & Water Management/Use				
7.3	Other Ecosystem Modifications				
8	Invasive & Other Problematic Species & Genes				
8.1	Invasive Non-Native/Alien Species				
8.2	Problematic Native Species				
8.3	Introduced Genetic Material				
9	Pollution				
9.1	Household Sewage & Urban Waste Water				
9.2	Industrial & Military Effluents				
9.3	Agricultural & Forestry Effluents				
9.4	Garbage & Solid Waste				
9.5	Air-Borne Pollutants				
9.6	Excess Energy				
10	Geological Events				
10.1	Volcanoes				
10.2	Earthquakes/Tsunamis				
10.3	Avalanches/Landslides				
11	Climate Change & Severe Weather				
11.1	Habitat Shifting & Alteration				
11.2	Droughts				
11.3	Temperature Extremes				
11.4	Storms & Flooding				

Overall Threat Impact

Very High

High

Medium

Low

Unknown

Null = Factor not assessed

The following overall impact ranges are also permissible for expressing uncertainty:

Very High–High

Very High–Medium

High–Medium

High–Low

Medium–Low

Threat Comments

Discuss individual threats as well as overall threat impact. Whenever possible, use the standardized IUCN-CMP names for threats (shown in the Classification of Threats, Table 14).

Intrinsic Vulnerability

A Threats Factor

Note that this factor is not used if the Threats status factor has been assessed. (See Table 1 on page 9.)

Intrinsic Vulnerability is the observed, inferred, or suspected degree to which characteristics of the species or ecosystem (such as life history or behavior characteristics of species, or likelihood of regeneration or recolonization for ecosystems) make it vulnerable or resilient to natural or anthropogenic stresses or catastrophes. For ecosystems, Intrinsic Vulnerability is most readily assessed using the dominant species and vegetation structure that characterize the ecosystem, but it can also refer to ecological processes that make an ecosystem vulnerable or lack resiliency (e.g., shoreline fens along estuarine and marine coasts subject to rising sea levels).

Since geographically or ecologically disjunct or peripheral occurrences may show additional vulnerabilities not generally characteristic of a species or ecosystem, characteristics of Intrinsic Vulnerability are to be assessed for the species or ecosystem throughout the area of interest, or at least for its better occurrences. Information on population size, number of occurrences, area of occupancy, extent of occurrence, or environmental characteristics that affect resiliency should not be considered when assessing Intrinsic Vulnerability; these are addressed using other status factors.

Note that the Intrinsic Vulnerability characteristics exist independent of human influence, but may make the species or ecosystem more susceptible to disturbance by human activities. The extent and effects of current or projected extrinsic influences themselves should be addressed in the comments field of the Threats status factor.

Intrinsic Vulnerability Fields

Select from the following values:

A = Highly Vulnerable. Species is slow to mature, reproduces infrequently, and/or has low fecundity such that populations are very slow (>20 years or five generations) to recover from decreases in abundance; or species has low dispersal capability such that extirpated populations are unlikely to become reestablished through natural recolonization (unaided by humans). Ecosystem occurrences are highly susceptible to changes in composition and structure that rarely if ever are reversed through natural processes even over substantial time periods (>100 years).

B = Moderately Vulnerable. Species exhibits moderate age of maturity, frequency of reproduction, and/or fecundity such that populations generally tend to recover from decreases in abundance over a period of several years (on the order of 5–20 years or 2–5 generations); or species has moderate dispersal capability such that extirpated populations generally become reestablished through natural recolonization (unaided by humans). Ecosystem occurrences may be susceptible to changes in composition and structure but tend to recover through natural processes given reasonable time (10–100 years).

C = Not Intrinsically Vulnerable. Species matures quickly, reproduces frequently, and/or has high fecundity such that populations recover quickly (<5 years or 2 generations) from decreases in abundance; or species has high dispersal capability such that extirpated populations soon become reestablished through natural recolonization (unaided by humans). Ecosystem occurrences are resilient or resistant to irreversible changes in composition and structure and quickly recover (within 10 years).

U = Unknown

Null = Factor not assessed

Intrinsic Vulnerability Comments

Describe the reasons for the value selected to indicate Intrinsic Vulnerability. Examples for species include reproductive rates and requirements, time to maturity, dormancy requirements, and dispersal patterns. For ecosystems, describe the characteristics of the community that are thought to be intrinsically vulnerable and the ecological processes on which these characteristics depend. For example, an ecosystem type may be defined by old growth features that require more than150 years to recover its structure and composition after a blowdown; a pine forest type may be highly dependent on timing of masting or availability of seed sources to recover after a catastrophic fire; a wetland may be dependent on periodic drawdowns or flash flooding for regeneration of its species; a desert shrubland ecosystem with an abundant cryptogram crust (important for nutrient cycling, N-fixation, and moisture retention) may take a long time (>50 years) to recover an intact crust after disturbance due to the slow growth of the cryptogram layer.

Other Considerations

Not a status factor, but a field for recording information not captured in the status factors.

Other Considerations Field

Provide and comment on any other information that should be considered in the assignment of NatureServe conservation status. Including comments in this field is particularly important when the conservation status resulting from the overall assessment is different from the status that the values for the formal status factors, taken alone, would suggest. This field may also be used for other general notes pertinent to multiple status factors.

The following are some examples of Other Considerations:

- A population viability analysis may indicate that the species has x-percent probability of surviving for y years (or an equivalent number of generations) in the same area of interest (globe, nation, or subnation).
- NatureServe global conservation status is based primarily on particular national or subnational status(es), or national status is based on particular subnational status(es).

Rescue Effect

Note that this factor and its associated data are used only for national- and subnational-level conservation status assessments for species.

Rescue Effect is the process by which immigrating propagules result in a lower extinction risk for the population being assessed (see IUCN 2003). Questions to be considered in making this judgment are shown below.

For example, if the jurisdictional population being assessed experiences any significant immigration of propagules capable of reproducing in the jurisdiction and the immigration is not expected to decrease, changing the conservation status to a lower risk category may be appropriate. Normally, such a downgrading will involve a half-step or one-step change in status, such as changing the status from Imperiled (S2) to Vulnerable (S3), but for expanding populations whose global range barely touches the edge of the jurisdiction, a change of two or more ranks may be appropriate. Similarly, if the jurisdiction is very small and not isolated by barriers from surrounding regions, downgrading by two or more ranks may be appropriate. Conversely, if the population within the jurisdiction is a demographic sink that is unable to sustain itself without immigration from populations outside the region, ***and*** if the extra-jurisdictional source is expected to decrease, the extinction risk of the target population may be underestimated by the criteria. In such exceptional cases, changing the status to a higher risk category may be appropriate.

For non-breeding (e.g., wintering) migratory species, changing the conservation status to a lower risk category may be appropriate if the breeding population could rescue the target population should it decline, and assuming that conditions inside and outside the jurisdiction are not deteriorating.

Questions to be Considered

Breeding populations:

- Does the national/subnational population experience any significant immigration of propagules likely to reproduce in the region? (Y/N/U)
- Is the immigration expected to decrease? (Y/N/U)
- Is the national/subnational population a sink (an area where the local reproduction of a taxon is lower than local mortality)? (Y/N/U)
- What is the distance to the next population, if not contiguous? ________ km.

Visiting populations (i.e., populations that are regularly occurring but non-breeding in the jurisdiction):

- Are the conditions outside the nation/subnation deteriorating? (Y/N/U)
- Are the conditions within the nation/subnation deteriorating? (Y/N/U)
- Can the breeding population rescue the national/subnational population should it decline (plausibility of a Rescue Effect)? (Y/N/U)

Rescue Effect Fields

Enter the Rescue Effect (e.g., -1, -½, 0, +½, +1, +1½, +2): ________.

Rescue Effect Comments

Discuss any uncertainties in estimating the Rescue Effect.

Conservation Status Rank Qualifiers

As briefly described in Appendix A, there are three qualifiers that may be appended to conservation status ranks: **?** = imprecision, **Q** = questionable taxonomy, and **C** = captive or cultivated (for species only). These qualifiers are used either to indicate the degree of uncertainty associated with an assigned status rank, or to provide additional information about the ecosystem or taxon that has been assessed.

? – Inexact Numeric Rank. The addition of a ? qualifier to a 1–5 conservation status rank denotes that the assigned rank is imprecise. This qualifier is used only with the numeric status ranks, not with X, H, or U ranks, or range ranks. As described in previous sections, uncertainty about the exact status of a species or ecosystem is usually denoted by a range rank, with the range indicating the degree of uncertainty; however a #? may also be used. Figure 3 illustrates the uncertainty associated with different status ranks.

FIGURE 3
Comparison of Uncertainty Associated with Examples of an Exact Status Rank, Rank with "?" Qualifier, and Range Ranks. (Credit: Larry Morse.)

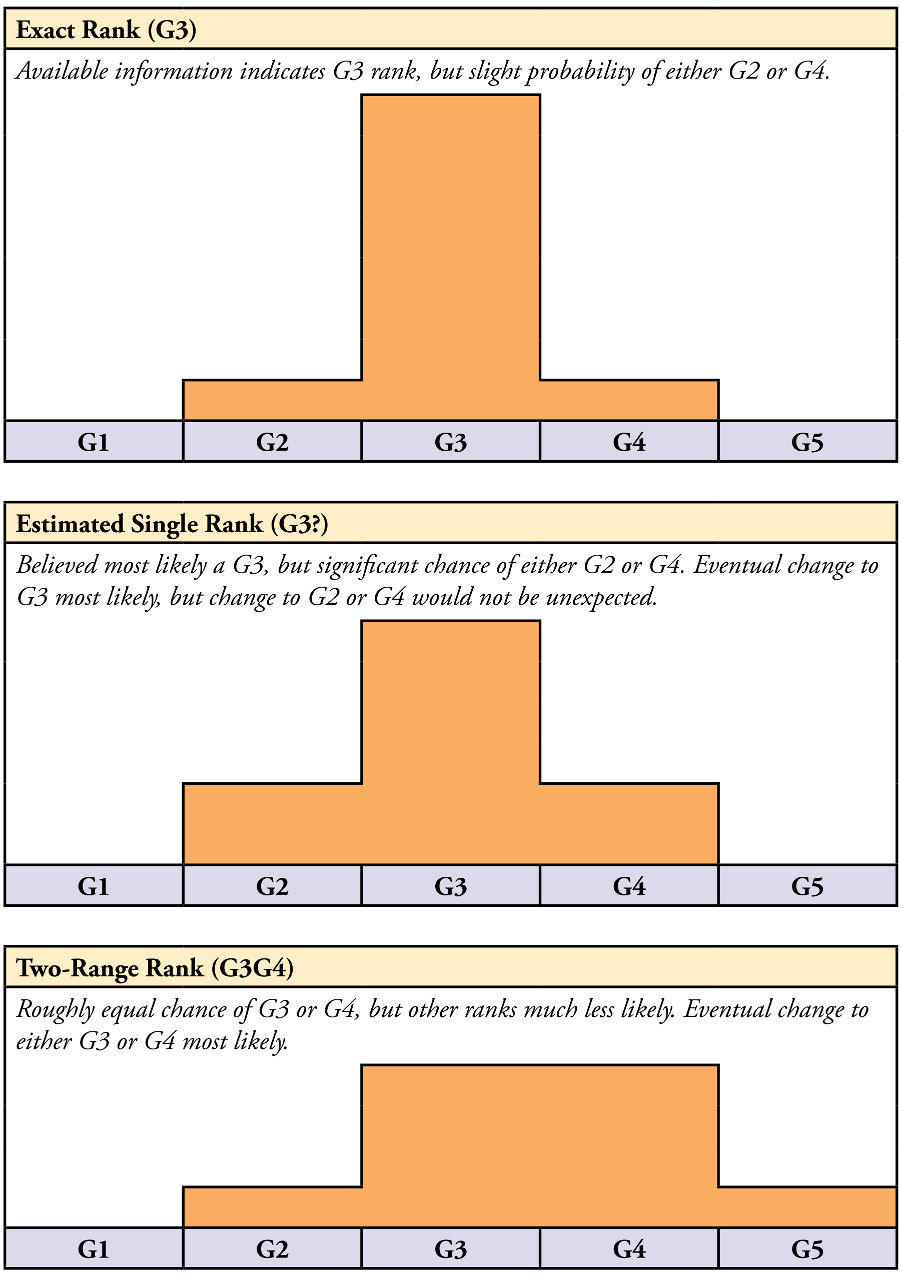
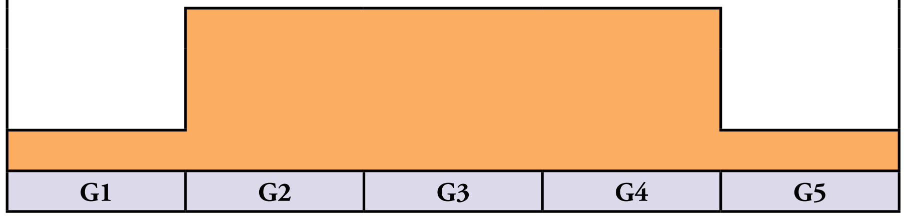


FIGURE 3 (cont.)

Three-Range Rank (G2G4)

Roughly equal chance of G2, G3 or G4, but other ranks much less likely. Considerable further information needed to resolve. Eventual change to either G2, G3 or G4 expected.



Q – Questionable taxonomy, which may reduce conservation priority. Use of the Q qualifier denotes that the distinctiveness of the assessed entity as a taxon or ecosystem type at the current level is questionable. More importantly, use of the Q further indicates that *resolution of this uncertainty may result in a change, either from a species to a subspecies or hybrid, or inclusion of the assessed taxon or ecosystem type in another taxon or type, such that the resulting taxon/type will have a lower-priority (numerically higher) conservation status rank than that originally assigned.*

An example of an invalid use of the Q qualifier would be a G5Q, which is not appropriate since resolution of the uncertainty associated with the assessed taxon or ecosystem type could not result in a taxon or type with a conservation status that is lower priority (higher numerically)—the assigned status (5) is already the lowest priority. Similarly, a taxon or type that may be split into several new species or types would not qualify for a Q qualifier as the conservation statuses of the resulting entities would either stay the same or have higher priority (become numerically lower); for example, a G4 taxon or type is split into three G2 and G3 ranked (higher-priority) taxa/types. Note that the Q modifier is only used with global level conservation status ranks, and not at a national or subnational level. Note also that other data fields are available at a global level to specify taxonomic uncertainties, regardless of resolution of the taxonomic uncertainty on the conservation status.

C – Captive or Cultivated Only. The C qualifier is used to indicate that a taxon, at present, is extinct in the wild across its entire native range, but is extant in cultivation, in captivity, as a naturalized population (or populations) outside its historical native range, or as a reintroduced population not yet established. Note that the C modifier is only used for species status ranks at the global level, and not at a national or subnational level.

Additional Information of Interest

Number of Protected and Managed Occurrences Field

This field is no longer included in the set of core factors used for NatureServe conservation status assessments. The degree of threat to a species or ecosystem that is indirectly assessed for this field is largely addressed, and better captured, in the Threats conservation status factor. However, this field may still provide useful supplemental information for conservation status assessments.

Enter the estimated number of protected and managed occurrences (a range is acceptable): _________.

Enter the code that best describes the observed, estimated, inferred, or suspected number of occurrences that are appropriately protected and managed for the long-term persistence of the species or ecosystem in the area of interest (globe, nation, or subnation). Note that both the protection and management criteria must be met in order to assign a rating code value. If the values are different for protected versus managed occurrences, assign the code that represents the more restrictive of the two. For example, if several occurrences are protected but none are appropriately managed, select the A = None code.

Select from the following values:

A = None (no occurrences appropriately protected and managed)

B = Few (1–3) occurrences appropriately protected and managed

C = Several (4–12) occurrences appropriately protected and managed

D = Many (13–40) occurrences appropriately protected and managed

E = Very many (>40) occurrences appropriately protected and managed

U = Unknown whether any occurrences are appropriately protected and managed

Null = Not assessed

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NatureServe Global Conservation Status Definitions

Listed here are definitions for interpreting NatureServe's global (range-wide) conservation status ranks. Global conservation status ranks are assigned by NatureServe scientists or by a designated lead office in the NatureServe network.

Appendix A. NatureServe Conservation Status Ranks

Global (G) Conservation Status Ranks

Rank	Definition
GX	**Presumed Extinct** (species) – Not located despite intensive searches and virtually no likelihood of rediscovery. **Extinct** (ecological communities and systems) – Eliminated throughout its range, with no restoration potential due to extinction of dominant or characteristic taxa and/or elimination of the sites and ecological processes on which the type depends.
GH	**Possibly Extinct** – Known from only historical occurrences but still some hope of rediscovery. There is evidence that the species may be extinct or the ecosystem may be eliminated throughout its range, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is extinct or eliminated throughout its range.[1]
G1	**Critically Imperiled** – At very high risk of extinction or elimination due to extreme rarity, very steep declines, or other factors.
G2	**Imperiled** – At high risk of extinction or elimination due to very restricted range, very few populations or occurrences, steep declines, or other factors.
G3	**Vulnerable** – At moderate risk of extinction or elimination due to a restricted range, relatively few populations or occurrences, recent and widespread declines, or other factors.
G4	**Apparently Secure** – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5	**Secure** – Common; widespread and abundant.

1 Possibly Eliminated ecosystems (ecological communities and systems) may include ones presumed eliminated throughout their range, with no or virtually no likelihood of rediscovery, but with the potential for restoration, for example, American chestnut forests.

Variant Global Conservation Status Ranks

Rank	Definition
G#G#	**Range Rank** – A numeric range rank (e.g., G2G3, G1G3) is used to indicate uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).
GU	**Unrankable** – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. *Note:* Whenever possible (when the range of uncertainty is three consecutive ranks or less), a range rank (e.g., G2G3) should be used to delineate the limits (range) of uncertainty.
GNR	**Unranked** – Global rank not yet assessed.
GNA	**Not Applicable** – A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities.[2]

Rank Qualifiers

Rank	Definition
?	**Inexact Numeric Rank** – This should not be used with any of the Variant Global Conservation Status Ranks or GX or GH.
Q	**Questionable taxonomy that may reduce conservation priority** – Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The "Q" modifier is only used at a global level and not at a national or subnational level.
C	**Captive or Cultivated Only** – Taxon at present is extinct in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population not yet established. The "C" modifier is only used at a global level and not at a national or subnational level. Possible ranks are GXC or GHC.

2 A global conservation status rank may be not applicable for several reasons, related to its relevance as a conservation target. In such cases, typically the species is a hybrid without conservation value, of domestic origin, or the ecosystem is non-native, for example, ruderal vegetation, a plantation, agricultural field, or developed vegetation (lawns, gardens, etc).

Infraspecific Taxon Global Conservation Status Ranks

Infraspecific taxon status ranks apply to species only; these ranks do not apply to ecological communities or systems.

Rank	Definition
T#	**Infraspecific Taxon (trinomial)** – The status of infraspecific taxa (subspecies or varieties) are indicated by a "T rank" following the species' global rank. Rules for assigning T ranks follow the same principles outlined above. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T rank cannot imply the subspecies or variety is more abundant than the species, for example, a G1T2 rank should not occur. A vertebrate animal population (e.g., listed under the U.S. Endangered Species Act or assigned candidate status) may be tracked as an infraspecific taxon and given a T rank; in such cases a Q is used after the T rank to denote the taxon's informal taxonomic status.

NatureServe National and Subnational Conservation Status Definitions

Listed here are definitions for interpreting NatureServe conservation status ranks at the national (N-rank) and subnational (S-rank) levels. The term "subnational" refers to state- or province-level jurisdictions (e.g., California, Ontario).

Assigning national and subnational conservation status ranks for species and ecosystems (ecological communities and systems) follows the same general principles as used in assigning global status ranks. A subnational rank, however, cannot imply that a species or ecosystem is more secure at the state/province level than it is nationally or globally (e.g., a rank of G1S3 is invalid), and similarly, a national rank cannot exceed the global rank. Subnational ranks are assigned and maintained by state or provincial NatureServe network programs.

National (N) and Subnational (S) Conservation Status Ranks

Rank	Definition
NX **SX**	**Presumed Extirpated** – Species or ecosystem is believed to be extirpated from the jurisdiction (i.e., nation, or state/province). Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered. (= "Regionally Extinct" in IUCN Red List terminology)
NH **SH**	**Possibly Extirpated** – Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the jurisdiction, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20–40 years despite some searching or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.
N1 **S1**	**Critically Imperiled** – Critically imperiled in the jurisdiction because of extreme rarity or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the jurisdiction.
N2 **S2**	**Imperiled** – Imperiled in the jurisdiction because of rarity due to very restricted range, very few populations or occurrences, steep declines, or other factors making it very vulnerable to extirpation from the jurisdiction.
N3 **S3**	**Vulnerable** – Vulnerable in the jurisdiction due to a restricted range, relatively few populations or occurrences, recent and widespread declines, or other factors making it vulnerable to extirpation.
N4 **S4**	**Apparently Secure** – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
N5 **S5**	**Secure** – Common, widespread, and abundant in the jurisdiction.

Variant National and Subnational Conservation Status Ranks

Rank	Definition
N#N# **S#S#**	**Range Rank** – A numeric range rank (e.g., S2S3 or S1S3) is used to indicate any range of uncertainty about the status of the species or ecosystem. Ranges cannot skip more than two ranks (e.g., SU is used rather than S1S4).
NU **SU**	**Unrankable** – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
NNR **SNR**	**Unranked** — National or subnational conservation status not yet assessed.
NNA **SNA**	**Not Applicable** – A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities.[3]
Not Provided	Species or ecosystem is known to occur in this nation or state/province. Contact the appropriate NatureServe network program for assignment of conservation status.

3 A conservation status rank may be not applicable for some species, including long-distance aerial and aquatic migrants, hybrids without conservation value, and non-native species or ecosystems, for several reasons:

Rank Qualifier

Rank	Definition
N#? S#?	**Inexact Numeric Rank–** This should not be used with any of the Variant National or Subnational Conservation Status Ranks, or NX, SX, NH, or SH.

Breeding Status Qualifiers[4]

Qualifier	Definition
B	**Breeding** – Conservation status refers to the breeding population of the species in the nation or subnation.
N	**Non-breeding** – Conservation status refers to the non-breeding population of the species in the nation or subnation.
M	**Migrant** – Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the nation or subnation.

■ ■ ■

Long distance migrants: Assigning conservation status to long-distance aerial or aquatic migrant animals (e.g., species like migrant birds, bats, butterflies, sea turtles, and cetaceans) during their migrations is typically neither practical nor helpful to their conservation. During their migrations, most long-distance migrants occur in an irregular, transitory, and dispersed manner. Some long-distance migrants occur regularly, while others occur only as accidental or casual visitors to a subnation or nation. Some long-distance migrants may regularly occur as rare breeding or non-breeding seasonal (e.g., winter) species, but in an inconsistent, spatially irregular fashion, or as breeders that die out apparently with no return migration and no overwintering (e.g., some Lepidoptera). In all these circumstances, it is not possible to identify discrete areas for individual species that can be managed so as to significantly affect their conservation in a nation or subnation. The risk of extinction for these species is largely dependent on effective conservation of their primary breeding and non-breeding grounds, notwithstanding actions that may benefit species collectively such as protecting migratory "hotspots," curbing pollution, minimizing deaths from towers and other obstructions, etc.

An exception is those species, such as shorebirds, whose populations concentrate at particular areas during migration, and species occurring in multiple species assemblages at migration "funnels" or hotspots. Such species may be collectively treated within "Animal Assemblage" elements, for which conservation status assignment would be appropriate. Examples of such assemblages are Shorebird, Waterfowl, Landbird, and Raptor Migratory Concentration Areas. Species considered within assemblage elements differ from the more common situation during migration, whereby most long-distance migrants are tied to particular places and habitats during their breeding season, as well as during the non-breeding [e.g., wintering] season when they are not in transit. For these species, conservation of both types of places is important to minimize their risk of extinction.

Hybrids without conservation value and non-natives: It is not appropriate to assign a conservation status to hybrids without conservation value, or to non-native species or ecosystems. However, in the rare case where a species is presumed or possibly extinct in the wild (GXC/GHC) but is extant as a naturalized population outside of its native range, the naturalized population should be treated as a benign introduction, and should be assessed and assigned a numeric national and/or subnational conservation status rank. The rationale for this exception for naturalized populations is that when a species is extinct over its entire natural range, the presence of that species within an area must be considered important to highlight and preserve, even if the area is not part of the species' natural range.

4 A breeding status is only used for species that have distinct breeding and/or non-breeding populations in the nation or subnation. A breeding-status S rank can be coupled with its complementary non-breeding-status S rank if the species also winters in the nation or subnation. In addition, a breeding-status S rank can also be coupled with a migrant-status S rank if, on migration, the species occurs regularly at particular staging areas or concentration spots where it might warrant conservation attention. Multiple conservation status ranks (typically two, or rarely three) are separated by commas (e.g., S2B,S3N or SHN,S4B,S1M).

Appendix B. Summary of IUCN Red List Categories and Criteria

The IUCN Red List Categories

Extinct (EX)
A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), and throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

Extinct in the Wild (EW)
A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity, or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), and throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

Critically Endangered (CR)
A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E (see below) for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

Endangered (EN)
A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.

Vulnerable (VU)
A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.

Near Threatened (NT)
A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered, or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

Least Concern (LC)
A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened. Widespread and abundant taxa are included in this category.

Data Deficient (DD)
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required, and acknowledges the possibility that future research will

show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

Not Evaluated (NE)

A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

Summary of the IUCN Red List Criteria

Summary of the five criteria (A–E) used to evaluate if a taxon belongs in a threatened category (Critically Endangered, Endangered, or Vulnerable).

Use any of the criteria A–E	**Critically Endangered**	**Endangered**	**Vulnerable**
A. Population reduction Declines measured over the longer of ten years or three generations			
A1	>90%	>70%	>50%
A2, A3, and A4	>80%	>50%	>30%
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible ***and*** understood ***and*** ceased based on (and specifying) any of the following: (a) direct observation (b) an index of abundance appropriate to the taxon (c) a decline in area of occupancy (AOO), extent of occurrence and/or habitat quality (d) actual or potential levels of exploitation (e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.			
A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased ***or*** may not be understood ***or*** may not be reversible, based on (and specifying) any of (a) to (e) under A1.			
A3. Population reduction projected or suspected to be met in the future (maximum 100 years) based on (and specifying) any of (b) to (e) under A1.			
A4. An observed, estimated, inferred, projected or suspected population reduction (maximum 100 years) where the time period must include both the past and the future, and where the causes of reduction may not have ceased ***or*** may not be understood ***or*** may not be reversible, based on (and specifying) any of (a) to (e) under A1.			
B. Geographic range in the form of either B1 (extent of occurrence) *or* B2 (area of occupancy)			
Either (B1) extent of occurrence	< 100km^2	< 5,000km^2	< 20,000km^2
Or (B2) area of occupancy and at least two of (a) to (c):	< 10km^2	< 500km^2	< 2,000km^2
(a) severely fragmented, or number of locations	= 1	≤ 5	≤ 10
(b) continuing decline in (i) extent of occurrence, (ii) area of occupancy, (iii) area, extent, and/or quality of habitat, (iv) number of locations or subpopulations, and (v) number of mature individuals.			
(c) extreme fluctuations in any of (i) extent of occurrence, (ii) area of occupancy, (iii) number of locations or subpopulations, and (iv) number of mature individuals.			

Use any of the criteria A–E	**Critically Endangered**	**Endangered**	**Vulnerable**
C. Small population size and decline			
Number of mature individuals and either C1 or C2:	<250	<2,500	<10,000
C1. An estimated continuing decline of at least (maximum 100 years)	25% in three years or one generation	20% in five years or two generations	10% in ten years or three generation
C2. A continuing decline and (a) and/or (b):			
(a.i) number of mature individuals in largest subpopulation	<50	<250	<1,000
(a.ii) or percentage of mature individuals in one subpopulation	90–100%	95–100%	100%
(b) extreme fluctuations in the number of mature individuals			
D. Very small or restricted population			
Either (D1) number of mature individuals	<50	<250	<1,000
Or (D2) restricted area of occupancy	n/a	n/a	typically: <20km^2 or # locations ≤5
E. Quantitative Analysis			
Indicating the probability of extinction in the wild to be at least	50% within 10 years or three generations (100 yrs max)	20% within 20 years or five generations (100 yrs max)	10% in 100 years

The tables below provide comparisons between the different conservation status categories used by NatureServe and the IUCN Red List (each compared at multiple geographic levels), and those used by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). In both tables, rough equivalencies are indicated through the display of statuses in the same row.

Appendix C. NatureServe, IUCN Red List, and COSEWIC Statuses Compared

Comparison of NatureServe and IUCN Red List Global Statuses

NatureServe Global Status	IUCN Red List Status
Presumed Extinct (GX)	Extinct (EX)
Presumed Extinct in the Wild[1] (GXC)	Extinct in the Wild[1] (EW)
Possibly Extinct (GH)	Critically Endangered (CR) (possibly extinct)
Possibly Extinct in the Wild[1] (GHC)	Critically Endangered (CR) (possibly extinct)
Critically Imperiled (G1)	Critically Endangered (CR)
Critically Imperiled (G1)	Endangered (EN)
Imperiled (G2)	Vulnerable (VU)
Vulnerable (G3)	Near Threatened (NT)
Apparently Secure (G4)	Least Concern (LC)
Secure (G5)	Least Concern (LC)
Unrankable (GU)	Data Deficient (DD)

Comparison of NatureServe National/Subnational Statuses with the IUCN Regional Red List and COSEWIC Statuses

NatureServe National/ Subnational Status	IUCN Regional Red List Status	COSEWIC Status[2]
Presumed Extirpated (NX/SX ***and*** GX)	Extinct (EX)	Extinct (X)
Presumed Extirpated (NX/SX ***and not*** GX)	Regionally Extinct (RE)	Extirpated (XT)
Possibly Extirpated (NH/SH)	Critically Endangered (CR) (possibly extinct)	Endangered (EN)
Critically Imperiled (N1/S1)	Critically Endangered (CR)	Endangered (EN)
Critically Imperiled (N1/S1)	Endangered (EN)	Endangered (EN)
Imperiled (N2/S2)	Vulnerable (VU)	Threatened (T)
Vulnerable (N3/S3)	Near Threatened (NT)	Special Concern (SC)
Apparently Secure (N4/S4)	Least Concern (LC)	Not At Risk (NAR)
Secure (N5/S5)	Least Concern (LC)	Not At Risk (NAR)
Unrankable (NU / SU)	Data Deficient (DD)	Data Deficient (DD)

1 Species ranked GXC and GHC are presumed or possibly extinct in the wild across their entire native range, but are extant in cultivation, in captivity, as a naturalized population (or populations) outside its historical native range, or as a reintroduced population not yet established. The C modifier is only used with status ranks at a global level, and not a national or subnational level. Similarly, IUCN's EW status is only used at a global level.

2 COSEWIC status (aside from Extinct) applies only within Canada, and thus, is equivalent to the national rankings of NatureServe or the regional IUCN Red List status. See www.natureserve.org/explorer/statusca.htm.

Appendix D. Extinction Risk and Setting Conservation Priorities

Assessment of extinction risk and setting conservation priorities are two related, but different, processes. To set conservation priorities, extinction risk is considered along with other factors, including ecological and/or phylogenetic characteristics, historical and/or cultural preferences for some taxa over others, the probability of success of conservation actions, availability of funds or personnel to carry out such actions, and existing legal frameworks for conservation of at-risk taxa. For additional discussion of this topic, see Possingham et al. (2002), IUCN (2003), and Bunnell et al. (2009).

In the context of setting conservation priorities within a jurisdiction (e.g., state, province), it is critical to consider not only the status of a species or ecosystem (i.e., risk of local extinction or extirpation) within the jurisdiction, but also other factors such as the global status or risk of extinction, and the proportion of the global population or range that occurs within the jurisdiction. Because the extirpation risk of a species or ecosystem is not evenly distributed across jurisdictions, a particular species or ecosystem may be at significant risk in one jurisdiction but relatively secure in other jurisdictions. Thus, the use of conservation status alone to assign priority can result in the focus of conservation effort precisely where it is least likely to succeed (Possingham et al. 2002). In addition, conservation actions may begin too late to be effective if initial efforts are focused on the rarest species within a jurisdiction where the success of actions is least likely and most costly (Bunnell et al. 2009).

The following combinations of global and subnational conservation statuses are listed in a suggested priority sequence for conservation attention, all else being equal (jurisdiction responsibility, feasibility, etc.) (The Nature Conservancy 1988):

> G1S1, G2S1, G2S2, G3S1, G3S2, G3S3, G4S1, G5S1, G4S2, G5S2, G4S3, G5S3

However, “all else” is never equal; the stewardship responsibilities for a species or ecosystem will vary between the different jurisdictions in which it occurs. For example, if two species with equal global and jurisdictional conservation statuses differ such that one of the species has a large percentage of its global range in a jurisdiction, that jurisdiction bears particular responsibility for securing the future of that particular species relative to the other species that has a smaller portion of its global range in the jurisdiction. Thus, it is recommended that when reporting and publishing national or subnational statuses, a jurisdiction also include not only the global statuses, but also an estimate of the proportion (percentage) of the global population or range for the species or ecosystems that occur within that jurisdiction.

For additional discussion of this topic, see Bunnell et al. (2009), and Keinath and Beauvais (2004). In particular, Bunnell et al. (2009) describe goals for conservation that can help jurisdictions effectively allocate their resources, and also provide two tools to facilitate the process. One of these tools sorts species into practical groups for conservation action, creating groups comprised of species that require similar actions. The other tool assigns conservation priorities by ordering “species or ecosystems based on criteria governing risk (= conservation status), modified by feasibility, stewardship responsibility (as discussed above), disjunctness, and pattern of range collapse.” (Bunnell et al. 2009) These tools thus enable priorities to be ordered within an action group, within a particular goal, or within an overall status rank. This system for conservation prioritization developed by Bunnell et al. (2009) can be applied to any North American jurisdiction.

Appendix E. Changes to Status Factors with Conversions

In moving from the 2002 NatureServe conservation status factors to using the revised 2009 factors, the value choices for several factors have been expanded for better compatibility with IUCN Red List statuses. Automated conversions for the Area of Occupancy factor and those in the trends and threats categories were developed to facilitate ranking using the updated status assessment protocol and to permit use of the rank calculator. Note in the table comparing the 2002 and 2009 factors below, these automated conversions may result in the assignment of range ranks as conservation status values in many cases. Upon review of the underlying data, it should be possible to narrow these ranges or assign single status ranks, eliminating the more imprecise range ranks altogether.

Summary of Status Factors Changes between 2002 and 2009 with Conversions

2002 Factor	2009 Factor	Factor Change/New Rule/Conversion
Number of EOs	**Number of Occurrences**	
Z = 0 (zero) A = 1–5 B = 6–20 C = 21–80 D = 81–300 E = >300 U = Unknown	Z = 0 (zero; presumed extinct) A = 1–5 B = 6–20 C = 21–80 D = 81–300 E = >300 U = Unknown	Factor change? No New Rule? No
Number of EOs with Good Viability	**Number of Occurrences with Good Viability/Ecological Integrity**	
A = No (A- or B-ranked) occurrences with good viability B = Very few (1–3) occurrences with good viability C = Few (4–12) occurrences with good viability D = Some (13–40) occurrences with good viability E = Many (41–125) occurrences with good viability F = Very many (>125) occurrences with good viability U = Unknown	A = No occurrences with excellent or good (A or B) viability or ecological integrity B = Very few (1–3) occurrences with excellent or good viability or ecological integrity C = Few (4–12) occurrences with excellent or good viability or ecological integrity D = Some (13–40) occurrences with excellent or good viability or ecological integrity E = Many (41–125) occurrences with excellent or good viability or ecological integrity F = Very many (>125) occurrences with excellent or good viability or ecological integrity U = Unknown	Factor Change? Yes New Rule: Along with this field, a companion field—Percent Area with Good Viability/Ecological Integrity—has been added to replace the 2002 factor Number of EOs with Good Viability. Enter a value for the number of occurrences with good viability/ecological integrity using this field ***and/or*** enter a value for the Percent Area with Good Viability/Ecological Integrity field (below). If values have been recorded for both fields, the more restrictive of the two will be used in the conservation status assessment.

2002 Factor	2009 Factor	Factor Change/New Rule/Conversion
	Percent Area with Good Viability/Ecological Integrity	
	A = No area with excellent or good viability or integrity B = Very small percentage (<5%) of area with excellent or good viability or integrity C = Small percentage (5–10%) of area with excellent or good viability or integrity D = Moderate percentage (11–20%) of area with excellent or good viability or integrity E = Good percentage (21–40%) of area with excellent or good viability or integrity F = Excellent percentage (>40%) of area with excellent or good viability or integrity U = Unknown percentage of area with excellent or good viability or integrity	Factor change? Yes New rule: This field is an alternative replacement for the 2002 Number of EOs with Good Viability factor. Must also enter a value for Area of Occupancy.
Range Extent	**Range Extent**	
Z = Zero (no occurrences believed extant) A = <100 square B = 100–250 km² C = 250–1,000 km² D = 1,000–5,000 km² E = 5,000–20,000 km² F = 20,000–200,000 km² G = 200,000–2,500,000 km² H = >2,500,000 km² U = Unknown	Z = Zero (no occurrences believed extant; presumed extinct) A = <100 km² B = 100–250 km² C = 250–1,000 km² D = 1,000–5,000 km² E = 5,000–20,000 km² F = 20,000–200,000 km² G = 200,000–2,500,000 km² H = >2,500,000 km² U = Unknown	Factor change? No New Rule? No
Population Size	**Population Size**	
Z = Zero, no individuals extant A = 1–50 individuals B = 50–250 individuals C = 250–1,000 individuals D = 1,000–2,500 individuals E = 2,500–10,000 individuals F = 10,000–100,000 individuals G = 100,000–1,000,000 individuals H = >1,000,000 individuals U = Unknown	Z = Zero, no individuals believed extant (presumed extinct) A = 1–50 individuals B = 50–250 individuals C = 250–1,000 individuals D = 1,000–2,500 individuals E = 2,500–10,000 individuals F = 10,000–100,000 individuals G = 100,000–1,000,000 individuals H = >1,000,000 individuals U = Unknown	Factor change? No New Rule? No

2002 Factor		2009 Factor	Factor Change/New Rule/Conversion
Area/Linear Distance of Occupancy (Ecosystem)		**Area of Occupancy (Ecosystem)**	
Area	Linear Distance		Conversion:
Z = Zero	Z = Zero	Z = Zero (no occurrences believed extant)	
A = <0.4 km^2	A = <4 km	A = <1 km^2	
B = 0.4–4 km^2	B = 4–40 km	B = 1–4 km^2	B >> AB
C = 4–20 km^2	C = 40–200 km	C = 4–10 km^2	C >> CD
D = 20–100 km^2	D = 200–1,000 km	D = 10–20 km^2	D >> E
E = 100–500 km^2	E = 1,000–5,000 km	E = 20–100 km^2	E >> F
F = 500–2,000 km^2	F = 5,000–20,000 km	F = 100–500 km^2	F >> G
G= 2,000–20,000 km^2	G = 20,000–200,000 km	G = 500–2,000 km^2	G >> H
H = >20,000 km^2	H = >200,000 km	H = 2,000–20,000 km^2	H >> I
		I = >20,000 km^2	Factor change? Yes
U = Unknown	U = Unknown	U = Unknown	New rule? No

2002 Factor	2009 Factor		Factor Change/New Rule/Conversion
Area of Occupancy (Species)	**Area of Occupancy (Species)[1]**		
	# 4 km^2 grid cells	# 1 km^2 grid cells	Conversion:
Z = Zero	Z = 0	Z = 0	
A = <0.4 km^2	A = 1	A = 1–4	A >> AC
B = 0.4–4 km^2	B = 2	B = 5–10	B >> AD
C = 4–20 km^2	C = 3–5	C = 11–20	C >> DE
D = 20–100 km^2	D = 6–25	D = 21–100	D >> EF
E = 100–500 km^2	E = 26–125	E = 101–500	E >> FG
F = 500–2,000 km^2	F = 126–500	F = 501–2,000	F >> GH
G = 2,000–20,000 km^2	G = 501–2,500	G = 2,001–10,000	G >> HI
H = >20,000 km	H = 2,501–12,500	H = 10,000-50,000	H >> I
	I = >12,500	I = >50,000	Factor change? Yes
U = Unknown	U = Unknown	U = Unknown	New rule? No

1 The initial automatic conversion of Area of Occupancy for species is to 4 km^2 grid cells but in some cases (see "Estimating Area of Occupancy" on page 15), it is more appropriate to convert to a 1 km^2 grid. Although this conversion and the conversion for species Linear Area of Occupancy are both fairly generous so as to conceptually attempt to capture ≥80% of actual cases, some cases (e.g., either a particularly dispersed set of small occurrences, or a very narrowly concentrated set of occurrences) will fall outside of the converted ranges, and so these conversions should be evaluated carefully when reviewing the initial calculated rank.

2002 Factor	2009 Factor	Factor Change/New Rule/Information
Linear Distance of Occupancy (Species)	**Area of Occupancy (Species)[1]**	
	# of 1 km² grid cells	Conversion:
Z = Zero	Z = 0	
A = < 4 km	A = 1–4	
B = 4–40 km	B = 5–10	B ≫ BD
C = 40–200 km	C = 11–20	C ≫ DE
D = 200–1,000 km	D = 21–100	D ≫ EF
E = 1,000–5,000 km	E = 101–500	E ≫ FG
F = 5,000–20,000 km	F = 501–2,000	F ≫ GH
G = 20,000–200,000 km	G = 2,001–10,000	G ≫ HI
H = >200,000 km	H = 10,000–50,000	H ≫ I
	I = >50,000	Factor change? Yes
U = Unknown	U = Unknown	New rule? No
Environmental Specificity	**Environmental Specificity**	
A = Very narrow	A = Very narrow	Factor change? No
B = Narrow	B = Narrow	New rule: Only used if Number of Occurrences ***and*** Area of Occupancy are Unknown or Null
C = Moderate	C = Moderate	
D = Broad	D = Broad	
U = Unknown	U = Unknown	
Long-term Trend	**Long-term Trend**	
A = Very large decline (>90%)	A = Decline of >90%	Conversion:
B = Large decline (75–90%)	B = Decline of 80–90%	B ≫ BC
C = Substantial decline (50–75%)	C = Decline of 70–80%	C ≫ D
D = Moderate decline (25–50%)	D = Decline of 50–70%	D ≫ E
E = Relatively stable (+/- 25% change)	E = Decline of 30–50%	E ≫ FGH
F = Increase (>25%)	F = Decline of 10–30%	F ≫ I
	G = Relatively Stable (≤10% change)	
	H = Increase of 10–25%	Factor change? Yes
	I = Increase of >25%	New rule? No
U = Unknown	U = Unknown	
Short-term Trend	**Short-term Trend**	
		Conversion:
A = Severely declining (>70% in population, range, area occupied, and/or number or condition of occurrences)	A = Decline of >90%	A ≫ ABC
B = Very rapidly declining (50–70%)		B ≫ D
C = Rapidly declining (30–50%)	B = Decline of 80–90%	C ≫ E
D = Declining (10–30%)	C = Decline of 70–80%	D ≫ F
E = Stable (unchanged or within +/- 10% fluctuation in population, range, area occupied, and/or number or condition of occurrences)	D = Decline of 50–70%	E ≫ G
F = Increasing (>10%)	E = Decline of 30–50%	F ≫ HI
U = Unknown	F = Decline of 10–30%	
	G = Relatively Stable (≤10% change)	
	H = Increase of 10–25%	
	I = Increase of >25%	Factor change? Yes
	U = Unknown	New rule? No

2002 Factor	2009 Factor	Factor Change/New Rule/Information
Overall Threat	**Overall Threat Impact[2]**	
A = Substantial, imminent threat B = Moderate and imminent threat C = Substantial, non-imminent threat D = Moderate, non-imminent threat E = Localized substantial threat F = Widespread, low-severity threat G = Slightly threatened H = Unthreatened	A = Very High B = High C = Medium D = Low U = Unknown	Conversion: A >> AB B >> B C >> AC D >> BC E >> C F >> C G >> D H >> D Factor change? Yes New rule: Threat is assigned on the basis of Scope and Severity. Timing is no longer used to determine overall Threat Impact, but it still useful to record. See text for details on threat impact calculation.
Intrinsic Vulnerability	**Intrinsic Vulnerability**	
A = Highly vulnerable B = Moderately vulnerable C = Not intrinsically vulnerable	A = Highly vulnerable B = Moderately vulnerable C = Not intrinsically vulnerable	Factor change? No New rule: Only used if Overall Threat Impact is Unknown or Null.
Number of Protected EOs	**Number of Protected and Managed Occurrences**	
A = None. No occurrences appropriately protected and managed B = Few (1–3) occurrences appropriately protected and managed C = Several (4–12) occurrences appropriately protected and managed D = Many (13–40) occurrences appropriately protected and managed E = Very many (>40) occurrences appropriately protected and managed	A = None. No occurrences appropriately protected and managed B = Few (1–3) occurrences appropriately protected and managed C = Several (4–12) occurrences appropriately protected and managed D = Many (13–40) occurrences appropriately protected and managed E = Very many (>40) occurrences appropriately protected and managed	Factor change? No New rule: Used as supplementary information only. No longer a formal rank factor.

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DECLARATION OF
Testimony of William Walters, P.E.

I, **William Walters,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission's Siting,Transmission and Environmental Protection Division, as a senior associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Air Quality** for the **Blythe Solar Power Project Supplemental Staff Assessment** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

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

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 2, 2010 Signed: ______________________

At: Agoura Hills, California

William Walters, P.E.
Air Quality Specialist

Academic Background
B.S., Chemical Engineering, 1985, Cornell University

Professional Experience

Mr. Walters has over 20 years of technical and project management experience in environmental compliance work, including environmental impact reports, RCRA/CERCLA site assessment and closure, site inspection, source monitoring, emissions inventories, source permitting, and energy and pollution control research.

Aspen Environmental Group — 2000 to present

Responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- **Engineering and Environmental Technical Assistance to Conduct Application for Certification Review for the California Energy Commission:**
  - Preparation and project management of the air quality section of the Staff Assessment and/or Initial Study and the visual plume assessment for the following California Energy Commission (CEC) licensing projects: Hanford Energy Park; United Golden Gate, Phase I; Huntington Beach Modernization Project (including Expert Witness Testimony); Woodland Generating Station 2; Ocotillo Energy Project, Phase I; Magnolia Power Project; Colusa Power Project; Inland Empire Energy Center; Rio Linda/Elverta Power Plant Project; Roseville Energy Center; Henrietta Peaker Project; Tracy Peaking Power Plant Project (including Expert Witness Testimony); Avenal Energy Project; San Joaquin Valley Energy Center (including expert witness testimony); Salton Sea Unit 6 Project (including expert witness testimony); Modesto Irrigation District Electric Generation Station (including expert witness testimony); Walnut Energy Center (including expert witness testimony); Riverside Energy Resource Center (including expert witness testimony); Pastoria Energy Facility Expansion; Panoche Energy Center (in progress); Starwood Power Plant (in progress); Bullard Energy Center (in progress).
  - Preparation and project management of the visual plume assessment for the following California Energy Commission (Energy Commission) licensing projects: Metcalf Energy Center Power Project (including Expert Witness Testimony); Contra Costa Power Plant Project (including Expert Witness Testimony); Mountainview Power Project; Potrero Power Plant Project; El Segundo Modernization Project; Morro Bay Power Plant Project; Valero Cogeneration Project; East Altamont Energy Center (including expert witness testimony); Russell City Energy Center; SMUD Cosumnes Power Plant Project (including expert witness testimony); Pico Power Project; Blythe Energy Project Phase II; City of Vernon Malburg Generating Station; San Francisco Electric Reliability Project; Los Esteros Critical Energy Facility Phase II; Roseville Energy Park; City of Vernon Power Plant (in progress); South Bay Replacement Project; Walnut Creek Energy Park; Sun Valley Energy Project; Highgrove Power Plant (in progress); Colusa Generating Station; and Russell City Energy Center (in progress).
  - Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; Russell City Energy Center Amendment (in progress); Eastshore Energy Power Plant; and the Blythe Energy Power Plant and Blythe Energy Project Phase II (including expert witness testimony) siting cases. Assistance in the aircraft safety review of thermal and visual plumes of the operating Blythe Energy Power Plant.

- Preparation of a white paper on methods for the determination of vertical plume velocity determination for aircraft safety analyses.
- Preparation and instruction of a visual water vapor plume modeling methodology class for the CEC.
- Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 Energy Commission licensing project.
- Preparation of project amendment or project compliance assessments, for air quality or visual plume impacts, for several licensed power plants, including: Metcalf Energy Center; Pastoria Power Plant; Elk Hills Power Plant; Henrietta Peaker Project; Tracy Peaker Project; Magnolia Power Project; Delta Energy Center; SMUD Cosumnes Power Plant; Walnut Energy Center; San Joaquin Valley Energy Center; City of Vernon Malburg Generating Station; Otay Mesa Power Plant; Los Esteros Critical Energy Facility; Pico Power Project; Riverside Energy Resource Center; Blythe Energy Project Phase II; Inland Empire Energy Center; and Salton Sea Unit 6 Project.
- Preparation of the air quality section of the staff paper "A Preliminary Environmental Profile of California's Imported Electricity" for the Energy Commission and presentation of the findings before the Commission.
- Preparation of the staff paper "Emission Offsets Availability Issues" and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the Energy Commission.
- Completion of an audit of power plant cost factors for integration into the Energy Commission Cost of Generation Model.

- For the **Los Angeles Department of Water and Power (LADWP)**:
  - Preparation of the Air Quality Inventory for the LADWP River Supply Pipeline Project EIR.
  - Project management and preparation of the Air Quality Section for the LADWP Valley Generating Station Stack Removal IS/MND support project.

- For the **Department of Water Resources (DWR)**:
  - Preparation of the Air Quality sections for two separate DWR Santa Ana Valley Pipeline Repairs Project CEQA Categorical Exemption Memorandums.
  - Preparation of the emission estimates used in the Air Quality Sections for the DWR Tehachapi Second Afterbay Project Initial Study and EIR.

- For the **U.S. Army Corps of Engineers (Corps)**:
  - Preparation of the Air Quality Section and General Conformity Analysis for the Matilija Dam Ecosystem Restoration Project EIS/R for the Corps.
  - Preparation of emission inventory and General Conformity Analysis of the Murrieta Creek Flood Control Project and the Joint Red Flag exercise to be conducted in the Nevada Test and Training Range.
  - Emission inventory for the construction activities forecast for the San Jose/Old San Jose Creeks Ecosystem Restoration project for the Corps.

- For **Los Angeles Unified School District (LAUSD)**:
  - Preparation of the Air Quality Section of the LAUSD New School Construction Program EIR and provided traffic trip and VMT calculation support for the Traffic and Transportation Section.
  - Management and preparation of the Draft Air Quality Sections for the Reseda Senior High School Portable Addition IS/MND and Wonderland Elementary Addition IS/MND projects for LAUSD.

- Other Projects:
  - Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.

- Preparation of the Air Quality section of the PG&E Hydrodivestiture Draft EIR/EIS for the California Public Utilities Commission (CPUC).
- Preparation of the Air Quality Section of the Environmental Information Document in support of the Coastal Consistency Determinations for the suspension of operation requests for undeveloped units and leases off the Central California Coast.
- Preparation of comments on the Air Quality, Alternatives, Marine Traffic, Public Safety, and Noise section of the Cabrillo Port Liquefied Natural Gas Deepwater Port Draft EIS/EIR for the City of Oxnard.

Camp Dresser & McKee, Inc. 1998 to 2000

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Preparation of emission inventories and dispersion modeling for criteria and air toxic pollutants for the Los Angeles International Airport Master Plan (LAXMP) EIS/EIR.
- Project Manager/Technical lead for the completion of air permit applications and air compliance audits for two Desa International fireplace accessory manufacturing facilities located in Santa Ana, California.
- Project manager/technical lead for the completion of Risk Management Plans (RMPs) for four J.R. Simplot food processing facilities in Oregon, Idaho, and Washington and the Consolidated Reprographics facility located in Irvine, California.

Planning Consultants Research 1997 to 1998

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Project Manager for a stationary source emission audit of the entire Los Angeles International Airport complex for Los Angeles World Airports (LAWA) in support of the LAXMP.
- Review of the Emission Dispersion Modeling System (EDMS) and preparation of a report with findings to the Federal Aviation Administration for LAWA in support of the LAXMP.
- Project manager for the ambient air monitoring and deposition monitoring studies performed for LAWA in support of the LAXMP, including the selection of the monitoring sites and specialty sub-contractor, and review of all monitoring data.

Aspen Environmental Group/Clean Air Solutions 1995 to 1996

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Manager of the Portland, Oregon, office of Clean Air Solutions from March 1995 to December 1995, with responsibilities including Project Management, Business Development, and Administration.
- Control technology assessment, engineering support and Notice of Intent to construct preparation for J.R. Simplot's Hermiston, Oregon, food processing facility. Review and revision of an Air Contaminant Discharge Permit application, Title V permit application, and PSD modeling analysis for J.R. Simplot's Hermiston facility.

- Air quality compliance report including an air emission inventory, regulation and permit compliance determination, and recommendations for compliance for Lumber Tech, Inc.'s Lebanon, Oregon, wood products facility.

Fluor Daniel, Inc. — 1990 to 1995 and 1996 to 1997

Mr. Walters was responsible as lead technical or project manager for major environmental projects for both government and private clients. His projects included:

- Prepared several air permit applications for the ARCO Los Angeles Refinery Polypropylene Plant Project; Phase I environmental assessments for properties located in Southern California; and a site investigation and RCRA closure plan for a hazardous waste storage site in Vernon, California.
- Project manager of the Anaconda Smelter site for the U.S. Environmental Protection Agency's (EPA) Alternative Remedial Contract System (ARCS) project during the conclusion of technical activities and project closeout. Prepared a cost recovery report for the project.
- Performed environmental analysis for the Bonneville Power Authority, including air pollution BACT analysis, wastewater analysis, and evaluation of secondary environmental effects of electric power producing technologies.

Jacobs Engineering Group — 1988 to 1990

Mr. Walters was responsible for a wide range of air pollution regulatory and testing projects, including the following:

- Project manager of air toxic emission inventory reports prepared for U.S. Borax's boron mining and refining facility and the Naval Aviation Depot (N. Island Naval Base, San Diego, California).
- Prepared air permit applications and regulatory correspondence for several facilities including the U.S. Department of Energy's Feed Material Production Center uranium processing facility in Fernald, Ohio; Evaluation of a sludge dewatering process at Unocal's Wilmington, California, Refinery; and United Airlines blade repair facility at the San Francisco Airport.
- Characterized and quantified air emissions for offshore oil and gas development activities associated with Federal oil and gas Lease Sale 95, offshore southern California, for the U.S. Minerals Management Service.

CERTIFICATIONS

- Chemical Engineer, California License 5973
- CARB, Fundamentals of Enforcement Seminar
- EPA Methods 1-8, 17; Training Seminar

AWARDS

- California Energy Commission Outstanding Performance Award 2001

DECLARATION OF
Carolyn Chainey-Davis

I**, Carolyn Chainey-Davis,** declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-05-002, I am serving as an Associate Biological Resource Specialist, Level II, to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Biological Resources** for the **Blythe Solar Power Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

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

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:__June 29, 2010_________ Signed:______________________________

At: Nevada City, California

Carolyn Chainey-Davis, botanist

Over 23 years experience conducting biological inventories and impact assessments, rare plant and noxious weed surveys, large-scale vegetation mapping, wetland delineations, large-scale watershed assessments, designing and implementing mitigation & monitoring plans, habitat management plans, and restoration plans throughout California. Ms. Chainey-Davis field experience includes a diverse group of clients and projects from large transmission and hydro relicensing projects to urban and residential development projects, local, state and federal agencies, resource conservation organizations, landfill and mine reclamation projects, and many more. She led Garcia and Associates (GANDA) botanical studies for numerous FERC relicensing projects (PG&E & SCE) including Stanislaus River, Upper North Fork Feather River, Pit River, Vermillion, Bucks Lake and Poe hydro-relicensing projects, Transmission Separation project, Lower Owens River riparian monitoring, and hundreds of other large and small projects around the state.

Ms. Davis is past President of the California Native Plant Society, Nevada and Placer County Chapter and is a co-author of the recently published field guide "*Wildflowers of Nevada and Placer Counties*", published by the California Native Plant Society. Ms. Davis completed her wetland training at Portland State University and is certified for conducting wetland delineations based on the U.S. Army Corps of Engineers Wetland Delineation Manual. Ms. Chainey-Davis is skilled in the use of Trimble GeoExplorer series Global Positioning (GPS) equipment. As a botanist, she apprenticed for several years under some of the state's leading botanists, vegetation and wetland ecologists, including Robert Holland. Ms. Davis' continuing education includes several annual intensive botanical taxonomy workshops through the U.C. Berkeley Jepson Herbarium.

A Sampling of Relevant Project Experience

Project: **Beacon Solar Energy Project Rosamond Water Alternative**
Client: **California Energy Commission (CEC)**
Conducted detailed habitat assessment and vegetation mapping for a 40-mile alternative water pipeline alignment near Mojave, CA, in support of the Final Staff Assessment. CEC evaluated the feasibility of BSEP using an alternative source of water other than onsite potable groundwater and identified City of Rosamond tertiary treated wastewater as a feasible source. Prepared supplemental report describing the vegetation resources occurring along the southern 23 miles of the 39.61-mile Rosamond water pipeline alignment, including vegetation mapping and a rare plant habitat assessment. Assisted staff in the impact assessment for the proposed and preferred alternative.

Project: **Lower Owens River Monitoring Program**
Client: **Ecosystem Sciences**
Member of a team of three biologists to design long-term monitoring program for collecting and analyzing data on riparian habitat and key wildlife habitat characteristics on 62 miles of the Lower Owens River. Directed field efforts to collect baseline data at 350 sites. Future monitoring, conducted after the initiation of appropriate flow and land management practices, will be compared against the baseline to determine if changes resulting from proposed restoration efforts (augmented stream flows) are consistent with the LORP goals and objectives.

Project: **Open ended Contract for Biological Services**
Client: **Southern California Edison (SCE)**
Led Garcia and Associates (GANDA) botanical studies (vegetation mapping, habitat assessments, etc.) in support of various SCE construction and relicensing projects in the central and southern Sierras, Sierra east slope and Great Basin region, and the eastern edge of the San Joaquin Valley.

182 Grove Street Nevada City, CA 95959 [ph] 530.478.1963 [cell] 530.205.6218 bighair60@att.net

Project: **Stanislaus River Hydroelectric Project Relicensing Studies**
Client: **Pacific Gas and Electric Company, Technical and Ecological Services**
Led GANDA field efforts to conduct floristically-based botanical studies for the Federal Energy Regulatory Commission relicensing of four hydroelectric and transmission line projects located on the Stanislaus River, Stanislaus National Forest. Riparian and watershed vegetation mapping and sampling, special-status plant surveys, noxious weed mapping, and identify and map culturally significant Native American botanical resources for local tribes in support of the Federal Energy Regulatory Commission relicensing process. Prepared draft and final reports.

Project: **Owens Lake Dust Control Project**
Client: **Garcia and Associates**
Conducted two years of floristically-based special status plant surveys and wetland delineations for the Los Angeles Department of Water and Power Owens Lake Dust Control mitigation project.

Project: **Kern River Natural Gas Pipeline**
Client: **Garcia and Associates**
Conducted floristically-based special status plant surveys for the Daggett and Goodsprings segments of the interstate pipeline.

Project: **Pit River Hydroelectric Project Relicensing Studies**
Client: **Pacific Gas and Electric Company, Technical and Ecological Services**
Led field efforts to conduct floristically-based special status plant surveys, noxious weed surveys, upland habitat mapping, and riparian vegetation classification and mapping for PG&E's Pit 3, 4, and 5 hydroelectric project in Shasta County in support of the Federal Energy Regulatory Commission relicensing process. Prepared draft and final reports.

Project: **Upper North Fork Feather River and Poe Hydroelectric Projects, Lake Almanor Habitat Management Plan**
Client: **Pacific Gas and Electric Company, Technical and Ecological Services**
Led field efforts to conduct floristic surveys for special-status plant species and noxious weeds on the Upper North Fork Feather River (Plumas and Lassen National Forests) and Poe Project Included GIS-based riparian and upland vegetation mapping in support the Federal Energy Commission relicensing process. Prepared draft and final reports. Also conducted detailed mapping of the wet meadows around Lake Almanor and prepared a long-term habitat management plan for meadow resources and willow flycatcher habitat.

Project: **Transmission Separation Project**
Client: **Foster Wheeler Environmental Corporation**
Led field efforts to conduct floristically-based special-status plant surveys and noxious weed surveys for the PG&E Transmission Separation Project. GANDA botanists conducted surveys on selected transmission line segments and their associated access roads on USDA Forest Service (USFS) lands in the Plumas, Shasta-Trinity, Tahoe, and Eldorado National Forests, created GIS-based vegetation and noxious weed maps, and analyzed potential threats to special-status plant populations. Prepared draft and final reports.

Project: **Nevada and Placer County projects – large and small subdivisions, infrastructure development, etc.**
Client: **Susan Sanders Biological Consulting and Beedy Environmental Consulting**
Conducted biological inventory and impact analyses and prepared mitigation plans for over 100 large and small subdivisions and infrastructure development projects in Nevada and Placer County. Lead writer and botanist. All projects included vegetation mapping, habitat assessments, floristic surveys, and mitigation planning. Prepared detailed habitat management plans and recreation/ trail plans for over a thousand acres of open space.

Project: **Dog Ranch-Salmon Creek Conservation Project**
Client: **Robert Holland**
Conducted endangered species surveys and documented over 300 occurrences of special status plants (using Trimble data dictionary and population sampling protocol) for a proposed conservation easement/land swap on a 400+ acre ranch in Humboldt County on the Samoa Peninsula.

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Project: **Field Guide to *Epilobium* in the Sierra Nevada, Tahoe National Forest**
Client: **U.S.D.A. Forest Service, Tahoe and Inyo National Forests (Open-ended Contract)**
Conducted surveys for rare *Epilobiums* at seven sites in the Tahoe and Inyo National Forests and prepared a field guide to the genus *Epilobium* in the Sierra Nevada, with illustrations and keys to identification.

Project: **Bear Valley Meadow Restoration**
Client: **American Rivers**
Sample design and long-range monitoring design and protocol for a large-scale meadow restoration project in Placer County. Included detailed vegetation mapping, conducting baseline inventory, and preparing report on sample design and results of baseline monitoring.

Project: **Shirttail Creek Conservation Easement**
Client: **Beedy Environmental Consulting for Conservation Biology Institute**
Conducted biological inventory and conservation assessment for 800-acre property on Shirttail Creek in the American River watershed using protocol developed by The Nature Conservancy for conservation planning. Lead writer and botanist.

Project: **Natural Heritage 2020 Nevada County Watershed Assessment**
Client: **County of Nevada and Sierra Business Council**
Lead botanist for a countywide watershed and ecosystem assessment. A two-year process funded by the Sierra Business Council and the County of Nevada to create a GIS database and biotic inventory of the county's natural habitats and wildlife resources, including an assessment of vegetation, special status and invasive for 98 sub-watershed basins in the county. Prepared botanical sections of the report, verified accuracy of more than 40 GIS data themes, assessed the extent and quality of each of the county's ecosystem types, potential to support special-status plants and animals.

Project: **Special Status Plant Surveys and Habitat Mapping for Rock Creek/Cresta Hydroelectric**
Client: **Pacific Gas and Electric Company, Technical and Ecological Services**
Conducted floristically-based special status plant surveys and habitat mapping for PG&E's Rock Creek-Cresta hydroelectric facility project area and 72-mile transmission line in Plumas, Butte, Yuba and Sutter counties.

Project: **Osborne Hill Open Space Habitat Management Plan**
Client: **Susan Sanders Biological Consulting**
Prepared detailed, goal-driven, long-range habitat management plan for 250 acres of open space for a residential development in Nevada County. Included guidelines for forest management to promote old-growth conditions, fuels management specifications, habitat management specifications, and designs and implementation plan for recreational trails, educational signage, and formation of an independent non-profit land trust to manage the open space. Prepared similar plans for several other residential developments in Nevada County.

Project: **Ragsdale Creek Setback Study**
Client: **Susan Sanders Biological Consulting & County of Nevada**
Identified, described, and mapped important biological resources on an urban stream in Nevada County and recommended appropriate development setbacks to avoid/minimize impacts, assessed potential impacts to the creek as a result of adjacent development, and recommended mitigation measures to reduce impacts. Coordinated with County GIS Department in production of map of sensitive resources, and presented results of study to citizen advisory committee.

Project: **Open ended Contract for Biological Services, Various Transmission Projects**
Client: **Pacific Gas & Electric Company (PG&E)**
Led Garcia and Associates (GANDA) botanical studies (rare plant surveys, vegetation mapping, habitat assessments, etc.) in support of various PG&E transmission projects throughout California, including Kern #304, Northeast San Jose Reinforcement, Atlantic-Del Mar, Butte Reinforcement, and many more.

Project: **Open ended Contract for Biological Services, Transmission Relicensing Projects**
Client: **Southern California Edison (SCE)**
Led Garcia and Associates (GANDA) botanical studies (vegetation mapping, habitat assessments, etc.) in support of various SCE construction and relicensing projects in the central and southern Sierras, Sierra east slope and Great Basin region, and the eastern edge of the San Joaquin Valley.

182 Grove Street Nevada City, CA 95959 [ph] 530.478.1963 [cell] 530.205.6218 bighair60@att.nett

DECLARATION OF
Susan D. Sanders

I, **Susan Sanders**, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-08-001, I am serving as a Biological Resource Specialist and Project Manager to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Biological Resources**, for the **Blythe Solar Power Project Supplemental Staff Assessment**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

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

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 29, 2010 Signed:__________________________

At: Nevada City, California

Susan Sanders Biological Consulting

12213 Half Moon Way
Nevada City, California 95959
Phone: (530) 477-7415 Fax: (530) 477-7580
ssanders55@comcast.net

RESUME OF SUSAN SANDERS

EDUCATION

Ph.D.	Zoology	University of California, Davis (1983)
M.A.	Zoology	University of California, Davis (1979)
B.A.	Zoology	University of California, Berkeley (1976)

PROFESSIONAL AFFILIATIONS/CERTIFICATIONS
Wildlife Society, Sacramento-Shasta Chapter
Sierra Nevada Willow Flycatcher Working Group
Certified by California Unified Certification Program as DBE/WBE firm (UCP # 25204)

CONTINUING EDUCATION (UC Davis, University Extension)
Threatened and Endangered Reptiles and Amphibians of Northern California
Wetlands Regulations, Impacts, and Mitigation
Endangered Species: Resources, Law, and Potential Solutions
Resolving Endangered Species Conflicts: Practical Approaches to Problem Solving

REGULATORY COMPLIANCE EXPERTISE in coordination with state, federal, and local agencies in the environmental review process for projects regulated by the California Environmental Quality Act, National Environmental Policy Act, Federal and State Endangered Species Acts, National Fish & Wildlife Coordination Act, Clean Water Act, and California Coastal Act. Also experienced in providing technical support and agency coordination for license and permit applications.

TECHNICAL EXPERTISE in surveys for threatened and endangered wildlife species; biological inventories; habitat management plans; raptor surveys; wildlife habitat assessment; mitigation monitoring; expert testimony, constraints analysis; sensitive species research. Prepared Biological Assessments for endangered, threatened, and candidate species, and conducted field surveys and literature reviews for willow flycatchers, tricolored blackbirds, Swainson's hawks, burrowing owls, California spotted owls, San Joaquin kit fox, bald eagles, valley elderberry longhorn beetles, and many other special-status species. Conducted surveys for raptor species of special concern, including white-tailed kite, northern goshawk, and Cooper's hawk.

PROJECT MANAGEMENT EXPERIENCE on large and complex projects, including a two-year survey of 11,000 acres in the Plumas National Forest for a proposed land exchange, involving supervision of eight technical specialists and subconsultants. Responsible for overseeing numerous transportation and revegetation projects and mitigation monitoring programs which involved budget, personnel, and subconsultant management, agency and client coordination, and preparation of technical reports. Managed long-term (five-year) revegetation/mitigation monitoring projects with annual reporting requirements.

CONSULTING EXPERIENCE (1982 - 2010)

CALIFORNIA ENERGY COMMISSION TECHNICAL ASSISTANCE (2005 – 2010)

Siting Work: Reviewed Applications for Certification; prepared Data Adequacy Forms, Data Requests, Preliminary and Final Staff Assessments; participated in PSA Workshops and provided testimony at Evidentiary Hearings; organized and conducted issue resolution workshops and interagency conference calls to resolve complex and controversial biological resource issues; coordinated extensively with local, state and federal agencies, including California Department of Fish and Game, U.S. Fish and Wildlife Service, Regional Water Quality Control Board, U.S. Army Corps of Engineers, and Bureau of Land Management. Projects include:

- **Palen Solar Power Project**, Solar Millennium (09-AFC-07)
- **Blythe Solar Power Project**, Solar Millenium (09-AFC-06)
- **Genesis Solar Power Project**, NextEra (09-AFC-08)
- **Beacon Solar Energy Project** - Beacon Solar LLC (08-AFC-2)
- **Orange Grove Energy** - J Power USA (08-AFC-4)
- **Ivanpah Solar Electric Generating System -**BrightSource (07-AFC-5)
- **MMC Chula Vista Expansion** - MMC Energy Inc. (07-AFC-4)
- **Eastshore Energy Center** - Eastshore Energy, LLC / Tierra Energy (07-AFC-5)
- **Pastoria Phase 2 Expansion Project** - simple cycle addition - Calpine (05-AFC-1)
- **San Francisco Reliability Project** - City of SF (04-AFC-1)

Avian Specialist for Renewable Energy Issues: Since 2005 provided Energy Commission staff with technical expertise as an avian specialist on wildlife interactions with wind turbines and other utility structures. Activities/publications include the following:

- **Wind-Wildlife Guidelines:** Co-authored *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development in California* published by the Energy Commission in September 2007; helped organize and coordinate this statewide effort to develop science-based protocols for pre-and post-construction monitoring methods to assess the effects of wind energy development on birds and bats. Worked closely with siting, PIER, and legal staff from Energy Commission and California Department of Fish and Game; coordinated the efforts of an eight-member Science Advisory Committee, helped organize and conduct public workshops, worked with wind energy developers, non-governmental organizations, and other stakeholders on this collaborative effort. <www.energy.ca.gov/windguidelines/index.>

- **Guidelines Implementation:** Working with CDFG and Energy Commission staff since 2007 on training for and implementation of the *Guidelines*. Conduct monthly interagency conference calls, helped organize and conduct two training workshops for CDFG, worked with CDFG headquarters and regional staff to develop a draft white paper: *Recommended Compensatory Mitigation Approaches for Reducing Unavoidable Impacts to Biological Resources from Wind Energy Development*. Co-author or on-line *Frequently Asked Questions about the Guidelines* <www.dfg.ca.gov/habcon/energy/wind>

- **Renewable Energy Research for PIER:** Prepared: *A Roadmap for PIER Research on Methods to Assess and Mitigate Impacts of Wind Energy Development on Birds and Bats in California* (Sanders and Spiegel 2008). This roadmap summarizes the current state of knowledge on the impacts of wind energy on birds and bats, and describes research that will improve the biological assessment, mitigation, and monitoring of wind energy projects in California. Currently working with PIER staff to oversee disbursement of $2.25 million in grant money to address Terrestrial resources Energy Research (PON

08-003) and to monitor and manage this research. Continuing work to develop an annotated bibliography of publications relating to research on wildlife interactions with wind turbines. </www.energy.ca.gov/publications/search>

LITIGATION SUPPORT/EXPERT WITNESS

El Portal Road Improvement Project. Conducted field surveys and reviewed the Biological Assessment, Environmental Assessment/FONSI for the El Portal Road Improvement Project litigation (Sierra Club *et al. vs*. National Park Service). Prepared declarations and response to defendants opposition briefs, and provided other technical assistance to project attorneys. (Client: Mariposans for Environmentally Responsible Growth and Sierra Club).

Merced River Plan. Conducted field surveys and reviewed the Merced Wild and Scenic River Comprehensive Management Plan and Final Environmental Impact Statement (Sierra Club *et al. vs.* National Park Service). Prepared declarations and response to defendants opposition briefs, and provided other technical assistance to project attorneys. (Client: Friends of Yosemite Valley and Sierra Club).

Lower American River Instream Flows. Conducted original research and provided declarations on the effects of reduced instream flow to wildlife for the Friends of the American River v. EBMUD, Lower American River. Provided technical assistance to project attorneys, prepared declarations, and provided expert testimony before the State Water Resources Control Board. (Client: Sacramento County and Friends of the American River Parkway).

Putah Creek v. Solano Irrigation District. Litigation support and expert testimony regarding wildlife/fishery impacts of reduced flows in Putah Creek. Provided depositions, declarations, expert witness testimony, and other litigation support (Client: Putah Creek Council).

CEQA/NEPA Documents. Prepared biological resource sections of Environmental Impact Reports/Statements, Initial Studies, and Environmental Assessments for numerous commercial and residential developments, redevelopment projects, transportation projects, dams, and other water projects throughout northern California. Conducted wildlife and plant community surveys, habitat assessments, agency contacts, data analysis and report preparation. Secured 1602 Streambed Alteration Agreements from California Department of Fish and Game, Section 404 Permits from U.S. Army Corps of Engineers, and 401 Permits from Regional Water Quality Control Board. Some representative projects include:

- Pacific Bell Route 101 Fiber Optic Cable, Kern County (PAR Environmental Services, Inc. [PAR]);
- Higgins Corner Marketplace, Nevada County (FHK Development);
- Hinkle Creek Nature Area Biological Inventory/Impact Analysis, Folsom (PAR);
- Willow Flycatcher Surveys, Lake Isabella Project, Kern County (Jones & Stokes);
- Biological Resources Survey, Galilee and TRC Parcels, Roseville, Placer County (PAR);
- Burrowing Owl Impact Analysis/Mitigation Monitoring, Northpointe, Sacramento County (PAR);
- Laguna Creek Interceptor and Sewer Alignment Constraints Study, Sacramento County (PAR);

- Marin Public Safety and Emergency Radio System Project, Marin County (Cord Communication)
- Biological Studies for Endangered Species Compliance, Isabella Dam, Kern County (PAR);
- Granite Quarry, Placerville (The Bedrock Group);
- Pacific-Bell Rocklin Central Dialing Station, Rocklin, Placer County (PAR);
- Whitney Oaks Raptor Surveys, Placer County (Live Oak Enterprises/Pulte Homes);
- Auburn Ranch Subdivision Project, Placer County (Area West Engineers);
- Equestrian Ridge Estates, Placer County (PAR);
- Willow Creek Assessment District Swainson's Hawk Surveys, Sacramento County (PAR);
- Bucks Lake Spotted Owls Surveys, Menasha Corporation, Plumas County (PAR);
- Roseville Water Facilities Project, City of Roseville, Placer County (Geier & Geier Consulting);
- Sugar Bowl Ski Resort Expansion, Placer County (Omni-Means, Engineers/Planners);
- City of Lincoln Waste Water Treatment Plant Expansion, Placer County (City of Lincoln);
- The Heritage at Bickford Ranch, Placer County (Geobotanical Phenomenology);
- South Branch 60 kV Pole Line Project, Roseville, Placer County (PAR);
- Smith-Moulton Pipeline Project, Nevada County (PAR);
- Morada Ranch Annexation, San Joaquin County (Omni-Means);
- Clover Valley Lakes Estates EIR, Placer County (Planning Concepts);
- Turtle Island, Loomis, Placer County (Export International);
- Fort Hunter-Liggett Wildlife Resource Surveys, Monterey County (Jones & Stokes Associates);
- Superconducting Super Collider EIR/EIS, Yolo and Solano Counties (EIP Associates);
- South Lake Tahoe Redevelopment Agency EIR, El Dorado County (Wagstaff & Brady);
- Stanford Ranch EIR, Placer County (Jones & Stokes Associates);
- Northeast Roseville Specific Plan EIR, Placer County, Placer County (Jones & Stokes Associates).
- Teichert/Granite Aggregate Mining Site, Sacramento County (Holliman, Hackard, & Taylor);
- Lower Laguna Drainage Master Plan, Sacramento County (PAR);
- Natomas Ditch Abandonment and Pipeline Construction Project, Sacramento County (PAR);
- Tuolumne River Wildlife Studies for FERC License, Tuolumne County (Holton & Associates);
- Turner Creek Hydroelectric Project, Plumas County (Jones & Stokes Associates);
- Calabazas Creek Flood Control Project, Santa Clara County (Santa Clara Valley Water District).

Transportation Projects. Prepared Caltrans Natural Environment Study Reports, Biological Assessments, Categorical Exemption/Exclusions, Preliminary Environmental Study Forms, and other documentation for bridge replacements, interchange modifications, seismic retrofits, road widenings, emergency storm damage repairs, and other transportation projects in Caltrans Districts 1, 2, 3, 4, 5, 6, and 10. Representative projects include:

- Interstate-80 West El Camino Avenue Interchange Project, City of Sacramento (PAR);
- Route 68 Widening Project, City of Monterey, Monterey County (PAR)
- U.S. 50/Ponderosa/South Shingle Road Interchange Project, El Dorado County, (PAR);
- Auburn Boulevard Improvement Project, Citrus Heights, Sacramento County (PAR);
- Valley Drive Bridge Replacement Project, Nevada County (Nevada County DOTS);
- SR 101/Prado Rd. Interchange Improvement Project, San Luis Obispo County (PAR);
- I-580/Isabel Avenue Interchange Project, Livermore, Alameda County (PAR);
- Gladding Road Bridge Replacement, Coon Creek, Placer County (Planning Concepts);
- Lozanos Road Bridge Replacement, Auburn Ravine, Placer County (PAR);
- Coyote Creek Bridge Replacement Project, Calaveras County (PAR);
- Route 99/Route 120 East Interchange Project, Manteca, San Joaquin County (PAR);
- Route 99/Prado Road Interchange, San Luis Obispo County (PAR);
- Ralston Avenue/Route 101 Interchange, Belmont, San Mateo County (PAR);

- Route 1 Improvement Project, Sand City to Seaside, Monterey County, PEAR (PAR);
- Northeast Area Transportation Plan, Constraints Analysis, Sacramento (PAR);
- Wilbur Avenue Overcrossing Project, Antioch, Contra Costa (PAR);
- Alpine Road Storm Damage Repair, San Mateo County (PAR);
- Pescadero Road Storm Damage Repair, San Mateo County (PAR);
- Route 92 Widening, Half Moon Bay, San Mateo County (PAR);
- Route 99/Hammer Lane Interchange Improvements, Stockton, San Joaquin County (PAR);
- Hammer Lane Widening, Stockton, San Joaquin County (PAR);
- La Gonda Way and Paraiso Drive Bridge Seismic Retrofit, Danville, Contra Costa County (PAR);
- Highway 162 Bridge Storm Damage Repair Project, Sacramento River, Glenn County (PAR);
- Norwood Avenue Reconstruction Project, Sacramento County (Planning Center);
- HOV Lane Construction, US 50, Sunrise to El Dorado Blvd., Sacramento/El Dorado Co. (PAR);
- Dry Creek Bridge Replacement Project, Route 99, Butte County (PAR);
- Ladies Canyon Bridge Storm Damage Repair, Sierra County, (PAR);
- Emergency Storm Damage Repair, Routes 49 and 89, Sierra and Nevada Counties, (PAR);
- Emergency Storm Damage Repair Project for: Route 70/89, Feather River Canyon, Route 20, 147, Plumas, Nevada, and Butte Counties, (PAR);
- Interstate 5 - Benjamin Holt/Hammer Lane Interchange project, San Joaquin County (PAR);
- State Route 113/Interstate 5 Connector Study, City of Woodland, Yolo County, California (PAR);
- Frederickson Road Widening, Antioch, Contra Costa County (May Consulting);
- East Lime Kiln Road Reconstruction Project, Nevada County (PAR);
- Lower Sacramento Road and Bridge Widening, Stockton, San Joaquin County (May Consulting);
- Sierra College Boulevard Widening Project, Roseville, Placer County (PAR);
- State Route 50/Folsom Interchange Improvement Project, Sacramento County (PAR);
- Pico Creek Bridge Replacement Project, Route 1, San Luis Obispo County (PAR)
- Burns Creek Bridge Replacement Project, Route 1, Monterey County (PAR);
- Pajaro River Bridge Replacement Project, Monterey and San Luis Obispo Counties (PAR);
- Route 113 Widening/North 1st Street Improvements, Dixon, Solano County (Planning Concepts);
- Bridgeport School Bridge Replacement Project, El Dorado County (PAR);
- State Route 49 Widening, Auburn, Placer County (PAR);
- Claus Road Bridge Widening, Modesto, Stanislaus County (PAR);
- Interstate 80/Enterprise Boulevard Interchange, City of West Sacramento, Yolo County (PAR).

Nevada County Biological Inventories/Habitat Management Plans. Conducted site specific vegetation and wildlife surveys in accordance with Policy 13.2A of the Nevada County General Plan; prepared Management Plans in accordance with Sec. L-II 4.3.3, General Provisions of the July 27, 2000 Zoning Ordinances. Representative projects include:

- Waxman Parcel Biological Inventory, Old Wood Road (Nevada City Engineering)
- Habitat Management Plan for DesJardins Dry Creek Crossing (Cranmer Engineering)
- Gregory Creek Biological Inventory, Truckee (King Engineering)
- Landon Parcel Biological Inventory and Management Plan, Wolf Road (California Survey Company)
- Oslin-Tarkowski Biological Inventory, Peardale (Ms. Jeanette Oslin)
- Jackson Parcel, Purdon Road (Mr.
- Hyatt Property Biological Inventory and Management Plan, Dry Creek (Mr. Mike Hyatt)
- Penn Valley Community Church, Penn Valley (Mr. Keith Brown)
- Chapa-De Health Clinic, Grass Valley (Ms. Elaine. Lieske, Architect)
- Inventory and Management Plan for Agren Pond Project, Penn Valley (Mr. Ray Agren)

- Humboldt Lily Plant Preservation Plan (Sares-Regis Group)
- Moore Property, Chicago Park (American Surveys)
- Callaghan Property, Lake of the Pines (Sylvester Engineering)
- Tracy Property, Duggans Road (Cranmer Engineering)
- Ragsdale Creek Setback Study, Higgins Area (Nevada County Planning Department)
- CDFG 1603 Permit Application, Eskaton Village, Grass Valley (Sares-Regis Group)
- Cedar Ridge Baptist Church Expansion, Cedar Ridge (Cedar Ridge Baptist Church)
- Penn Valley Properties, Penn Valley (Sylvester and Creighton)
- Record Connection Property, Brunswick Basin (Daggett Design)
- Droitcour Property, Wolf Road (Mr. Gerald Stapp)
- Hyepark Estates, near Wolf Road (King Engineering)
- Bartel Property Lake Setback (Nevada City Engineering)
- KLOVE Radio Tower, Banner Mountain (Westower Communications)
- Haas-Menasha Property, Ponderosa Way, Rough and Ready (Cliff McDivitt Surveying)
- Eskaton Village, Grass Valley (Sylvester & Creighton)
- Quist Property, Higgins Corner (Sylvester & Creighton)
- Hobart Mills Industrial Park (Sylvester & Creighton)
- Milhous Ranch, North San Juan (Sylvester & Creighton)
- Extasia Workshop Project, Tyler Foote Crossing Road, San Juan Ridge (Mr. Bruce Boyd, AIA);
- Flynn Property, Retrac Way, Grass Valley (Mr. Martin Flynn);
- McGuire Property, Banner Lava Cap Road, Nevada City (Mr. Kirk McGuire);
- Biological Inventory for 240-acre parcel near Donner Lake (Mr. James Mitchell);
- Brunswick Inn Project, Grass Valley (Sylvester Engineering);
- Lopez Tentative Map, Scott's Flat Road (Sylvester Engineering);
- Sierra Knoll Estates, Higgins Corner (Mr. and Mrs. Steve Joos);
- Smallwood Property, Grass Valley (Mr. Jay Smallwood).
- Harmony Ridge Resort (Sylvester & Creighton)

Land Exchanges. Prepared Biological Assessments/Evaluations for Forest Service land exchanges in the Plumas National Forest. The largest of these was the 11,000 acre Soper-Wheeler Company land exchange, a two-year project requiring management of eight employees and several subconsultants for surveys of rare plants, California spotted owls, northern goshawks, red-legged frogs, and other sensitive species. Other projects include the Crites Mineral Fraction Land Exchange and the Saunders Land Exchange, Plumas National Forest, (PAR).

Mitigation Monitoring. Supervised the design and ongoing monitoring of wetland and sensitive species mitigation projects, including riparian revegetation, vernal pool creation, and mitigation banking. Some projects involved preparation of a Habitat Mitigation and Monitoring Plan, and long-term monitoring efforts (five years plus), as well as preparation of annual reports, and coordination with US Army Corps of Engineers, US Fish and Wildlife Service, California Department of Fish and Game, California Department of Transportation, and the US Environmental Protection Agency. Projects include:

- Humboldt Lily Mitigation Monitoring, Eskaton Village, Nevada County (Eskaton)
- Dark Horse Mitigation Monitoring, Nevada County (Nevada City Engineering)
- Northpointe, Burrowing Owl Mitigation Monitoring, Sacramento County (PAR)
- Burrowing Owl Mitigation Monitoring, Meadowview, Sacramento County (PAR)
- Wilbur Avenue Overhead Project, Habitat Restoration for Lange's Metalmark Butterfly, Antioch, Contra Costa County, (PAR)
- Swainson's Hawk Nest Monitoring, Garden Highway, Sacramento, Sacramento County (PAR)
- Sierra College Boulevard Riparian Revegetation Monitoring, Roseville, Placer County (PAR);
- Roseville Sanitary Landfill Riparian Revegetation Project, Roseville, Placer County (PAR);

- State Route 99/Calvine Interchange Vernal Pool Vegetation and Fairy Shrimp Mitigation Monitoring, Sacramento County (PAR);
- Potrero Hills Landfill Bird Deterrence Monitoring, Solano County (Global Environmental);
- State Route 50/Folsom Boulevard Improvement Project, Beach Lakes Mitigation Bank (PAR);
- Niblick Bridge Riparian Revegetation and Mitigation Monitoring, San Luis Obispo County (PAR).

TEACHING EXPERIENCE

Lecturer. Biology 10, UCD Zoology Department (1985): Instructor - biology for non-majors.
Lab Coordinator. Zoology 2L, UCD Zoology Department (1983-1984): Trained and supervised teaching assistants, managed introductory zoology laboratories.
Teaching Assistant. UCD Zoology Department (1977-1983): General Zoology, Vertebrate Structure, Introductory Biology.
Outstanding UCD Graduate Teaching Assistant (1983).

PUBLICATIONS

Sanders, S. D. and L. Spiegel. 2008. *A Roadmap for PIER Research on Methods to Assess and Mitigate Impacts of Wind Energy Development on Birds and Bats in California.* Consultant Report, Prepared for the California Energy Commission. CEC-500-2008-076 October 2008

California Energy Commission and California Department of Fish and Game. 2007. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development.* Commission Final Report. California Energy Commission, Renewables Committee, and Energy Facilities Siting Division, and California Department of Fish and Game, Resources Management and Policy Division. Prepared by D. Anderson, S. Flint, S. Sanders, and D. Sterner. CEC700-2007-008-CMF.September 2007.

Beedy, E. C., S. D. Sanders, and D. A. Bloom. 1991. *Breeding status, distribution, and habitat associations of the tricolored blackbird* (*Agelaius tricolor*), 1850-1989. June 21, 1991. Jones & Stokes Associates (JSA 88-187.) Sacramento, CA. Prepared for USFWS, Sacramento, CA.

Flett, M. A. and S. D. Sanders. 1987. *Ecology of a Sierra Nevada population of Willow Flycatchers*. Western Birds. 18:37-42.

Fowler, C., B. Valentine, S. Sanders, and M. Stafford. 1991. *Habitat Suitability Index Model: Willow Flycatcher* (*Empidonax traillii*). USDA Forest Service, Tahoe National Forest.

Harris, J. D., S. D. Sanders, and M. A. Flett. 1987. Willow Flycatcher surveys in the Sierra Nevada. Western Birds. 18:27-36.

Sanders, S. D. and M. A. Flett. 1989. *The ecology of a Sierra Nevada population of Willow Flycatchers (Empidonax traillii), 1986 and 1987*. California Management Branch Administrative Report No. 89-3, California Department of Fish and Game.

Sanders, S. D. 1983. *Foraging Ecology of a Sierra Nevada population of Douglas Tree Squirrels* (*Tamiasciurus douglasii*). Ph.D. Dissertation, University of California, Davis

DECLARATION OF
Amy Golden

I, **Amy Golden**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting Office** as a Biologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Biological Resources**, for the **Blythe Solar Power Plant**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

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

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:__7/1/10____________ Signed:___Amy Golden__________________

At: ____________________

Amy W. Golden

Employment History

California Energy Commission

Planner II, Staff Biologist *11/2009 to present*

As a Staff Biologist with the Energy Commission, Ms. Golden analyzes the biological resource components of energy facilities siting applications to assess resource impacts, develop mitigation plans, and to evaluate compliance with applicable local, state, and federal laws, ordinances, regulations, and standards. In addition, she works closely with biological resource protection and management agencies and subject matter experts to ensure input into the Energy Commission and facility licensing process.

Foothill Associates

Wildlife Biologist *03/2005 to 10/2009*

While working as a private environmental consultant with Foothill Associates as a Wildlife Biologist, Ms. Golden assisted with ESA Section 7 Biological Assessments and Clean Water Act 404 permit applications primarily for private residential and commercial development projects. She performed field habitat assessments; focused species surveys for reptiles, amphibians, and vernal pool invertebrates; wetland delineations; raptor surveys; and arborist surveys. Ms. Golden performed the biological impact analysis for several parks master planning and proposed specific plan area projects. Amy also assisted with the preparation of riparian habitat mitigation plans pursuant to Section 1600 of California Fish and Game Codes and Wetland Mitigation Plans in support of Clean Water Act Section 404 Army Corps permit issuance and compliance. Ms. Golden also served as the biological lead on many CEQA projects and performed the biological field work and prepared the biological resources section for several CEQA documents.

Analytical Environmental Services

Biologist *09/2004 to 02/2005*

While with the environmental consulting firm Analytical Environmental Services as a Staff Biologist, Amy assisted with the preparation and analysis of many NEPA documents primarily for tribal projects. Ms. Golden prepared biological impact analyses and coordinated with local resource agencies on the development of mitigation plans to minimize impacts to sensitive biological resources. Amy also performed field biological assessments, wetland delineations, elderberry shrub impact assessments, and focused plant and wildlife surveys.

The Nature Conservancy

Biologist *04/2004 to 07/2004*

Ms. Golden worked on a field crew as a seasonal field biologist on a long-term avian monitoring project with The Nature Conservancy to monitor the use of montane meadows and forest edges by birds in the Sierra Nevada mountain range. Ms. Golden performed avian point counts utilizing the Variable Point Count method to document avian bird diversity in the Tahoe National Forest. Amy operated a GPS unit, recorded all birds observed based on visual surveys and auditory calls and input all collected data into a Microsoft Excel database.

Sapphos Environmental, Inc.

Wildlife Biologist *05/2002 to 03/2004*

As a Wildlife Biologist with Sapphos Environmental, Inc., Ms. Golden performed field habitat assessments in support of biological technical analyses and reports. Amy assisted with dry desert wash delineations, desert tortoise habitat assessments and focused surveys, Incidental Take Permit applications, and several CEQA biological resources sections. Amy coordinated with local resource agencies on the development of appropriate mitigation plans and land acquisitions on several Section 7 ESA permitting projects.

EDUCATION

Environmental Forest Biology *Bachelor of Science*

State University of New York, College of Environmental Science and Forestry *May 2000*

Field Ecology
University of California Riverside Extension *Certificate in Field Ecology*
February 2004

Veterinary Science Technology
State University of New York at Delhi *Associate of Applied Science*
May 1997

DECLARATION OF
Sara Keeler

I, **Sara Keeler**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting Office** as a Biologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Biological Resources**, for the **Blythe Solar Power Plant**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

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

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 29, 2010 Signed: Sara Keeler

At: ____________________

Sara M. Keeler

Employment History

California Energy Commission

Planner II, Staff Biologist *12/2009 to present*

As a staff biologist with the Energy Commission, Ms. Keeler analyzes the biological resource components of energy facilities siting applications to assess resource impacts, develop mitigation, and to evaluate compliance with applicable local, state, and federal laws, ordinances, regulations, and standards. This requires working closely with biological resource protection and management agencies, subject matter experts, and Energy Commission consultants as well as with other Energy Commission staff to provide the best available information is included in staff analyses.

California Department of Transportation, District 3

Associate Environmental Planner/Environmental *11/2007 to 12/2009*

Ms. Keeler's primary duties with Caltrans were to coordinate and complete environmental documents to satisfy CEQA, NEPA, regional, and permitting requirements, and act as the Project Biologist on various transportation-related projects in California.

Entrix, Inc.

Senior Staff Scientist/Staff Scientist *01/2005 to 11/2007*

While with the environmental consulting firm Entrix, Inc., Ms. Keeler specialized in California wildlife and floristics studies. She worked throughout California including in the Lake Tahoe Basin, Great Basin, Central Valley, Sierra Nevada, in coastal California, and desert areas. Projects while at Entrix included biological resource field studies such as habitat assessments, protocol-level surveys for special-status plants and animals, wetland delineations, and riparian surveys; project, task, and budget management; and writing biological resources sections of a variety of documents including documents to satisfy NEPA and CEQA requirements, environmental assessments, and existing conditions reports.

USDA, Forest Service, Pacific Southwest Research Station

Biological Sciences Technician *05/2001 to 09/2002*

Ms. Keeler conducted breeding bird surveys and vegetation inventories and assessments on a breeding bird survey crew in the Sierra Nevada. This included conducting surveys using a variety of techniques including tree-climbing (ascenders, 3-point climbing, Swedish ladders), auditory surveys, and vegetation sampling.

EDUCATION

Biological Sciences (Evolution and Ecology) *B.S (High Honors)*
University of California, Davis *June 2004*

DECLARATION OF
Mark Massar

I, **Mark Massar**, declare as follows:

1. I am presently employed by the Bureau of Land Management as a wildlife biologist for the Palm Springs/ South Coast Field Office.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **BIOLOGICIAL RESOURCES**, for the BLYTHE SOLAR POWER PROJECT RSA and Supplemental filings, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

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

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 7, 2010 Signed: Mark Massar

At: Palm Springs, California

Mark Massar
Bureau of Land Management
1201 Bird Center Drive
Palm Springs, CA 92262

Education

B.S., Forestry and Natural Resource Management, University of California, Berkeley

M.S., Biological Sciences, California Polytechnic State University Pomona

Work Experience

Bureau of Land Management, Palm Springs, California. Wildlife Biologist (2005- Present). Currently serving as the overall program lead for wildlife and habitat management in the BLM Palm Springs-South Coast Field Office. Prepare and monitor wildlife habitat management plans. Participate in the preparation and review of land use and activity plans, environmental impact statements, and environmental assessments. Work with local groups to promote and sustain cooperative wildlife conservation interest and volunteerism. Provide input to the BLM Annual Work Plan and budget process regarding the wildlife habitat management program, and monitor work progress during the year. Serve as the Bighorn Sheep Program lead by planning, developing, evaluating, and monitoring the program for the Field Office. Review project proposals to assess their potential impact on wildlife and their habitats. Conduct field inventories in support of biological analyses. Facilitate compliance with the Endangered Species Act as required, by preparing Biological Assessments and working with contractors for accurate completion of Biological Assessments. Coordinate closely with the U.S. Fish and Wildlife Service to pro-actively address biological issues and facilitate timely completion of the Section 7 consultation process. Foster community relationships by participating in interagency planning efforts and activities, such as the flat-tailed horned lizard committee, the Coachella Valley fringe-toed lizard preserve committee, the Desert tortoise recovery team, the Dos Palmas Management Committee, Coachella Valley Multi-Species Habitat Conservation Plan, and the Peninsular Rangers Bighorn Sheep Recovery Team. Prepare and submit grant proposals in support of resource management projects; provide input and facilitate successful submission of office-wide grant proposals.

Charis Corporation, Fort Irwin, California. Ecologist. (2000 - 2005). Worked as an ecologist for the Directorate of Public Works, Natural Resources Division. Ensured post compliance with the Endangered Species Act, Migratory Bird Treaty Act, and the National Environmental Policy Act. Implemented Fort Irwin's Integrated Natural Resources Management Plan and Endangered Species Management Plan. Developed, conducted, and oversaw monitoring of plant and animal species, especially the desert tortoise. Conducted biological assessments and Section 7 consultations of the Endangered Species Act. Developed databases for the data generated by monitoring and survey activities insuring the data and databases conformed to appropriate standards and were accessible through the use of geographic information systems. Developed and reviewed scopes of work for university studies and surveys. Participated in numerous outreach and educational programs on desert ecology for base personnel and surrounding communities in Southern California.

Computer Sciences Corporation, Edwards Air Force Base, California. Wildlife Biologist (1998-2000). Worked as a wildlife biologist providing natural resource program support for Environmental Management on Edwards Air Force Base. Duties included ensuring Base compliance with Federal environmental laws. Technical support included conducting biological surveys, monitoring projects for compliance with environmental laws, preparing environmental assessments and other NEPA documents by analyzing potential environmental impacts to natural and developing protection measures to minimize project impacts, conducting natural resource damage assessments by designing survey protocols, training surveyors, analyzing data, and writing damage assessment reports.

National Park Service. Biological Science Technician (1994-1997). Researched, developed, and presented interpretive programs on the natural history of the Sonoran Desert for Saguaro National Park. Was the primary coordinator of the Saguaro National Park's summer Junior Ranger program. Assisted in a bighorn sheep inventory study at Joshua Tree National Park, which involved designing the survey protocol, developing standardized data recording forms, spending 160 hours in a blind recording sheep behavior, and identifying individual sheep using photography. Assisted in a desert tortoise home range study by radio-tracking desert tortoises at Joshua Tree National Park. Organized and conducted biological surveys for amphibians, including foothill yellow-legged frog (*Rana boylii*), mountain yellow-legged frog (*R. muscosa*), red-legged frog (*R. aurora*), and Yosemite toad (*Bufo canorus*) in Yosemite, Sequoia, and Kings Canyon national parks. Fieldwork involved the location of appropriate habitat for amphibian species, measurement of aquatic habitat parameters, identification of all amphibians encountered, behavioral studies on reproduction and predation, analysis of blood samples for environmental toxin studies. Numerous reports were prepared on survey findings for the National Biological Service and cooperating Forest Service offices. Extensive planning was undertaken to organize field work into backcountry areas, with most trips lasting 10 days.

Bureau of Land Management, EI Centro, California. Biological Science Technician (1993). Organized and conducted biological surveys for threatened lizards in the California desert, including the flat-tailed horned lizard (*Phrynosoma mcalii*) and Colorado Desert fringed-toed lizard (*Uma notata*) . Work involved weighing and measuring lizards, and precisely describing habitat conditions, including vegetation structure and composition, microhabitat conditions, and human-caused disturbances. Conducted scientific literature searches for information on the natural history, distribution, and possible causes of decline for these lizards.

California Department of Fish and Game, Bishop, California. Fisheries Technician (1992). Assisted a team of fisheries biologists to accomplish diverse management objectives. Work included the operation and maintenance of a fish weir, conducting creel surveys, electroshocking fish, monitoring the status of rare amphibians in the Sierra Nevada, habitat mapping, assessing the population and breeding status of amphibians, and writing reports of findings.

United States Forest Service, Foresthill, California. Forestry Technician (1991). Inspected silvicultural contract work (i.e., planting, thinning, site preparation) for compliance with government contracts. Explained steps necessary for compliance to contractors and reported violations to supervisor. Examined sapling and larger stands to collect and record data on stocking, disease, site quality, and vegetation. Made recommendations for areas requiring remedial action. Examined plantations to assess numbers of tree seedlings present, condition, growth and survival rates, and evidence of animal damage.

DECLARATION OF
Magdalena Rodriguez

, **Magdalena Rodriguez**, declare as follows:

1 I am presently employed by The California Department of Fish and Game in the Inland Deserts region 6 as an Environmental Scientist.

2 A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **BIOLOGICIAL RESOURCES**, for the BLYTHE SOLAR POWER PROJECT RSA and Supplemental filings, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4 It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

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

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated 7/07/2010 Signed: Magdalena R

At: Ontario, California

Magdalena Rodriguez
Work Address: 3602 Inland Empire Blvd. Ontario, CA 91764
Work Phone: 909-945-3294

EDUCATION:

- University of Arizona, Tucson, AZ Master of Science, Wildlife Science –April 2002
- University of Arizona, Tucson AZ Bachelor of Science, Renewable Natural Resources/Wildlife and Fisheries Science – December 1997

WORK EXPERIENCE:

January 2009 to present

- ENVIRONMENTAL SCIENTIST, California Department of Fish and Game, Ontario, CA

Duties include evaluating biological resource documents from the renewable energy applications within Imperial and Riverside County. Work with the applicants on their streambed and endangered species compliance. Work cooperatively with several government agencies to evaluate resource impacts, mitigation ratios, plant and wildlife surveys, and strategies for avoidance and minimization. Comply with the Warren Alquist Act in providing California Energy Commission with technical assistance in fulfilling streambed and endangered species requirements for the state. Write streambed and endangered species permits for non CEC renewable projects in the desert. Represent CDFG as region 6 fire coordinator and at the Desert Managers Group (DMG) meetings.

November 2006 to January 2009

- ENVIRONMENTAL SCIENTIST, California Department of Fish and Game, Ontario, CA

Duties included implementing the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP). Review biological documents for consistency with the plan; evaluate potential impacts to riparian/riverine resources, vernal pools and 146 covered species within the plan boundaries. Work jointly with FWS writing letters to permittees addressing our concerns and solutions for project impacts. Visit the project proponent sites and verify their findings in the document as they related to biological resources. Represent CDFG on the Burn Area Response Team (BART) in Southern California immediately after the wildfires of 2007 and 2008.

June 2002 to August 2002

- WILDLIFE TECHNICIAN, University of Arizona, Tucson, AZ

Duties included implementing several surveys in remote desert locations in southeastern California. I would perform 3-km plant transects to look at environmental variables, such as percent cover. All GPS coordinates were downloaded into an Excel spread sheet to analyze with current mule deer data. Research was also conducted to look at historical use of mule deer in the same area and how that compared to the data we were collecting.

April 2001 to July 2001

- WILDLIFE TECHNICIAN, Harris Environmental, Tucson, AZ

I aided in coordinating field activities with the US Air Force to locate Pima Pineapple Cactus (PPC). Using scientific methods I led a group of 3 biologists on a 3-km transect to locate PPC's. Once a plant was found measurements were taken and the overall health of the plant was assessed. Environmental conditions were recorded for each PPC. Once all data was collected I assisted in data analysis and preparing an environmental document to show the Air Force was in compliance with the Endangered Species Act.

<u>January 1999 to January 2001</u>

- GRADUATE RESEARCH ASSISTANT, University of Arizona, Tucson, AZ

Perform research on Opinions and Attitudes of Mexican citizens on reintroduction of the Mexican gray wolf into Mexico. Researched environmental reports on the wolf and interpreted relevant information. I modified a United States wolf opinion survey, using scientific methods, to use in Mexico. I traveled to Mexico to distribute my survey and make presentations to several different interest groups, such as the Cattlemen's Association. All responses were analyzed and recommendations were developed. I presented my results to the public, where questions were answered. Non-governmental organizations from the US and Mexico were provided consultative advice and given copies of the results. The results were published in the wildlife society bulletin.

<u>September 1995 to January 1997</u>

- UNDERGRADUATE FIELD TECHNICIAN, AZ Coop Fish/Wildlife Research Unit-Minority Program, Tucson, AZ

I assisted in evaluating cavity nesting birds in transplanted Saguaro's. Each Saguaro was monitored for woodpeckers and owls occupying each cavity. We also used a remote camera and physical observations to determine effects of human activities on nest success. Helped coordinate with Arizona Game and Fish in 4 deer drives. Each survey consisted of walking the entire length of the enclosure and getting an accurate count of white tailed deer present. Using scientific methods, I also participated in the collection of plants in the enclosure to analyze vegetation content. In addition, I assisted in 3-km transects to determine environmental factors such as, habitat availability for deer in the enclosure.

Kimberly Nicol
Work Address: 78078 Country Club Dr. Suite 109, Bermuda Dunes, CA 92203
Work Phone: (760) 200-9178

Education:

- California State University, Sacramento
  Master of Science, Biological Conservation, June 1988

- California State University, Sacramento
  Bachelors of Science, Biology, December 1980

Work Experience:

July 2007 to Present
Environmental Program Manager, California Department of Fish and Game, Bermuda Dunes

Provide program level oversight to staff working on the Salton Sea Restoration Program, the Western Riverside HCP/NCCP, the Coachella Valley HCP/NCCP and the Imperial Irrigation District HCP implementation. Serve on several policy level committees related to the HCPs. Provide guidance on the development of the Desert Renewable Energy Conservation Plan required under the Executive Order concerning renewable energy.

December 2004 to July 2007
Senior Environmental Scientist, California Department of Fish and Game, Bermuda Dunes

Department lead on the Salton Sea Ecosystem Restoration process. Represented Department policy in the development of the Coachella Valley HCP/NCCP and the Imperial Irrigation District NCCP. Conducted performance evaluations, oversaw their work and guided them on policy and procedure issues. Represented the Department on issues related to implementation of the Quantification Settlement Agreement in the Imperial Irrigation District and Coachella Valley Water District Service areas.

June 2002 to December 2004
Staff Environmental Scientist, California Department of Fish and Game, Bermuda Dunes

Represented Department policy in the development of NCCP's, during CESA permit development, Streambed Alteration negotiations, and during negotiations in relation to CEQA mitigation. Department's lead staff person in development of the Salton Sea Restoration Program, and in developing the NCCP for the Quantification Settlement Agreement related to impacts on species in the Imperial Valley and the Salton Sea.

May 2001 to June 2002
Environmental Scientist III, California Department of Fish and Game, Indio

Duties consisted of conducting environmental review of CEQA and NEPA documents as they pertain to the fish and wildlife resources of the California Desert in Riverside and Imperial Counties. I attended pre-project planning meetings and advised project proponents on the Lake and Streambed Alteration Agreements and California Endangered Species Act permitting processes; discussed project design methods to minimize and mitigate impacts to fish and wildlife resources. I prepared CESA permits. Additional duties included working within DFG and with other agencies to develop Multi-species and Natural Communities Conservation Plans. This included advising on individual species needs, as well as regulations and policies related to endangered species and NCCP.

May 1993 to May 2001
Associate Biologist (Wildlife), California Department of Fish and Game, Indio

My job duties consisted of conducting environmental review of CEQA and NEPA documents as they pertain to the fish and wildlife resources of the area. I attended pre-project planning meetings and advised project proponents on the Lake and Streambed Alteration Agreements and California Endangered Species Act permitting processes; discussed project design methods to minimize and mitigate impacts to fish and wildlife resources. I prepared CESA permits. Additional duties included working within DFG and with other agencies to develop Multi-species and Natural Communities Conservation Plans. This.included advising on individual species needs, as well as regulations and policies related to endangered species and NCCP.

August 1989 to May 1993
Associate Biologist (Fisheries), California Department of Fish and Game, Indio

As lead Fishery biologist for Imperial and eastern Riverside counties my duties included management of the fish, reptile and amphibian resources. I was involved in the development of management plans for the flat-tailed horned lizard and the desert pupfish. I performed various fishery surveys on the Salton Sea, Colorado River and small lakes and reservoirs within Imperial County. I reviewed environmental documents; conducted annual monitoring surveys for several species including desert pupfish, flat-tailed horned lizard, desert slender salamander and the Coachella Valley fringe-toed lizard.

August 1985 to August 1989
Fisheries Biologist, California Department of Fish and Game, Indio

Unit Fishery Biologist for Imperial and eastern Riverside Counties. Conducted surveys on various species of fish, reptiles and amphibians within the unit. Participated in the preparation of Habitat Management Plans. Reviewed environmental doucments. Participated on the Coachella Canal lining biological work group. Participated in studies on Salton Sea fishes, and supervised several seasonal aides involved in those studies.

DECLARATION OF
Michael P. Donovan, P.G., C.Hg.

I, **Michael P. Donovan**, declare as follows:

1. I am presently under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. I am serving as a Senior Hydrogeologist and to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.

2. My professional qualifications and experience are attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Soil and Water Resources** section for the **Blythe Solar Power Project Supplemental Staff Assessment** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

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

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 5, 2010 Signed: ____________________

At: Santa Ana, California

Michael P. Donovan, P.G., C.Hg.

Senior Hydrogeologist

Education

BS/1978/Geology/Oregon State University

Computer Modeling of Groundwater Flow and Contaminant Transport by Jacob Bear/University of California, Irvine

Registration

1986/California Registered Geologist #4112 (Expires 06/30/11)

2000/California Certified Hydrogeologist #701 (Expires 06/30/11)

Experience

With Psomas 5 years; with other firms for 24 years.

Background

Mr. Donovan is a professional hydrogeologist with over 29 years of experience in project management, hydrology and hydrogeological assessments, conceptual model development, groundwater modeling studies, water quality assessments, and groundwater resource development. He has extensive skills with monitoring well design, water quality sampling and analytical techniques, quality assurance/quality control, CEQA, environmental impact assessment, ecohydrology, agency negotiations, risk assessment, and expert witness.

Related Projects

San Juan Basin Authority (2004-Present): Senior Hydrogeologist – Hydrogeologic characterization and monitoring of groundwater extraction as part of desalination facility. Project includes implementation of groundwater monitoring plan including water quality sampling and analytical testing, groundwater modeling, monitoring of surface and groundwater levels and flow and assessments in change in storage to the alluvial groundwater basin from ongoing extraction wells. In addition, evaluated recharge of alluvial groundwater system using diverted stream channels and percolation basins for ongoing desalination project.

Metropolitan Water District of Southern California: Senior Hydrogeologist – Hydrogeologic characterization of bedrock geology in vicinity of proposed Pipeline No. 6 water conveyance tunnel. Work included development of monitoring plan including sampling protocols, laboratory analytical techniques, and quality assurance and quality control procedures.

Private Developer, Hydrogeologic Assessment (2004 to Present): Senior Hydrogeologist - Hydrogeologic characterization of Shaver Valley (east of Indio, CA) for potential conjunctive use project as part of major residential, commercial, and golf resort development in Eastern Riverside County. Work includes workplan development, geophysical investigation, well installation, aquifer testing, water quality assessment, groundwater modeling, conceptual design of groundwater recharge/extraction program, and providing documentation for Specific Plan and EIR.

Mission Springs Water District, Groundwater Modeling Study (2005-Present): Senior Hydrogeologist –The work included potential historical impacts to regional groundwater system, potential reuse sites for recycled water, and recommendations for a Groundwater Management Plan.

Poseidon Resources, Hydrogeological Assessment: Senior Hydrogeologist – Preparation of Hydrogeological Assessment and Feasibility for the use of vertical extraction wells to supply feedwater for a desalination plant in Southern California. Evaluation included characterization of nearshore hydrogeological regime and design of extraction wells and potential drawdown field created by maximum feasible yield.

Mission Springs Water District, Preliminary Water Balance: Senior Hydrogeologist - Hydrogeologic characterization and water supply assessment for the Mission Springs Water District (MSWD) service area. The objective of this project is to develop a long term Integrated Water Resource Management Plan that can be used by MSWD to optimize the use of their groundwater basins and evaluate alternative water supplies. The alternatives developed must minimize impacts to biological and wildlife of concern by the local environmental community. As part of this project, Mr. Donovan completed a preliminary water balance study for the Mission Creek sub-basin. The results of the study would be used to direct future investigations for the Mission Creek sub-basin.

City of San Juan Capistrano (2007): Senior Hydrogeologist – Assisted the City of San Juan Capistrano in the evaluation of proposed well production sites including installation and testing of pilot test wells at two location. Evaluation included advancement of test borings using Sonic Drilling, well completion, aquifer test, water quality sampling, and preparation of Pilot Test Well Report that included suitability of each location and expected production from a production well placed at each location.

Elsinore Valley Municpal Water District (2006-2007): Senior Hydrogeologist - Meeks & Daley Water Company (M&D) and the City of Riverside constructed two new wells (in City of San Bernardino and Colton). Psomas was responsible for designing and preparing a preliminary design report, construction documents and project specifications for: two new +700-Foot deep wells with a vertical turbine pump assembly at an estimated flow rate of 3,000 GPM and associated piping. Mr. Donovan prepared a Mitigated Negative Declaration, Mitigation Monitoring and Reporting Program, required forms for submittal to State Clearing House, response letter to comments, and presentations to lead agency/public forum on the project.

East Orange County Water District (2008): Senior Hydrogeologist – EOCWD planned to construct a 900-foot deep well (in City of Tustin). Psomas was responsible for designing and preparing a preliminary design report, construction documents and project specifications for the new +900-Foot deep well with a vertical turbine pump assembly at an estimated flow rate of 2,000 GPM and associated piping. Mr. Donovan prepared a Mitigated Negative Declaration, Mitigation Monitoring and Reporting Program, required forms for submittal to State Clearing House, response letter to comments, and presentations to lead agency/public forum on the project.

Surface and Groundwater Assessment, Eastern Utah: Principal investigator for baseline surface water and groundwater assessment and impact monitoring of White

River Shale Corporation major oil shale mining project in eastern Utah. Responsible for locating over 8 surface water monitoring stations, streamflow monitoring (including static and continuous monitoring), development of rating curves for stream cross-sections, water quality sampling, reduction and analysis of data and development of a comprehensive data management system designed after the USGS WASTORE system over a period of seven years. In addition, developed a data quality management system that monitored and corrected deficiencies in the collection and reporting of the surface water quality data and later developed a statistical approach for evaluating mitigation monitoring for naturally-occurring compounds including metals and selected nutrients..

Surface Water Quality Monitoring, Southeast Alaska: Principal investigator for baseline surface water quality monitoring program for the Quartz Hill Molybdenum Project. Responsible for locating over 17 surface water monitoring stations, streamflow monitoring (including static and continuous monitoring), development of rating curves for stream cross-sections, water quality sampling (including storm-activated samplers), reduction and analysis of data and development of a comprehensive data management system designed after the USGS WASTORE system over a period of five years. In addition, developed a data quality management system that monitored and corrected deficiencies in the collection and reporting of the surface water quality data.

Surface Water Quality Monitoring, Thompson Creek Molybdenum Mine, Idaho: Principal investigator for baseline surface water quality monitoring program for a proposed fluorite mine project. Responsible for locating over 12 surface water monitoring stations, streamflow monitoring, water quality sampling, data analysis and reporting of the information over a period of two years.

Surface Water Quality Monitoring, Ima Mine, Idaho: Principal investigator for baseline surface water quality monitoring program for tungsten mine project. Responsible for locating over 5 surface water monitoring stations, streamflow monitoring, water quality sampling, data analysis and reporting of the information over a period of two years.

Surface Water Quality Monitoring, Bayhorse Creek Mine, Idaho: Principal investigator for baseline surface water quality monitoring program for a proposed fluorite mine project. Responsible for locating over 12 surface water monitoring stations, streamflow monitoring, water quality sampling, data analysis and reporting of the information over a period of two years.

Surface and Groundwater Quality Monitoring Program, Equity BX In-situ Oil Shale Mine, Colorado: Principal investigator for mitigation monitoring of surface water and groundwater quality during operation of a pilot test program for steam injection removal of oil from oil shale. Responsible for locating over 4 surface water and 8 groundwater monitoring stations, streamflow monitoring, water quality sampling, data analysis, impact evaluation and reporting of the information.

Surface Water Quality Monitoring, Creede, Colorado: Principal investigator for baseline surface water quality monitoring program for Chevron's proposed silver mine project. Responsible for locating over 12 surface water monitoring stations, streamflow monitoring, water quality sampling, data analysis and reporting of the information.

Private Developer (2007): Principal Hydrogeologist. Evaluated the feasibility of constructing a golf course and adjacent housing complex on a closed landfill in Riverside County, California. The work included reviewing technical documents, meeting with regulators and developing issues environmental constraints list with recommendation for further study.

Valley Center Residential Project, CA (2005): Senior Hydrogeologist for hydrogeological characterization that included aquifer tests, water quality sampling and analysis, and numeric groundwater flow model development for a proposed residential development project in Valley Center. The project required analyzing the effect of wastewater effluent on the local groundwater aquifer and developing mitigation measures as required.

Sacramento Regional County Sanitation District, Peer Review – Hydrogeological Assessment: Project Manager/Senior Hydrogeologist – Conducted a review documents associated with the dewatering activities conducted during construction activities that occurred at the New Natomas Pump Station and evaluate whether "actual conditions are more adverse than baselines" were present. The evaluation included site walk, review of aquifer testing data and methods, dewatering activities, existing hydrogeological data and preparation of a report on findings.

Mission Springs Water District, Urban Water Management Plan: Senior Hydrogeologist – Preparation of the Hydrogeological portions of an Urban Water Management Plan in compliance with The California Water Management Planning Act of 1983, which required water purveyors to develop water management plans to achieve conservation and efficient use.

Remedial Investigation, Los Angeles, California: Senior Hydrogeologist and Project Manager responsible for interpreting existing information and developing a geologic and hydrogeologic evaluation program for a former chromium-plating facility. The facility is adjacent to a former major manufacturing facility that used chlorinated solvents and hexavalent chromium in its manufacturing operations. Responsibilities included reviewing historical site investigation activities, preparing a remedial investigation workplan, implementation of the workplan, commenting on adjacent facilities' workplans, California Environmental Protection Agency DTSC meetings and negotiations, and formulating arguments/briefs for impending mediation.

Superfund Oversight, City of Industry, California: Senior Hydrogeologist responsible for participating as the client's technical representative to the Puente Valley Operable Unit Steering Committee. Responsibilities included reviewing historical site investigation activities and preparing a de minimis argument for the client's facility, assessing offsite liability stemming from adjacent responsible parties, reviewing proposed activities of the Steering Committee's consultant, and formulating arguments/briefs for impending mediation.

Remedial Investigation, Redlands, California: Principal investigator for Lockheed Corporation, a rocket motor manufacturing and testing facility. The purpose was to identify potential source areas of TCE contamination. Areas evaluated included burn pits, leachfields, vapor degreasing units, evaporation ponds, solid propellant mixing areas, rocket motor testing areas, and painting areas. The evaluation involved ranking the potential of various manufacturing activities to act as a source of TCE and evaluating available pathways into existing groundwater systems.

Site Investigation for Southern Pacific Pipeline. Palm Springs, California: Senior project manager for a site investigation of a fuel leak for this major fuel product transport line. The site investigation included developing soil sampling and field screening techniques, shallow probe installation and groundwater monitoring well installation and sampling. The initial investigation culminated in development of potential remedial alternatives.

Xerox Corporation, Pomona, California: Senior Hydrogeologist for the design, implementation, and interpretation of a remedial investigation of a 12-acre former electronics manufacturing facility. Responsibilities included design and implementation of remedial investigations at the site, operation and maintenance of groundwater treatment system, groundwater monitoring, soil and groundwater cleanup evaluation, regulatory interaction, preparation of demolition specifications, bid documents, selection of subcontractor, and monitoring execution of the demolition program. In addition, provided technical support to outside legal counsel for civil liability lawsuit filed in association with the aforementioned site.

Recovery of Past Investigation Cost Claims, San Diego, California: Senior hydrogeologist for a client who was seeking reimbursement from a previous site operator for site investigation and remedial action costs. Reviewed with legal counsel the costs associated with various activities and segregated into costs that were viable for cost recovery. Provided testimony in court case and was successful in recovering 80% of past costs.

Redevelopment Project, San Diego, California: Project Manager responsible for the environmental assessment associated with the demolition of a bus maintenance facility and construction of multi-story apartment complex at a site severely impacted with petroleum hydrocarbons. The activities included reviewing prior site investigations conducted by five previous consulting firms, delineating areas of concern for excavation activities, conducting focused site investigations on the property, and formulating proposed alternatives for handling petroleum-contaminated soils during site construction.

Xerox Corporation, Santa Clara, Sunnyvale, & Hayward, California: Senior Hydrogeologist for the successful development and implementation of a site closure plan. Responsibilities included interpretation of hydrogeology and contaminant transport, groundwater monitoring, preparation of a site closure plan including hydrogeologic evaluation, fate and transport of chlorinated volatile organic compounds, and negotiations with the regulatory agencies.

Remedial Investigation, Carson, California: Program manager for remedial investigation/feasibility study at a 30-acre chemical-manufacturing site in southern California. The activities conducted at the site included soil vapor surveys, soil sampling, and groundwater sampling (three separate aquifer systems). The program also involved development of a feasibility study work plan, risk assessment evaluation, and public participation plan.

Remedial Investigation, Sacramento, California: Principal investigator for preliminary endangerment assessment and remedial investigation at a large aerospace facility. The 4,000- acre former rocket test facility is currently undergoing soil and groundwater investigations for potential releases of chlorinated solvents and metals. Responsible for developing the remedial investigation tasks and implementation.

Remedial Investigation/Feasibility Study, San Diego, California: Senior hydrogeologist responsible for design and implementation of all site characterization activities including design and implementation of the RI/RFI at a major gas turbine manufacturing facility. The work included assessment of soil and groundwater impacted with chlorinated solvents, metals, benzene, petroleum hydrocarbons and PCBs. Assisted in preparation of a comprehensive RI/RFI work plan that included a historical summary of facility operations, site geology and hydrogeology, and contaminants of concern, and the proposed site characterization activities to be undertaken. Site characterization activities included advancement of borings and completion of wells using hollow-stem auger and casing hammer reverse air circulation drilling; soil vapor surveys; geophysical investigations including electrical and seismic; continuous water level monitoring to correct for tidal influence; and laboratory analysis using CLP protocols.

Six Flags Magic Mountain, Hydrogeological Assessment (2005-2006): Senior Hydrogeologist – Assistance with permitting requirements associated with construction of a bank protection structure along the Santa Clara River in northern Los Angeles County. Work included assessment of hydrogeological regime including water quality, preparation of creekside dewatering permit and negotiations with RWQCB.

Fate and Transport Evaluation, San Diego, California: Senior hydrogeologist for the RI/RFI fate and transport evaluation to determine the necessity for implementing interim remedial measures for the transport of chlorinated volatile organic compounds and metals off-site into marine waters.

Feasibility Study, United States Navy, British Indian Ocean Territories, Indian Ocean (1984): Principal Investigator for enhancing development of groundwater resources on the island of Diego Garcia for the U.S. Rapid Deployment Force. The study included design and placement of horizontal infiltration galleries for development of a fresh groundwater lens.

Publications & Presentations

“Application Of Ecohydrology In Analysis And Minimization Of Development Impacts” Groundwater Resources Association of California 17th Annual Conference & Meeting; GROUNDWATER: Challenges to Meeting Our Future Needs. Sep. 25, 2008

“Hydrogeology of the San Diego Region on CD-ROM”
EnviroConcepts, Inc., March 2004.

“Hydrogeology of the Coastal Plain of Los Angeles on CD, Vol. II”
EnviroConcepts, Inc., March 2004.

“Hydrogeology of the San Fernando Valley on CD-ROM”
EnviroConcepts, Inc., August 2003.

“Hydrogeology of the Inland Plain of Los Angeles on CD-ROM” EnviroConcepts, Inc., January 2003.

“Hydrogeology of the Coastal Plain of Los Angeles on CD, Vol. I” EnviroConcepts, Inc., May 2002.

“Environmental Consultants’ Resource Handbook (California Edition).” 600 pp. EnviroConcepts, Inc., March 1998.

“Environmental Consultants’ Resource Handbook (California Edition).” 561 pp. EnviroConcepts, Inc., April 1995.

DECLARATION OF
Suzanne L. Phinney, D.Env.

I, Suzanne L. Phinney, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Senior Associate.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare staff testimony on **TSE Appendix A** and **Response to Comments** for the **Blythe Solar Power Project Supplemental Staff Assessment** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

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

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 6/29/2010 Signed: Suzanne Phinney

At: Sacramento, California

Aspen Environmental Group

SUZANNE L. PHINNEY

Senior Associate, Energy and Infrastructure

ACADEMIC BACKGROUND

Doctorate, Environmental Science & Engineering (D.Env.), University of California, Los Angeles, 1981
M.S., Marine Biology, Dalhousie University, Halifax, Nova Scotia, Canada, 1975
B.A., Biological Sciences, University of California, Berkeley, 1973

PROFESSIONAL EXPERIENCE

Dr. Phinney has 30 years of experience in the environmental and energy field, providing technical and policy support in energy analysis, environmental assessment, environmental remediation, air and water quality assessments, risk assessment, regulatory compliance, permitting, and project/program management. Her particular emphasis is energy and infrastructure with projects addressing climate change, alternative energy generation technologies, liquefied natural gas, petroleum infrastructure, advanced transportation vehicles and fuels, land use and energy, and power plant siting. Prior to employment at Aspen, Dr. Phinney worked for 16 years with Aerojet, where she oversaw all environmental and safety issues.

Aspen Environmental Group — 2001 to present

Dr. Phinney manages energy and infrastructure projects for Aspen and provides environmental support on major projects. She has provided energy and environmental expertise to the following clients:

California Energy Commission (CEC). Dr. Phinney has supported CEC staff since 2001. She has prepared analyses for several power plants throughout the State, and has authored or contributed to over a dozen special studies. She is currently Deputy Program Manager for planning studies conducted by the Aspen team. Her major efforts for the CEC include the following.

- **Power Plant Siting, CEC, Project Management/Technical Support (2001 – Present).** Dr. Phinney prepared the alternatives analysis for the following power plants under review by the Energy Commission:
  - **Palomar Energy Project –** 500 MW combined-cycle natural gas facility in Escondido, San Diego County
  - **Russell City Energy Center –** 600 MW combined-cycle natural gas facility in Hayward, Alameda County
  - **Eastshore Energy Center -** 115.5 MW simple-cycle natural gas facility in Hayward, Alameda County
  - **Carrizo Energy Solar Farm –** 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
  - **CPV Sentinel Energy Project –** 850 MW natural gas plant in the Coachella Valley, Riverside County
  - **Marsh Landing Generating Station-** 930 MW natural gas plant within the existing Contra Costa Power Plant in Antioch, Contra Costa County
  - **Orange Grove Project –** 96 MW natural-gas peaking facility near Pala, San Diego County
  - **Willow Pass Generating Station –** 550 MW natural gas plant within the existing Pittsburg Power Plant in Pittsburg, Contra Costa County

- **Almond 2 Peaking Power Plant Project** – 174 MW natural-gas peaking facility near Ceres, Stanislaus County
- **Abengoa Mojave Solar Project** – 250 MW solar thermal (parabolic trough) plant near Harper Dry Lake, San Bernardino County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County

Dr. Phinney prepared the waste management assessments of power plant licensing applications:

- **Eastshore Energy Center –** 115.5 MW natural gas simple-cycle plant in Hayward, Alameda County
- **Carrizo Energy Solar Farm –** 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
- **Palmdale Hybrid Power Project –** 570 MW natural gas-solar thermal (parabolic trough) hybrid plant in Palmdale, Los Angeles County
- **SES Solar Two Siting Case –** 750 MW solar thermal (Stirling dish) plant on 6,500 acres of mostly BLM land in Imperial County
- **Hanford Energy Park Peaker Plant –** 120 MW simple-cycle, natural gas facility in Hanford, Kings County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County
- **Blythe Solar Power Project** – 1,000 MW solar thermal (parabolic trough) plant on 9,400 acres of BLM land near Blythe, Riverside County
- **Palen Solar Power Project** – 500 MW solar thermal (parabolic trough) plant on 5,200 acres of BLM land in the Chuckwalla Valley, Riverside County

Dr. Phinney also coordinated the study of cooling water alternatives for the Tesla and Tracy natural gas, combined-cycle power plants.

- **Environmental Performance Report, CEC, Project Manager/Technical Support (2001, 2003, 2005)**.Dr. Phinney was Project Manager for Aspen's technical contributions, graphics and production efforts for the 2001 Environmental Performance Report (EPR) which detailed the current and historical air, water and biological impacts from in-state generation facilities. She provided support to the water resources discussion in the 2003 EPR and managed the analysis of out-of-state generation facilities for the 2005 EPR.
- **Advanced Electric Generation Technologies, CEC, Project Manager (2001 - 2002).** Dr. Phinney served as Project Manager for a report defining the technical development, developmental capacity, commercial status, costs and deployment constraints of selected alternative electric generation technologies. Technologies included geothermal, fuel cell, solar thermal, solar photovoltaic, wind and hydro. The focus was on development and application of the technology in California. Two page fact sheets on each technology and a matrix comparing all technologies was developed. Finally, an updated discussion of renewable technologies was developed for insertion into the alternatives section of Staff Assessments for power plant applications.
- **Liquefied Natural Gas Support, CEC, Technical Author (2002 – 2007**). Dr. Phinney has been instrumental in the preparation of numerous safety and policy reports on liquefied natural gas (LNG). She authored the Commission document: *International and National Efforts to Address the Safety and Security of Importing Liquefied Natural Gas: A Compendium*. This report reviewed national and international LNG regulations, standards and guidelines, reviewed risk assessment techniques, and identified, compiled and reviewed LNG safety/risk studies. Dr. Phinney helped organize LNG Access Workshops held in June 2005 and prepared a 40 page summary of presentations made at the workshops. She developed over 30 fact sheets on LNG subject areas for distribution to the public. Dr. Phinney compiled state and local comments on a proposed LNG terminal at the Port of Long Beach;

these were presented in the *Safety Advisory Report on the Proposed Sound Energy Solutions Natural Gas Terminal at the Port of Long Beach, California,* which was delivered to the Federal Energy Regulatory Commission within the mandated 30-day period imposed by the 2005 federal Energy Bill. She provided technical review for the report *The Outlook for Global Trade in Liquefied Natural Projections to the year 2020.*

- **Natural Gas Market Assessment Support, CEC, Technical Author/Editorial Support (2005 –** 2007). Dr. Phinne**y** **c**ontributed to natural gas supply and demand analyses for the Commission document, *Natural Gas Assessment Update*. She provided technical and editorial support to the 2005 and 2007 Integrated Energy Policy Report (IEPR) documents, *Preliminary (and subsequently the Revised report) Reference Case in Support of the 2005 Natural Gas Market Assessment* and *2007 Natural Gas Market Assessment.* She edited the Commission document *Natural Gas Quality: Power Turbine Performance During Heat Content Surges.*
- **Petroleum Infrastructure Environmental Performance Report, CEC, Project Manager (2005)**. Dr. Phinney served as Project Manager for the 2005 IEPR document *Petroleum Infrastructure Environmental Performance Report.* In addition to managing preparation of the report and workshop presentations, she prepared responses to comments and provided policy recommendations.
- **Hydropower and Global Climate Change, CEC, Technical Author (2005)**. Dr. Phinney coauthored the document *Potential Changes in Hydropower Production from Global Climate Change in California and the Western United States*. This report investigated the effects of climate change on hydropower production in the West and compared impacts and policy actions in California, the Pacific Northwest, and the Southwest.
- **Advanced Energy Pathways, CEC, Project Manager (2006 – 2008).** Dr. Phinney provided project management support for a 3-year study evaluating the effects of advanced transportation technologies and fuels (out to 2050) on California's natural gas and electricity systems. This report involved the development of baseline and alternative energy demand and supply scenarios, in-depth technical analysis of advanced transportation technologies and fuels, and the development of an energy-rich model.
- **Land Use and Energy, CEC, Project Manager/Technical Author (2006 – 2008).** Dr. Phinney authored a CEC report on the linkages between land use and energy, which ultimately became one of the two chapters presented in the 2006 IEPR Update. The report highlighted how energy can be better integrated in land use planning, and how efforts such as smart growth can help the state meet its energy and greenhouse gas emission reduction goals. She organized a full-day workshop involving over a dozen speakers representing state agencies, local governments, research entities, environmental groups, utilities, and non-profits. Dr. Phinney was one of the authors of the 2007 land use and energy follow-up report which further defined the role of land use in meeting California's energy and climate change goals. She helped synthesize the report into a chapter for the 2007 IEPR. Dr. Phinney helped edit the Land Use Subgroup of the Climate Action Team report prepared for submission to the California Air Resources Board AB 32 Scoping Plan.
- **AB 1632 Nuclear Power Plant Assessment, CEC, Technical Author (2007 – 2008).** Dr. Phinney was a key member of a team evaluating nuclear power issues in the state in response to AB 1632 legislation. She managed and prepared report sections regarding the impacts to local communities and the environmental issues and costs associated with alternatives, including renewables, to the state's two nuclear facilities. These sections were incorporated in the report *An Assessment of California's Nuclear Power Plants.*
- **Environmental Screening Tool for Out-of-State Renewable Energy Facilities, CEC, Project Manager (2009).** Dr. Phinney prepared an environmental screening tool/analysis allowing CEC to determine quickly whether out-of-state renewable facilities requesting RPS certification met California laws, ordinances, regulations and standards.

- **Energy Aware Facility Planning and Siting Guide, CEC, Project Manager (2009-2010).** Dr. Phinney is updating a 1997 version of the Energy Aware Guide to help local governments plan for and permit electricity generation facilities and transmission lines that will be needed in the upcoming years. The Guide informs planners, decision makers and the public about what, how, and why electricity infrastructure may be developed.

California Public Utilities Commission. Dr. Phinney has managed several environmental assessments for the CPUC and has been heavily involved in editorial support of many other CPUC documents prepared by Aspen.

- **Looking Glass Network Initial Study/Mitigated Negative Declaration, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the preparation of Initial Study/Mitigated Negative Declarations (IS/MND) for this telecommunication project that involved construction in the San Francisco Bay Area and the Los Angeles Basin to allow fiber optic connections in numerous locations.
- **Williams Communications Sentry Marysville Project IS/MND, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the installation of fiber optic connection to a Beale Air Force Base in Yuba County.
- **Kirby Hills II Natural Gas Storage Facility IS/MND, CPUC, Project Manager (2007).** Dr. Phinney managed an IS/MND for expansions at a natural gas storage facility in Solano County.
- **Multiple EIR Documents, CPUC, Technical Editor (2004 - 2008).** Dr. Phinney provided editorial and QA/QC review for the Diablo Canyon Steam Generator Replacement EIR, the Miguel Mission 230 kV Transmission Line EIR and the Sunrise Powerlink EIR/EIS.

California Institute of Technology/University of California. Dr. Phinney provided project management support to the following project.

- **Combined Array for Research in Millimeter-wave Astronomy EIS/EIR**, **U.S. Forest Service and the University of California (2001 – 2002).** Dr. Phinney was the Project Manager for this EIS/EIR for a radio telescope antenna array to be placed at a high altitude site in the Inyo National Forest. The evaluation of alternatives was especially contentious, and Aspen's field analyses of several potential sites were pivotal in the ultimate selection of one of these alternative sites.

Western Area Power Administration. Dr. Phinney provided editorial and QA/QC support to the following projects.

- **North Area ROW Maintenance Project Environmental Assessment, Western, Technical Editor/QA/QC (2006-2008).** Dr. Phinney provided technical editing and QA/QC support for all documents relating to the development of 800 miles of transmission lines in Northern California.
- **Sacramento Area Voltage Support Supplemental EIS/EA, Technical Editor/QA/QC (2006 – 2008).** Dr. Phinney provided technical editing and QA/QC support for all environmental documentation and permitting for new construction and reconstruction of transmission lines in the greater Sacramento area.

Vermont Yankee Nuclear Power Plant Report, Vermont Department of Public Service, Project Manager (December 2008 to January 2009). Dr. Phinney was the Project Manager and provided technical support for the environmental analysis of the continued operation of the Vermont Yankee Nuclear Power Station in Vernon, Vermont. The report assessed the environmental impacts to land, water and air resources (including climate change), soil and seismicity, on-site and off-site storage and disposal of high-level and low-level nuclear waste.

GenCorp — 1999 to 2000

- As Vice President, Environmental and Regulatory Affairs, Dr. Phinney held primary responsibility for coordinating the company's aerospace and automotive environmental activities with various federal, State, and local regulatory agencies. Her specific responsibilities included: working with external groups and entities to develop responsible environmental legislation, regulations, and standards and the implementation of sound public policy; developing stakeholder base and strategy to ensure that company objectives were achieved; facilitating company and regulatory agency discussions to achieve more comprehensive and quicker remediation of sites; and spearheading a stakeholder group to develop and fund scientific studies on selected chemicals of concern.

Aerojet General Corporation — 1984 to 1999

As Vice President, Environmental Health and Safety, Dr. Phinney ensured that programs were in place to meet all regulatory requirements and company initiatives. Her responsibilities included: providing strategic direction and management of all superfund-related investigation and remediation activities; developing environmental management plans; communicating environmental requirements, concerns, and successes to both internal and external audiences, including the board of directors, investment banking, and the analyst community; and participating as a member of the leadership council in defining company-wide business objectives and targets.

- Dr. Phinney created the first corporate EHS department, defining and staffing key functional areas. She managed a $20,000,000 annual budget and oversaw a staff of up to 30 professionals. Select accomplishments include: the development of remediation technologies that resulted in the cleanup of over 50 billion gallons of contaminated groundwater; development of the world's first groundwater treatment facility for perchlorate; significant reductions in emissions and hazardous waste generation; representation on numerous legislative and regulatory task forces and leadership positions on external business and community EHS committees and councils; and extensive public outreach efforts.

PREVIOUS EXPERIENCE, 1976 TO 1984

Jacobs Engineering Group. Dr. Phinney conducted toxicological, ecological, and air and water quality assessments.

Department of Environmental Science and Engineering at the University of California, **Los Angeles.** Dr. Phinney analyzed legal, economic, public health, and administrative barriers to waste water reuse. She also conducted an analysis of ecological and institutional factors in coastal siting of power plants.

Southwest Los Angeles Junior College. Dr. Phinney taught lecture and laboratory courses in general science.

TRAINING

- Certificate, Executive Program, University of California, Davis, 1989
- Expert Witness Training, California Energy Commission, 2001

HONORS AND AWARDS

- Who's Who of American Women, 18th Edition
- YWCA Outstanding Woman of the Year (Sciences) Award, 1992
- Woman of Achievement Award, Downtown Capitol Business and Professional Women, 1993
- Individual Award for Outstanding Contribution in Air Quality, 1995
- Sacramento Safety Center Incorporated, Eagle Award for Safety, 1998
- Regional Award for Outstanding Contribution in Air Quality, 2003

ACTIVITIES AND ASSOCIATIONS

- Editorial Board, The Environmental Professional, 1987-1989
- City of Sacramento Toxic Substances Commission, 1986-1988
- Sacramento Environmental Commission, 1988-1991
- Board of Directors, League of Women Voters of Sacramento, 1989-1999; President 1996-1997; Co-President 1997-1998; 2003-2005; Energy Study Committee 2005; Moderator/Facilitator of Debates and Forums (e.g., climate change, the SACOG's MTP, and flood control)
- Toxics Consultant, League of Women Voters of Sacramento, 1988-1989
- Member, Advisory Committee on AB 3777 (Risk Management Prevention Programs)
- Board of Directors, American Lung Association of Sacramento-Emigrant Trails, 1992-2000; President 1998-1999;
- Board of Directors, Sacramento Metropolitan Chamber of Commerce, 1992-1997; Vice President, Public Policy, 1996-1997
- Board of Directors, Air and Waste Management Association, 1991-1994
- Steering Committee Chair, Cleaner Air Partnership, 1993-1996, 2000-2001; Executive Committee 1993 to present
- Co-chair, TCE Issues Group, 1994-2000
- Sacramento Water Forum, 1995-2000
- Rate Advisory Committee, Sacramento Municipal Utility District, 1999-2001

SELECTED PUBLICATIONS/PRESENTATIONS

Phinney, S.L., Panel Moderator, Climate Change Initiatives for California, AEP Annual Conference, Shell Beach, California, 2007.

Phinney, S.L., Panel Moderator, Is there a Need for LNG in California, AEP Annual Conference, Shell beach, California, 2007.

Phinney, S.L., "LNG Safety Analysis in California – Federal, State and Local Processes" Presented at California Foundation on the Environment and the Economy, 2005.

Phinney, S.L., "Energy Basics" Presented at League of Women Voters of California Annual Convention, 2005.

Phinney, S.L., Presentation to U.S. Department of Justice, Office of the U.S. Attorney, on Women and Equality, 2004.

Phinney, S.L., "Trends in Industrial Waste Generation and Management" Presented at National Ground Water Association Conference, Las Vegas, Nevada, 1996.

Phinney, S.L., "Effective Management of an RI/FS to Reduce Financial Exposure," Manufacturers Alliance Environmental Management Council, Washington, D.C., 1995.

Phinney, S.L., "Knowing Your Compliance Challenge," 7th Annual California Statewide Community Awareness and Emergency Response (CAER) Conference, Sacramento, California, 1995.

Phinney, S.L., "Industry's Role in Broadening the Use of Alternative Fuels in America," Clean Cities Ceremony, Sacramento, California, 1994.

Phinney, S.L., "Aerospace Industry Perspective on Defense Conversion," AAAS Annual Meeting, San Francisco, California, 1994.

Phinney, S.L., "Aerojet's Waste Reduction Successes," Business for the Environment Conference, Sacramento, California, 1993.

Phinney, S.L., "Company Worker Trip Reduction Programs Under the Clean Air Act Amendments." MAPI Hazardous Materials Management Council, Washington, D.C., 1993.

Phinney, S.L., Testimony Before House Government Operations Subcommittee, 1993.

Phinney, S.L., Moderator, The Clean Air Act, A Public Forum, Sacramento, California, 1993.

Phinney, S.L., Plenary Session Chairperson and Speaker, "Business and the Environment: Must You Sacrifice One for the Other?" National Association of Environmental Professionals Conference, Seattle, Washington, 1992.

Phinney, S.L., "Facing the Challenge: The New California EPA." HazMat Northern California Conference, San Jose, California, 1992.

Phinney, S.L., "Understanding the Client Perspective." Environmental Business Conference, Pasadena, California, 1991.

Phinney, S.L., Panelist – Women of Science: Secrets of Success. Workshop, AAAS Annual Meeting, Washington, D.C., 1991.

Phinney, S.L., Keynote Address, ADPA International Symposium on Compatibility and Processing, San Diego, California, 1991.

Phinney, S.L., Keynote Address, Women in Science and Technology Conference, Jackson, Mississippi, 1991.

Phinney, S.L., Guest Speaker, Sacramento County Bar Association, Environmental Law Section, Sacramento, California, 1991.

Phinney, S.L., "Managing CERCLA Compliance from the Corporate Perspective." Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Phinney, S.L., and C.A. Fegan, "Identifying a Feasible, Effective Treatment Method for an Unusual Chemical of Concern." Proceedings, American Defense Preparedness Association 16th Environmental Symposium, New Orleans, Louisiana, 1988.

Phinney, S.L., "A Proactive Superfund Cleanup by Industry." Proceedings of the 4th Annual Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Thompson, C.H., S.L. Phinney and F.R. McLaren, "Aerojet: A Regional Site Program – Problem Definition." Proceedings of the Hazardous Waste and Environmental Emergencies Conference, Cincinnati, Ohio, 1985.

Kahane S.W., S.L. Phinney and A. Wright, "The Tightening Environmental Regulatory Climate for Hazardous Waste Management – Current Mandates and Future Directions for Industrial Compliance." Proceedings of the 1984 AlChE Summer National Meeting, Philadelphia, Pennsylvania, 1984.

Bachrach, A., D.M. Morycz, S.L. Phinney and S.W. Kahane, "Regulation and Offshore Oil and Gas Facilities." In: Emerging Energy/Environmental Trends and the Engineer. Eds. R.D. Nuefeld and R.W. Goodwins, 1983.

Lindberg, R.G., S.L. Phinney, J. Daniels and J. Hastings (eds)., "Environmental Assessment of the U.S. Department of Energy's Solar Thermal Technology Program." Prepared for the U.S. Department of Energy, June 1982.

Kahane, S.W., S.L. Phinney, J.A. Hill and R.C. Sklarew, "Key Considerations in Assessing the Air Impacts of Projected Outer Continental Shelf Oil and Gas Development," presented at the 74th Annual Air Pollution Control Association Meeting, Philadelphia, Pennsylvania, 1981

Phinney, S.L., "The U.S. Environmental Protection Agency's Pesticide Registration Program: A Case Study – Chloramben." Doctoral Dissertation, Environmental Science and Engineering Program, University of California, Los Angeles, California, 1981.

Phinney, S.L., (contributing author) et al. "Institutional Barriers to Wastewater Reuse in Southern California." Environmental Science and Engineering Report Prepared for the Office of Water Research and Technology, U.S. Department of the Interior, 1979.

Phinney, S.L., "Area-Restricted Feeding in American Plaice." Masters Thesis. Dalhousie University, Halifax, Nova Scotia, Canada, 1975.

DECLARATION OF
Heather Blair

I, Heather Blair, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Senior Associate.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare staff testimony on **TSE Appendix A** for the **Blythe Solar Power Project Supplemental Staff Assessment** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

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

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 7/6/2010 Signed: /s/

At: Sacramento, California

Aspen Environmental Group

HEATHER BLAIR
Environmental Scientist

ACADEMIC BACKGROUND

M.S., Conservation Biology, Sacramento State University, In Progress
B.S., Ecology, San Diego State University, 2004

PROFESSIONAL EXPERIENCE

Heather Blair is an Environmental Scientist experienced in a range of natural resource investigations and environmental impact analysis including botanical and wildlife research, inventory, and survey techniques; technical writing; and data analysis. She has experience preparing environmental documents pursuant to applicable federal, state and local environmental regulations, including the California Environmental Quality Act, National Environmental Policy Act, and the California and federal Endangered Species Acts.

Aspen Environmental Group — 2004 to present

Selected project experience at Aspen includes the following:

Power Generation and Transmission Interconnection Projects

- **California Energy Commission.** Aspen has a multi-year contract to provide support to the Energy Facility Planning and Licensing Programs. Under this contract Ms. Blair has participated in the following projects:
  - **Biological Resources Assessment for the Abengoa Mojave Solar Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 250 MW power plant in the Mojave Desert. Important biological issues include impacts to Harper Dry Lake from potentially decreased water availability, desert tortoise, and Mojave ground squirrel.
  - **Biological Resources Assessment for the San Joaquin Solar 1&2 Hybrid Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 107 MW solar thermal/biomass hybrid power plant. Important biological issues include potential impacts to San Joaquin kit fox habitat and movement corridor connectivity.
  - **Biological Resources Assessment for the Genesis Solar Energy Project.** Ms. Blair is currently serving as the assistant technical staff for the analysis of impacts to biological resources from the 250 MW power plant in an undeveloped area of the Sonoran Desert. Important biological issues include direct and indirect (downstream) impacts to ephemeral drainages from site development and indirect impacts to sand dune dependent vegetation and wildlife communities from disruption of Aeolian processes.
  - **Biological Resources Assessment for the Carlsbad Energy Center.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 540 MW CECP. Important biological issues include potential impacts to Agua Hedionda Lagoon and consistency with the Carlsbad Habitat Management Plan. Ms. Blair recently testified as an expert witness in biological resources during Evidentiary Hearings before the Commission.
  - **Biological Resources Assessment for the CPV Sentinel Project.** Ms. Blair served as the lead technical staff for the analysis of impacts to biological resources from the 850 MW CPV Sentinel project. Important biological issues include potential impacts from groundwater drawdown to the mesquite hummock plant community and the special-status species it supports.
  - **Biological Resources Assessment for the CPV Vaca Station Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 660 MW CPVVS.

Important biological issues include potential impacts to giant garter snake from reduced flows in Old Almao Creek and loss of Swainson's hawk foraging habitat.

- **Biological Resources Assessments for the Marsh Landing and Willow Pass Generating Stations.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 930 MW MLGS and 550 MW WPGS. Important biological issues include potential indirect impacts to listed plant species in the Antioch Dunes National Wildlife Refuge from nitrogen deposition.

- **Biological Resources Assessments for the Panoche and Starwood Energy Centers.** Ms. Blair served as the lead technical staff for the analysis of impacts to biological resources from the 400 MW Panoche Energy Center and 120 MW Starwood Project. These projects required coordination with USFWS and CDFG regarding impacts to the State and federally listed San Joaquin kit fox.

- **Northern California CO2 Storage Pilot, Confidential Client, CEQA and NEPA compliance, (2008).** Contributed to the preparation of Department of Energy NEPA environmental questionnaire to comply with Category Exclusion requirements and preparation of the Initial Statement under CEQA for the proposed CO_2 sequestration pilot test site in Montezuma Hills, California. Ms. Blair conducted focused nesting surveys of the State-threatened Swainson's hawk (*Buteo swansonii*).

- **Arizona Utilities CO_2 Storage Pilot, CEC and University of California, NEPA compliance, (2007).** Contributed to the preparation of Department of Energy NEPA environmental questionnaire to comply with Category Exclusion requirements for the proposed CO_2 sequestration pilot test site near Joseph City, Arizona. Ms. Blair conducted focused surveys of the federally endangered Peebles Navajo cactus (*Pediocactus peeblesianus* var. *peeblesianus*).

- **Environmental Screening Tool for Out-of-State Renewables, KEMA and CEC, Staff (2009).** Assessed the potential for California laws, ordinance, regulations and standards to be impacted by out-of-state renewable facilities seeking RPS certification. Ms. Blair prepared the assessment of impacts associated with geothermal projects.

- **Nuclear Power Plant Assessment (Assembly Bill 1632).** Ms. Blair managed the preparation of and was a contributing author for a major Appendix to the Nuclear Power Plan Assessment Report for the Energy Commission. This report evaluated nuclear power issues in the state in response to recent legislation (AB 1632), including environmental issues associated with alternatives (including renewable) to the state's two nuclear facilities.

- **Diablo Canyon Power Plant Steam Generator Replacement Project.** Ms. Blair supported the management team in preparing the project description, alternatives and supporting sections of the Draft and Final EIR.

Transmission Line and Substation Projects

- **Sunrise Powerlink Transmission Line Project.** Under contract to the California Public Utilities Commission (CPUC), Aspen prepared an EIR/EIS for a 150-mile proposed transmission line from Imperial Valley Substation, near El Centro, California, to Peñasquitos Substation in northwestern San Diego County. The Proposed Project would potentially deliver renewable resources from the Imperial Valley via a 500 kV transmission line to a new 500/230 kV substation, and from the new substation to western San Diego via 230 kV overhead and underground transmission lines. Ms. Blair analyzed the impacts to wilderness and recreation. Additionally, she wrote the project description and assisted with overall project support.

- **TANC Transmission Project.** Aspen was awarded a contract with the Transmission Agency of Northern California (TANC) for CEQA/NEPA and environmental permitting support for 600-miles of proposed 500 and 230 kV transmission lines between Lassen County and Santa Clara County, California. The project included evaluation of over 600 additional miles of alternative routes, six new substations, and modifications to six existing substations. Ms. Blair was the Deputy Project Manager, responsible for coordinating the biological and cultural resource field surveys. The project was cancelled in July 2009.

- **Sacramento Area Voltage Support Project.** Under contract to Western Area Power Administration (Western) and in cooperation with SMUD, Aspen prepared an SEIS and EIR for a double-circuit 230 kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. Ms. Blair was part of the project management team and managed the wetland delineation, Biological Survey Report, and Biological Evaluation.
- **North Area ROW Maintenance Project**. Under contract to Western, Ms. Blair is currently providing project support to prepare an Environmental Assessment and Operation and Maintenance Program associated with the operation and maintenance procedures along Western's transmission line ROWs between Sacramento (Sutter/Yuba County line) and the Oregon border. This project also includes a detailed survey of the biological and cultural resources along 434 miles of North Area ROW, 342 miles of COTP ROW, and several hundred miles of access and maintenance roads. Ms. Blair is working closely with project management and resource specialists to coordinate and execute over 800 miles of surveys. She conducted wildlife inventory and surveyed portions of ROW for sensitive species and recorded habitat types, jurisdictional waters and infrastructure using a Trimble GeoXT GPS unit. Additionally, Ms. Blair was integrally involved in the management and development of the North Area O&M GIS database.
- **Categorical Exclusions for Routine Operation and Maintenance.** Under contract to Western, Ms. Blair has prepared multiple CXs for routine maintenance activities along Western's CVP, PACI, and COTP transmission line ROWs and access roads. She has developed a streamlined and highly efficient system to use the results and analysis for the North Area ROW Maintenance Project to complete these documents.
- **GIS Data Verification and Resource Database Development for the Trinity County PUD Direct Interconnection Project.** Under contract to Western, Ms. Blair was the Deputy Project Manager for this project and also be coordinated and conducted biological resources in support of the development of an O&M GIS database, which included identification of sensitive resources and associated project conservation measures for this new segment of Western's CVP transmission system.
- **Seventh Standard Substation Project.** Under contract to the CPUC, Ms. Blair prepared the biological resource section of an Initial Study/Mitigated Negative Declaration for a proposed 4.9 acre 115/21 kV substation and transmission interconnection in northwest Bakersfield, Kern County, California. Important biological issues included impacts to the State and federally listed San Joaquin kit fox and western burrowing owl (a California species of special concern), as well as compliance with the Metropolitan Bakersfield Habitat Conservation Plan.
- **Atlantic–Del Mar Reinforcement Project Mitigated Negative Declaration**. Under contract to the CPUC, Ms. Blair served as an assistant environmental monitor during the construction of four miles of overhead transmission towers and lines and approximately 1.3 miles of underground lines. The project involved trenching, horizontal drilling and blasting and requires avoidance of several wetlands, seasonal pools and threatened and endangered species.
- **Miguel-Mission 230 kV #2 Project EIR Addendum**. Under contract to the CPUC, Ms. Blair helped to prepare a detailed addendum associated with engineering design changes for the Miguel-Mission 230 kV #2 Project.

Other Infrastructure, Resource Management, and Monitoring Projects

- **Hazardous Fuels and Vegetation Management for Angeles National Forest.** Under contract to the U.S. Forest Service, Ms. Blair conducted botanical and wildlife surveys at approximately 100 sites ranging from one to 2500 acres throughout the Angeles National Forest. Modifications to current fuel management practices were proposed in response to increased frequency and intensity of wildfire resulting from climate change. She prepared 75 Biological Evaluations/Biological Assessments that assessed the biological impacts of proposed fuel management practices throughout the forest.

- **Rare Plant Surveys for the East Branch Extension Pipeline Project.** Under contract to the Department of Water Resources, Ms. Blair conducted rare plant surveys of the endangered Santa Ana River wooly star (*Eriastrum densifolium* ssp. *sanctorum*) and the state and federally endangered slender horned spine flower (*Dodecahema leptoceras*) in response to the proposed construction of a water pipeline through San Bernardino and Riverside Counties.

- **Upper San Antonio Creek Watershed Giant Reed Removal Project.** Ms. Blair prepared the biological resource analysis of an Initial Study to remove invasive plant species from the Upper San Antonio Creek Watershed. Required field survey and development of impact avoidance measures for several special-status species, including California red-legged frog, southern steelhead, and riparian nesting birds.

- **Least Tern Monitoring for the Montezuma Slough Tidal Wetlands Restoration Project**. Under contract to EcoBridges Environmental, Ms. Blair monitored the nesting success of three nesting colonies of the federally and State endangered least tern. This effort involved counting and mapping the nest sites and tern chicks once a week for two years.

- **Endangered Species Monitoring for the Lomita Canal Vegetation Clearing Project**. Monitored the federally threatened California Red-legged frog and the state- and federally endangered San Francisco Giant Garter Snake during vegetation clearing activities along the Lomita Canal at the San Francisco International Airport. Involved identification of these species, relocation of California red-legged frogs, and re-direction of work in the event a SF Garter Snake was spotted.

PREVIOUS EXPERIENCE

Soil Ecology and Restoration Group ***January to May 2004***

Research Assistant. Ms. Blair assisted in managing the greenhouse where native seeds were germinated and propagated. In this role, she collected seeds from native plants and analyzed the composition of the soil present in their native habitat to ensure seedling viability. The plants were subsequently used in the restoration of degraded habitat as contracted by the U.S. Army Corps of Engineers and others.

DECLARATION OF TERRY O'BRIEN

I, Terry O'Brien declare as follows:

1. I am presently Deputy Director of the Siting, Transmission and Environmental Protection Division at the California Energy Commission.

2. I am personally familiar with the BLYTHE SOLAR ENERGY PROJECT currently under review by the Energy Commission staff. I have reviewed relevant sections of the Revised Staff Assessment and have discussed the case with technical staff, siting management and legal staff. In addition to the BLYTHE project, I reviewed the filings and staff's analysis regarding all the solar power projects currently filed with the Energy Commission.

3. I prepared the attached testimony regarding Land Use and Visual Resources and the appropriateness of recommending a finding of overriding considerations. The testimony is based on my independent analysis and review of the relevant documents submitted in the case.

4. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness, could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:___________ Signed:__________/S/________________

At: Sacramento, California

Resume

Terrence O'Brien

Education:

M.A. in Geography, University of California, Davis
B.A. in Geography, University of California, Berkeley

Experience:

California Energy Commission

May 2002 to Present
Deputy Director, Systems Assessment & Facilities Siting Division, C.E.A. III

I plan, organize and direct the programs and resources of the Systems Assessment and Facilities Siting Division (125 staff) and ensure these activities are coordinated with the other programs within the Commission. I work under the administrative direction of the Executive Director and serve as a member of the Executive Director's Management Team and am responsible for working with the Team to implement the mission and goals of the Commission. I advise the Commission, Governor's Office, members of the Legislature and other government agencies on matters related to energy facility siting, energy resource assessments, and environmental protection in California. I participate in the development, evaluation and implementation of Commission and state energy policy, and represent the Division before the Energy Commission, the State Legislature and the general public.

January 2000 to May 2002
Special Advisor to the Chairman of the Energy Commission, C.E.A. I

Served as the principal policy advisor to the Chairman of the Commission, William Keese. In this position I was involved in the formulation of policy on a wide range of energy issues. Under the administrative direction of the Chairman reviewed and recommended appropriate action on decisions before the Energy Commission and coordinated Commission work with other government agencies and the Legislature. Other duties included analyzing complex problems and reports, recommending effective courses of action, and representing the Chairman at meetings and public functions.

1997 to 1999
Policy Program Manager, Siting and Environmental Division

Served as the Siting and Environmental Division's policy program manager. I was primarily responsible for providing input and recommendations to division and Commission management on a variety of policy-related issues including SB 110, amending the Warren-Alquist Act and the Siting Regulations, reviewing the California Independent System Operator's transmission line white papers, and key power plant and environmental policy issues. During this time I also worked directly for Commissioner Robert Laurie as the project manager on the Commission's Reorganization Project.

1995 to 1997
1996 Electricity Report Project Manager

Working directly for Commissioners David Rohy and Jan Sharpless, I served as the project manager for the 1996 Electricity Report. I was responsible for writing parts of the report, acting as chief editor, establishing a project schedule, preparing Committee notices, and serving as a principal point of contact and spokesperson for the Committee with the staff and outside parties.

1986 to 1995
Regulatory Program Manager, Siting and Environmental Division

In this position I was responsible for supervising a staff of project managers and project secretaries who worked on all of the energy facility siting projects filed with the Energy Commission. In addition to the regulatory projects, I was responsible for a wide variety of other projects on an as-needed basis. I managed the division's work on modifying the siting regulations, coordinated the work on power plant jurisdiction investigations, and provided input on policy reports, including the demand conformance chapters of the Electricity Reports.

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 *BLYTHE SOLAR POWER PLANT PROJECT*

Docket No. 09-AFC-6

PROOF OF SERVICE
(Revised 5/3/10)

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*indicates change

DECLARATION OF SERVICE

I, Hilarie Anderson, declare that on July 8, 2010, I served and filed a copy of the attached Supplemental Staff Assessment. 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_blythe]

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:

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

__✔__ by personal delivery;

__✔__ 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:

__✔__ 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-6
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.

Original Signature in Dockets
Hilarie Anderson