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STATE OF CALIFORNIA
California Energy Commission

In the Matter of:

The Application for Certification for the CARRIZO ENERGY SOLAR FARM

Docket No. 07-AFC-08

CALIFORNIA UNIONS FOR RELIABLE ENERGY OPPOSITION TO MOTION OF CARRIZO ENERGY, LLC FOR A PROTECTIVE ORDER TO MAINTAIN THE CONFIDENTIALITY OF CORRIDOR LOCATION RESULTS OF THE WILDLIFE CORRIDOR STUDY, AND TO DESIGNATE ENTITIES HAVING ACCESS TO THE CORRIDOR LOCATION RESULTS

May 1, 2009

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I. INTRODUCTION

Pursuant to section 1716.5 of Title 20 of the California Code of Regulations, California Unions for Reliable Energy ("CURE") files this opposition to Carrizo Energy, LLC's ("Ausra") motion for a protective order to designate as confidential the results of the California Energy Commission's wildlife corridor study – "whether existing or generated in the future, and whether this information is contained in writing, images maps, or any other format"[1] – and to designate only certain entities as having access to the records. Ausra's motion fails to comply with Commission rules governing such requests, unjustifiably infringes upon the rights of the parties in this proceeding, and is inconsistent with Commission policies requiring disclosure of public records. Ausra's requests are not permissible under the California Public Records Act, the California Environmental Quality Act ("CEQA"), the Warren-Alquist Act, the California Endangered Species Act, the federal Endangered Species Act, or the Freedom of Information Act. Ausra's requests violate the Commission's duty to disclose data supporting its review of the Carrizo Energy Solar Farm Project ("CESF" or "Project"). For these reasons, Ausra's motion should be denied.

II. BACKGROUND

The CESF Project is a 177 megawatt solar thermal power plant, to be located in eastern San Luis Obispo County. The Project will impact at least 1,020 acres immediately adjacent to California State Route 58, approximately 3 miles west of

[1] Mot. at 3.

the town of Simmler, in the Carrizo Plain.[2] In addition to the CESF, two new photovoltaic facilities are proposed on approximately 8,100 acres, combined, in the Carrizo Plain: the 500 megawatt Topaz Solar Farm, proposed by First Solar (formerly Optisolar), located immediately north of the Project, and the 250 megawatt California Valley Solar Ranch, proposed by SunPower, located approximately 5 miles east of the Project.

In March 2008, approximately 3 months after the CESF application was deemed data adequate, the California Department of Fish and Game submitted the following comments on the Project:

> The Project is proposed in an area which supports one of the highest concentrations of special status species in California, as well as uncommon native game populations for which the State has committed considerable effort and public funds to re-establish and manage. The site is also in an area identified as critical for the recovery of Federally listed species and is a crucial wildlife movement corridor. The biological studies do not adequately consider this setting.... Following are the primary reasons why we have determined the application information is incomplete:
>
> ● The biological impact analysis lacks a correct assessment of effects on wildlife movement.
>
> ● The cumulative impacts analysis does not consider impacts from specific, known, probably future projects.[3]

The California Department of Fish and Game explained that the Project site is at the south end of a corridor linking the Carrizo Plains National Monument "to

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[2] In the Matter of Application for Certification for the Carrizo Energy Solar Farm by Carrizo Energy LLC, Docket No. 07-AFC-8, Preliminary Staff Assessment at 1-1, 1-7 (November 2008).

[3] Exhibit A: Memorandum from W.E. Loudermilk, Regional Manager, California Department of Fish and Game, to Mary Dyas, California Energy Commission, Subject: Review of Carrizo Energy Solar Farm Application for Certification (March 26, 2008).

satellite populations in the Salinas River and Pajaro River watersheds."[4] In fact, the U.S. Fish and Wildlife's Recovery Plan for Upland Species explains that recovery of the endangered San Joaquin Valley kit fox requires protection and enhancement of corridors for movement of kit foxes through the Salinas-Pajaro Region and from the Salinas Valley to the Carrizo Plain and San Joaquin Valley.[5] Federal and state kit fox conservation efforts currently include management activities on public lands and conservation agreements with private land owners.[6]

In November of 2008, Commission Staff issued a Preliminary Staff Assessment ("PSA") of the CESF, which recognized that the CESF Project site currently provides for the movement of multiple wildlife species, including pronghorn antelope, tule elk, and federal and state endangered San Joaquin kit fox, among others.[7] Commission Staff estimated that the CESF alone would impact 1,020 acres of land that provides habitat for multiple protected wildlife species, including the endangered kit fox.[8] Commission Staff also found that the CESF would block or impair wildlife corridors of multiple species within the Project area.[9] The PSA explains that the Project site is integral to the viability of tule elk, which

[4] *Id.*, p. 2.

[5] Region 1, U.S. Fish and Wildlife Service, Recovery Plan for Upland Species of the San Joaquin Valley, California (1998).

[6] *Id.*

[7] In the Matter of Application for Certification for the Carrizo Energy Solar Farm by Carrizo Energy LLC, Docket No. 07-AFC-8, Preliminary Staff Assessment at 4.2-12 (November 2008).

[8] In the Matter of Application for Certification for the Carrizo Energy Solar Farm by Carrizo Energy LLC, Docket No. 07-AFC-8, Preliminary Staff Assessment at 1-7 (November 2008).

[9] *Id.*

are known to utilize the site and may use the site for calving.[10] The PSA also explains that pronghorn antelope are known to cross Highway 58 at the Project site, evidencing a point of connectivity within a home range for the pronghorn herds and within the entire County population.[11]

To adequately assess and mitigate the direct and cumulative significant impacts of the CESF and other solar projects on wildlife movement within the Carrizo Plain, Commission Staff undertook a modeling analysis – the Wildlife Corridor Study (the "study") – in consultation with San Luis Obispo County and the California Department of Fish and Game ("DFG"), and in coordination with the U.S. Fish and Wildlife Service.[12] The Wildlife Corridor Study is a state-sponsored analysis, made by and for state and federal impact analyses. The study will assess biological factors with no distinction between private and public land.[13] According to the PSA, the study is modeling wildlife movements of indicator species, including the kit fox, pronghorn antelope and tule elk to determine the optimal location of the wildlife corridor as a means for assisting in the determination mitigation for significant impacts to biological resources.[14] The corridor modeling results will be a

[10] In the Matter of Application for Certification for the Carrizo Energy Solar Farm by Carrizo Energy LLC, Docket No. 07-AFC-8, Preliminary Staff Assessment at 4.2-12 (November 2008).

[11] *Id*.

[12] *See* Exhibit B: Letter from Terrence O'Brien, Deputy Director, Siting, Transmission and Environmental Protection to Wendy Lee Bogdan on behalf of Ausra (December 29, 2008).

[13] In the Matter of Application for Certification for the Carrizo Energy Solar Farm by Carrizo Energy LLC, Docket No. 07-AFC-8, Letter from Terrence O'Brien Deputy Director of Siting of the California Energy Commission to counsel for Applicant, Appendix A, at 6 (December 29, 2008).

[14] In the Matter of Application for Certification for the Carrizo Energy Solar Farm by Carrizo Energy LLC, Docket No. 07-AFC-8, Preliminary Staff Assessment at 1-8 (November 2008).

tool for assisting in the environmental review and identification of mitigation pursuant to CEQA and state and federal endangered species acts.

The agencies' impact analyses and identification of mitigation measures will largely depend on the results of the Wildlife Corridor Study.[15] The study will also provide information for permit applications to the state and federal wildlife agencies.[16] Thus, the wildlife corridor study will be widely relied upon for assessments of the CESF Project.

III. DISCUSSION

The Commission's policy of disclosure of Commission records recognizes that "[t]he California Legislature and the California Constitution have declared that access to information concerning the conduct of the people's business is a fundamental and necessary right of every person in this state," that members of the public will be given "the opportunity to exercise their right to inspect and copy Commission records with the least possible delay and expense," and that only "legitimate" interests in confidentiality will be protected. (20 Cal. Code Regs. § 2501; *see* Cal. Const., art. I § 3, subd. (b), (1).) In reviewing a request for confidentiality, the Commission's regulations must be construed consistently with the California Public Records Act. (20 Cal. Code Regs. § 2503(a).) A party seeking confidential designation of a record must specify with particularity the reasons why

[15] In the Matter of Application for Certification for the Carrizo Energy Solar Farm by Carrizo Energy LLC, Docket No. 07-AFC-8, Memorandum from John Kessler, Project Manager California Energy Commission to Commissioners Jeffrey D. Byron and Julia Levin at 4 (April 10, 2009).

[16] In the Matter of Application for Certification for the Carrizo Energy Solar Farm by Carrizo Energy LLC, Docket No. 07-AFC-8, Preliminary Staff Assessment at 1-8 and 1-9 (November 2008).

the Commission should deviate from its general policy of public disclosure. (20 Cal. Code Reg. § 2505(a)(1).) A party seeking confidential designation of Commission records carries the burden of making "a reasonable claim that the Public Records Act or other provision of law authorizes the Commission to keep the record confidential." (*See* 20 Cal. Code Reg. § 2505(a)(3)(A).) Ausra fails to meet its burden.

a. Ausra's Motion Fails To Comply With Commission Rules

Ausra moves for a protective order under section 2505 of the Commission's regulations. However, Ausra's motion fails to comply with the requirements in section 2505. As a result, Ausra fails to meet its burden to make a reasonable claim for nondisclosure.

i. Ausra Fails to Comply With The Application Requirements For Requesting Designation of Confidential Records

The Commission's regulations for requesting designation of confidential records provide distinct procedures for three categories of proceeding participants. Subsection (a) pertains to third parties; subsection (b) pertains to governmental entities; and subsection (c) pertains to confidentiality designations made by the Commission staff for information generated by the Commission. (20 Cal. Code Regs. § 2505.) A third party, such as Ausra, may proceed under subsection (a) when giving "custody or ownership of a record to the Commission."[17] In making the application, the third party must attach the record at issue, specifically indicate those parts of the record that should be kept confidential, provide justification

[17] *Id.*

under the Public Records Act, state the length of time the record is to be kept confidential, state whether information may be disclosed if aggregated or masked, and state whether the record has ever been disclosed. (Cal. Code Regs. § 2505(a)(1)(A)-(H).) Section 2505(a) clearly contemplates that the record, or records, for which confidentiality may be sought by a third party, must be in existence and in the custody of the party seeking confidential designation.

Although Ausra offered a purported justification for its request, as required by the regulation, Ausra fails to 1) attach the record at issue, 2) specifically indicate those parts of the record that should be kept confidential, 3) state the length of time the record is to be kept confidential (except to suggest that confidentiality should remain in place "until all Projects have satisfied all mitigation requirements involving the purchase of land to mitigate impacts to biological resources"[18] – whenever that may be), 4) state whether information may be disclosed if aggregated or masked, or 5) state whether the record has ever been disclosed.

Here, Ausra simply did not, and could not, provide the required information. Ausra seeks confidential designation for a Commission generated record, not yet in existence, but which will contain information already generally known. Information regarding the location of the wildlife corridor is widely and generally known and thus has already been disclosed. Information regarding the optimal corridor for each species has already been mapped and disclosed. Because

[18] Mot. at 3.

Ausra has not provided sufficient information supporting its motion for confidentiality under the Commission's regulations, Ausra's motion should be denied.

ii. Ausra's Request to Limit Disclosure to Certain Designated Entities Violates Commission Rules and Policies

Ausra's motion proposes that, upon signing a confidentiality order, only the Commission, South Coast Wildlands, California Department of Fish and Game, U.S. Fish and Wildlife Service, Ausra, and other solar developers - First Solar and SunPower - have access to certain Wildlife Corridor Study information.[19] Ausra seeks to exclude from disclosure CURE, other parties in this proceeding, the County of San Luis Obispo, and the public. Ausra claims that its request is in the public interest, because "premature disclosure" of this "highly sensitive information" would have "significant potential to cause undue increase to the value of land" identified in the mitigation results. Ausra's request violates Commission policies, is inconsistent with State law, and is nonsensical.

First, Intervenors, like applicants and staff, are parties in an Energy Commission proceeding. (20 Cal. Code Regs. § 1201.) Intervenors "shall have all of the rights and duties of a party" under the Commission's regulations. (20 Cal. Code Regs. § 1712.) Parties to proceedings must be served with "all written material filed by any party in a proceeding." (20 Cal. Code Regs. § 1210(a).) Each party "shall have the right to present witnesses, to submit testimony and other evidence, to

[19] Mot. at 3.

cross-examine other witnesses" and to request information from another party, including an applicant and staff. (20 Cal. Code Regs. §§ 1712(b), 1716.)

In this way, CURE as a party enjoys the same right of participation in this proceeding as Ausra. Yet, Ausra fails to present any legitimate reason for the diminishing CURE's rights, or diminishing the rights of all those similarly situated. In fact, Ausra fails to address the rights of other parties in this proceeding altogether. Ausra's request for confidentiality would prevent the public, San Luis Obispo County, CURE, and all other parties to this proceeding not designated by Ausra from exercising their rights in the Commission's siting process. This is not a "legitimate" interest in confidentiality, within the meaning of the Commission's regulations. (*See* 20 Cal. Code Regs. § 2501.)

Second, CEQA requires disclosure of all documents referenced in the Commission's environmental review document. (Pub. Res. Code § 21092.) To the extent the Wildlife Corridor Study is used for a Project or cumulative impact assessment, or for identifying feasible mitigation measures, the very purpose of the study, it must be made available for public review.

Third, Ausra's request is not legitimate, because it will diminish the integrity of the Commission's environmental impact analysis. The primary inputs for the entire study have been and will continue to be expert opinion and publicly available facts - provided by biological resources experts and the public. CURE has participated in the workshops on the Wildlife Corridor Study and retained a biological resources expert to evaluate the data. On April 8, 2009, CURE submitted

comments on the results of Task 1, which set forth the baseline conditions for focal species to be assessed in the Wildlife Corridor Study. (See Exhibit C.) Other parties and members of the public also submitted comments. These comments have been valuable in appropriately characterizing actual baseline conditions in the Carrizo Plains. If Ausra's motion is granted, the results would not be subject to review prior to Ausra and other potential developers implementing measures that may not mitigate impacts to a less than significant level. Without public review and comment, the entire process as set forth in CEQA for ensuring that proposed mitigation measures are subject to public scrutiny would be nonexistent, contrary to state law and good public policy.

Finally, Ausra's request is nonsensical. On the one hand, it forecloses parties, such as CURE, that are wholly disinterested in any future land transactions from obtaining information regarding the significant environmental impacts and feasible mitigation measures for the Project. On the other hand, Ausra makes no effort to erect a barrier to this "sensitive information" to its direct competitors in this anticipated land grab, First Solar and SunPower, neither of whom are parties to this proceeding.[20] Ausra's position lacks logic, and its request for confidentiality cannot be reconciled with the Commission's rules, or with state law governing the right of the public to participate in the environmental review process.

[20] *See* Mot. at 3.

b. Ausra's Requests Are Not Authorized by the Public Records Act

The California Public Records Act declares that "access to information concerning the conduct of the people's business is a fundamental and necessary right of every person in this state." (Cal. Gov. Code § 6250.) Except with respect to public records exempt from disclosure by express provisions of law, every person has a right to inspect any public record, and "any reasonably segregable portion of a record shall be available for inspection by any person requesting the record after deletion of the portions that are exempted by law." (Cal. Gov. Code. § 6253(a)-(b).) "Public records" includes "any writing containing information relating to the conduct of the public's business prepared, owned, used, or retained by any state or local agency regardless of physical form or characteristics." (Cal. Gov. Code § 6252(e).)

The Public Records Act "was enacted for the purpose of increasing freedom of information by giving members of the public access to information in the possession of public agencies." (*Filarsky v. Superior Court,* (2002) 28 Cal.4th at pp. 419; *see* Cal. Gov. Code § 6250 et seq.)

The Wildlife Corridor Study is a "writing" regarding "the conduct of the public's business," and must be disclosed under the Public Records Act unless otherwise prohibited by law. (*San Gabriel Tribune v. Superior Court*, (1983)143 Cal.App.3d 762, 774.) Ausra argues that the Commission should designate as confidential the results of the Wildlife Corridor Study under the "real estate appraisals" exemption from public disclosure under Government Code section

6254(h). Ausra also argues that under the facts of this case, the public interest is better served by keeping the biological resource study confidential under Government Code section 6255. Ausra's arguments lack merit. The Wildlife Corridor Study is made by and for the Energy Commission Staff for its review of the CESF Project and cumulative wildlife corridor impacts.

i. Ausra fails to show that the results of the Wildlife Corridor Study should be exempt from disclosure under the real estate assessment exemption to the Public Records Act

"All public records are subject to disclosure unless the Public Records Act expressly provides otherwise." (*BRV, Inc. v. Superior Court* (2006) 143 Cal.App.4th 742, 751.) Ausra argues that the Commission should designate as confidential the results of the Wildlife Corridor Study under the "real estate appraisals" exemption from public disclosure under Government Code section 6254(h).

The real estate appraisal exemption under the Public Records Act does not apply in this case. The Public Records Act states that nothing shall be construed to require disclosure of records that are "[t]he contents of real estate appraisals or engineering or feasibility estimates and evaluations made for or by the state or local agency relative to the acquisition of property, or to prospective public supply and construction contracts, until all of the property has been acquired or all of the contract agreement obtained." (Cal. Gov. Code § 6254(h).) Thus, the Act exempts actual contents of a real estate appraisal made by the state for the purpose of acquiring property; the exemption cannot be broadened to apply to future results of a biological resource analysis that is being prepared by the state for the

purpose of evaluating project and cumulative impacts to a wildlife corridor and feasible mitigation to reduce the impacts to a less than significant level. Ausra's argument that "the Corridor Location Results are essentially an appraisal of the value of land from a biological perspective" does not establish facts necessary to determine that the real estate appraisal exemption applies. To establish facts just to meet the "real estate appraisal" condition of the exemption, Ausra must show that a biological assessment of wildlife migration through the Carrizo Plain is tantamount to a calculation of market value in a particular transaction for a particular parcel of land. (*See* Cal. Bus. & Prof. Code § 11302(b).) Ausra has not shown any specific facts necessary to determine whether the real estate appraisal exemption applies.

Exemptions from disclosure should be narrowly construed. (*City of Hemet v. Superior Court* (1995) 37 Cal.App.4th 1411, 1425 and *Black Panther Party v. Kehoe*, (1974) 42 Cal.App.3d 645, 656.) The policy favoring disclosure of government information permeates the Public Records Act, and courts have held that even the exemptions from disclosure, codified at Government Code section 6254, should be narrowly construed, and deemed permissive not mandatory. (*City of Hemet v. Superior Court* (1995) 37 Cal.App.4th 1411, 1425; *Black Panther Party v. Kehoe*, (1974) 42 Cal.App.3d 645, 656.) In short, nothing in section 6254 of the Public Records Act should be construed as preventing an agency from opening its records concerning the administration of the agency to public inspection, unless disclosure is otherwise prohibited by law. (*Id.*; *see also, The Honorable Sheila*

James Kuehl, 89 Ops. Cal. Atty. Gen. 39 (2006) (the Public Records Act was interpreted to allow disclosure of "interim grading documents, including geology reports, compaction reports, and soils reports" prepared by property owners when applying for building permits from a city's building department).) Thus, the statute and case law do not permit the Commission to granting confidentiality of a prospective wildlife corridor study under Ausra's expansive interpretation of the real estate appraisal exemption under the Public Recods Act.

ii. The public interest served by disclosure of the Wildlife Corridor Study clearly outweighs Ausra's interest in maintaining its confidentiality

The Public Records Act allows nondisclosure of an otherwise public record if an agency demonstrates "that on the facts of the particular case the public interest served by not disclosing the record clearly outweighs the public interest served by disclosure of the record." (Cal. Gov. Code § 6255(a).) This catchall exemption to the Public Records Act "contemplates a case-by-case balancing process, with the burden of proof on the proponent of nondisclosure to demonstrate *a clear overbalance* on the side of confidentiality." (*Michaelis, Montanari & Johnson v. Superior Court* (2006) 38 Cal.4th 1065, 1071, 44 Cal.Rptr.3d 663 (emphasis added).) "Where the public interest in disclosure of the records is not outweighed by the public interest in nondisclosure, courts will direct the government to disclose the requested information." (*City of San Jose v. Superior Court*, (1999) 74 Cal.App.4th 1008.)

Ausra claims that the catchall exemption applies, because the public will not be harmed by limiting disclosure of the Corridor Location Results. Ausra also

claims that the catchall exemption applies because the public interest would be served by suppression of the data in order to prevent private "illegitimate" land purchasers and property holders to opportunistically and "illegitimately inflate property values" of the preferred corridor lands, thereby making mitigation and future solar power development infeasible.[21]

First, Ausra's argument that the public will not be harmed is far from evidence that the public interest will be "served by not disclosing the record," as required by the Public Records Act. (Gov. Code § 6255(a).) And, in fact, the contrary is true. Intervenors, the County, and members of the public would be significantly harmed by nondisclosure of the Commission's study evaluating significant impacts to endangered San Joaquin kit fox, pronghorn antelope, and tule elk migration corridors and feasible measures to mitigate impacts to the corridors to a less than significant level. Intervenors, the County, and members of the public have interests in protection of wildlife, public and private land management, and development in the Carrizo Plains.

Second, public participation is an essential part of the CEQA process. An EIR, or a CEQA equivalent document, shall provide the public and responsible government agencies with detailed information on the potential environmental consequences of an agency's proposed decision *before* such decision is made. (*Laurel Heights Improvement Assn. v. Regents of University of California* (1993) 6 Cal.4th 1112.) Disclosure of public information protects the integrity of the agency's

[21] Mot. at 6.

decision-making process: "the EIR 'protects not only the environment but also informed self-government.'" (*Id.* quoting *Laurel Height Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 392.) "The failure to comply with the law subverts the purposes of CEQA if it omits material necessary to informed decisionmaking and informed public participation. Case law is clear that, in such cases, the error is prejudicial." (*State Water Resources Control Bd. Cases*. (2006) 136 Cal.App.4th 674, 723 (citing *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 946).) Ausra's request has the potential of placing the Commission and the County of San Luis Obispo in violation of CEQA by precluding agencies from accessing all the relevant data, and in the case of the County, preventing an independent analysis of the cumulative impacts of the solar power plants in County jurisdiction.

Nondisclosure of the Wildlife Corridor Study results would render participation in this proceeding partially meaningless by precluding the public from ensuring that mitigation for the CESF project and cumulative impacts is appropriate, adequate, and based on substantial evidence, as required by CEQA.

Furthermore, contrary to Ausra's claims, the benefit of nondisclosure, i.e. preventing private "illegitimate" land purchasers and property holders to opportunistically and "illegitimately inflate property values" of the preferred corridor lands, thereby making mitigation and future solar power development infeasible, is slim at best. First, Ausra's claim regarding illegitimate land purchases is completely subjective. Ausra provides no definition of the term, or

legal basis for claiming that knowledge of biological resources is proprietary in some way. Second, Ausra provides no evidence of any current improper land transaction. Third, and most importantly, information regarding the wildlife corridor is widely known, as are locations of suitable habitat and optimal migration corridors of the kit fox, the tule elk, and the pronghorn antelope. (See Exhibits D and E.) Commission Staff, the parties, and the public already evaluated baseline biological data, commented on the optimal wildlife corridors for each species, and are analyzing the direct and cumulative impacts of the CESF on wildlife corridors in the Carrizo Plains. Therefore, the public already has knowledge of preferred corridor lands. As pointed out by Carrisa Alliance for Responsible Energy, any owner land of land in or near the corridor locations will be able to surmise that an offer to purchase their land may be made by one of the three project applicants.[22]

Finally, Ausra's protective order would fail to achieve its stated aim, because it does not guard against Opitsolar and SunPower, Ausra's direct and most foreseeable competitors in any future land purchase transactions.

In contrast, relevant policy considerations weigh heavily on the side of disclosure. The CESF will impact 1,020 acres within a natural area that is rich in habitat diversity, plant and wildlife, and that is instrumental to the recovery of the endangered kit fox. The Wildlife Corridor Study provides the sole means by which

[22] In the Matter of Application for Certification for the Carrizo Energy Solar Farm by Carrizo Energy LLC, Docket No. 07-AFC-8, Letter from Robin Bell, Carrisa Alliance for Responsible Energy, to Commissioner Byron and Commissioner Levin, Re: Motion of Carrizo Energy, LLC for a protective order to maintain the confidentiality of corridor location results of the Wildlife Corridor Study, and to designate entities having access to the corridor location results (April 24, 2009) at 3.

parties to this proceeding, and the general public may review the basis for Commission Staff's anticipated assessment regarding impacts to a significant wildlife corridor. In fact, CEQA requires the Commission to make publicly available "all documents referenced in the draft environmental impact report," or CEQA equivalent document. (Pub. Res. Code § 21092.) Ausra's request that the study results be suppressed until all mitigation has been completed would prevent the parties and the public from participating in this proceeding. In fact, because Ausra's request seeks to keep the information confidential until all thee solar developers in the Carrizo Plains purchase some unstated amount of land in the area, there is no guarantee the Wildlife Corridor Study would ever be released. It may be years before mitigation for all three projects is complete. Such restrictions on public participation, and the correlative restraints on agency analyses, endanger the viability of future renewable energy development in California.

c. Ausra's Requests Violate State and Federal Endangered Species Acts

The Warren Alquist Act requires the Commission to determine whether the Project's conformity with other laws, ordinances, regulations and standards ("LORS"). (Public Res. Code §§ 25523(d)(1), 25525.) LORS includes the state and federal Endangered Species Acts. The federal Endangered Species Act ("ESA") requires that all such data be disclosed to the public, and that the public have an opportunity for meaningful comment on the adequacy of the impact analysis and mitigation measures contained therein. (*Gerber v. Norton* (D.C. Cir. 2002) 294 F.3d

173, 179.) Failure to disclose such information is arbitrary and capricious under the Administrative Procedure Act, 5 U.S.C. § 706, and violates the ESA.

As discussed above, the impact analysis and mitigation measures that are the subject of the Wildlife Corridor Study will serve as the basis for Ausra's applications for an incidental take permit and biological opinion or habitat conservation plan. Thus, the Commission cannot approve Ausra's request for confidentiality, because it is in direct conflict with the express requirements of the federal ESA.

Implicit in ESA's public disclosure requirement is FWS's duty to consider and respond to relevant matters raised by the public during its review. Logic and legal precedent dictate that the opportunity for agency dialog with the public must be afforded at the earliest time possible to ensure that the agency incorporates all relevant information into its analysis. (*See Winter v. Natural Resources Defense Council, Inc.*, (2008) 129 S.Ct. 365, 390.) No reasonable justification exists for the suppression of the Wildlife Corridor Study at this time, and the public's interest in conserving scarce administrative resources demands that the study be given full disclosure during its development.

d. <u>The Freedom of Information Act Provides No Basis for Confidential Designation of the Wildlife Corridor Study</u>

Ausra argues that the results of the Wildlife Corridor Study are protected by the deliberative process exemption to the Freedom of Information Act ("FOIA"). (5 U.S.C. § 552 et seq.) Ausra's argument lacks merit.

The deliberative process exemption pertains to "inter-agency or intra-agency memorandums or letters which would not be available by law to a party other than

an agency in litigation with the agency." (5 U.S.C. § 552(b)(5).) Ausra's principle case, *NLRB v. Sears, Roebuck & Co.*, explains that the deliberative process exemption has limited application in the administrative process, applying exclusively to information which, in a civil proceeding, would be protected by the executive or the attorney client privilege. ((1975) 421 U.S. 132, 153-54.)

A record may be privileged if it is "deliberative" and "pre-decisional." These terms refer to the preliminary policy and legal calculus underlying an agency's decision to undertake a course of action, such as a decision to institute enforcement proceeding. (*See e.g. NLRB v. Sears, Roebuck & Co.*, 421 U.S. at 156-157 (exempting from public disclosure decisions to institute enforcement proceeding); *Renegotiation Bd. v. Grunman Aircraft Engineering Corp.*, (1975) 421 U.S. 168 (exempting from public disclosure records pertaining to agency decision to seek restitution from government contractors).) Whether a document is deliberative does not depend on whether it is "theoretical in nature," as Ausra argues.[23] Deliberative documents are those that reflect an agency's preliminary "ruminations" on the policy it should pursue. (*Petroleum Information Corp. v. U.S. Dept. of Interior*, 976 F.2d 1429, 1435 (D.C. Cir. 1992).) Therefore, Ausra's claim that the study is deliberative simply because it is "a product of the judgment of several different entities" is legally incorrect, as well as factually inaccurate. The deliberative process privilege simply does not apply to the Commission's fact-finding regarding Ausra's potential entitlement to a permit. Disclosure of the study would reveal only

[23] *See* Mot. at 8.

whether the Commission has adequately evaluated all factual matters that are in dispute in this proceeding. This is exactly the type of revelation that Congress sought to ensure in enacting FOIA. (5 U.S.C. § 552(a).)

The authority that Ausra cites does not help its argument, and only underscores the point that environmental analyses produced during a public proceeding are public documents. (*See Southwest Center for Biological Diversity v. U.S.D.A*, 170 F. Supp.2d 931, 940 (D. Ariz. 2000).) Finally, if the deliberative process privilege did in fact apply to the study, Ausra, just as any other member of the public, would be precluded from accessing its results. For these reasons, the Commission should reject Ausra's claim.

IV. CONCLUSION

For the foregoing reasons, Ausra's motion should be denied.

Dated: May 1, 2009

Respectfully submitted,

_____/s/_____

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STATE OF CALIFORNIA

Energy Resources Conservation and Development Commission

In the Matter of: The Application for Certification for the Carrizo Energy Solar Farm by Carrizo Energy, LLC	Docket No. 07-AFC-8

PROOF OF SERVICE

I, David Weber, declare that on May 1, 2009, I served and filed copies of the attached **CALIFORNIA UNIONS FOR RELIABLE ENERGY OPPOSITION TO MOTION OF CARRIZO ENERGY, LLC FOR A PROTECTIVE ORDER TO MAINTAIN THE CONFIDENTIALITY OF CORRIDOR LOCATION RESULTS OF THE WILDLIFE CORRIDOR STUDY, AND TO DESIGNATE ENTITIES HAVING ACCESS TO THE CORRIDOR LOCATION RESULTS.** The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list. The document has 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:

The documents was also sent electronically to all email addresses on the Proof of Service list and by U.S. Mail at South San Francisco, California, with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list to those addresses NOT marked "email preferred." An original paper copy and one electronic copy were mailed and emailed respectively to the Docket Office of the California Energy Commission.

CALIFORNIA ENERGY COMMISSION Attn: Docket No. 07-AFC-8 1516 Ninth Street, MS-4 Sacramento, CA 95814-5512 docket@energy.state.ca.us	Perry H. Fontana, QEP Vice President-Projects Ausra, Inc. 2585 East Bayshore Road Palo Alto, CA 94303 perry@ausra.com
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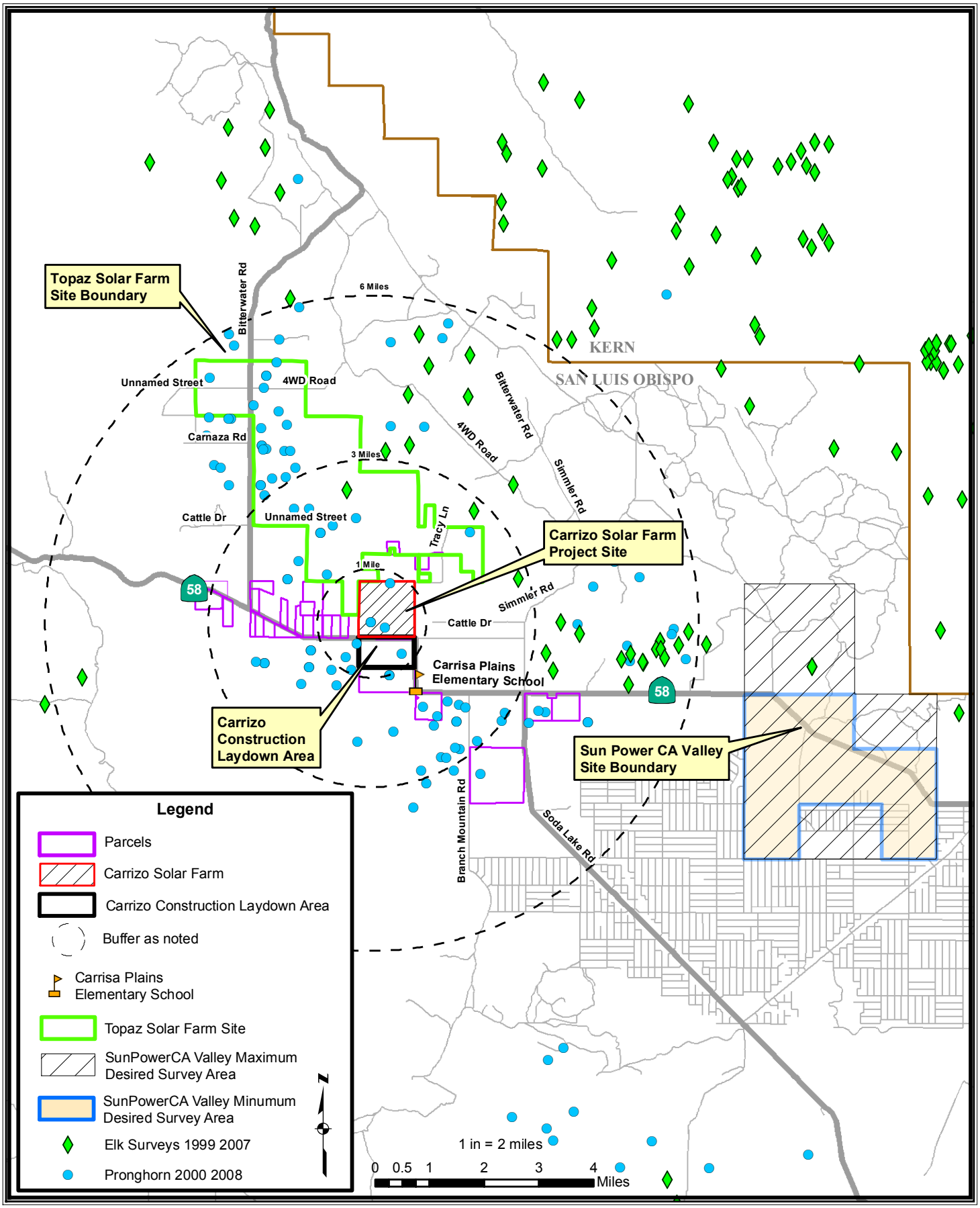
I declare under penalty of perjury that the foregoing is true and correct. Executed at South San Francisco, CA this 1st day of May, 2009.

_____/s/_____
David Weber

FIGURE 1
Carrizo Energy Solar Farm -



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, AUGUST 2008
SOURCE:

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OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL
GLORIA D. SMITH

April 8, 2009

John Kessler, Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: 07-AFC8; Carrizo Energy Solar Farm Project

Dear Mr. Kessler:

California Unions for Reliable Energy submits the attached comments prepared by Dr. Michael A. Bias and Scott Cashen, M.S. on the Revised Habitat Connectivity Planning for Selected Focal Special in the Carrizo Plain – Task 1.

Sincerely,

Tanya A. Gulesserian

TAG:bh
Attachments
cc: Docket Office
Service List for Docket No. 07-AFC-8

2118-047a

April 8, 2009

Tanya A. Gulesserian
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Re: Carrizo Energy Solar Farm (07-AFC-8)
Comments on Revised Habitat Connectivity Planning for Selected Focal Species in the Carrizo Plain – Task 1

Dear Ms. Gulesserian:

Dr. Michael A. Bias and I have conducted a preliminary review of the Revised *Habitat Connectivity Planning for Selected Focal Species in the Carrizo Plain* report presenting a revised draft summary of Task 1 modeling results for baseline conditions. In this letter we discuss issues pertaining to the models that have been developed, and we provide comments warranting consideration before corridor impact analyses proceed.

1. Section 5.1.2 of the report states:

   Because the majority of methods used to document dispersal distance underestimate the true value (LeHaye et al. 2001), we assumed each species can disperse twice as far as the longest documented dispersal distance.

   This appears to be a relatively significant assumption that may or may not be valid. Because the assumption may have significant implications on the validity of the model, additional justification should be provided. In particular, he study cited (i.e., LeHaye et al. 2001) involved research on the California spotted owl using specific monitoring techniques. Therefore, the report should explain how information obtained from LeHaye's study on dispersal of owls in a forested environment applies to a model being created for open habitat mammals.

2. Slope carries the most weight in the model developed for pronghorn. Within the factor "Slope", slopes > 20% were assigned a rating of 0.3. Research on pronghorn in Arizona and North Dakota concluded pronghorn typically avoid areas of high (> 20%) slope (Schuetze and Miller 1992, Lee et al. 1998, ND Game and Fish 2006). Consequently, a habitat model developed for pronghorn in Arizona assigned areas having slope > 20% with a rating of zero. We request a copy of the study used to assign "Slope" ratings (i.e., Longshore and Lowry 2008) for our review. In addition, the report should discuss why slopes > 20% were not excluded in the model (e.g., pronghorn exhibit differential use patterns in California).

3. The models incorporate 2 or 3 input variables to calculate habitat suitability for each focal species. There are several actual data points representing focal species occurrence in the

study area (e.g., as depicted in Figures 4 and 5 for pronghorn). Can these data points be used to help validate the models? That is, it seems that occurrence-specific data on the variables used in the models could be obtained and used to validate the suitability ratings assigned to each variable. For example, if all pronghorn occurrences are associated with slopes < 20% then it might not be appropriate to give areas with slopes > 20% any weight at all (i.e., they would be assigned a value of zero). We request the data for the variables being used in the models for each known focal species occurrence within the study area (i.e., for pronghorn occurrence #1, what is the slope, road density, and vegetation). Assuming data for the input variables is available for each occurrence point, the modeling should use the data to lead to a more accurate variable rating scheme (as opposed to a scheme developed through literature and expert opinion).

4. The report acknowledges pronghorn may be adversely affected by fences. Because a comprehensive fence data layer was unavailable, and because fences often accompany roads, the model appears to use roads as a surrogate for fences. Whereas the occurrence of fences is likely highly correlated with the "Road Density" variable, it's unclear whether use of the "Road Density" variable alone will be able to accurately predict habitat suitability for pronghorn. In addition, fences, which affect movement, occur frequently in the absence of roads. Research indicates:

   Pronghorn are unlikely to occupy some areas of apparently suitable habitat due to human-related factors. Fences and highways are barriers that pronghorn will not cross, and thus there may be areas of suitable habitat that the pronghorn cannot reach (Lee et al. 1998; DeVos 1999; Ticer et al. 1999). In addition, Pronghorn are likely to avoid areas of high human activity (Lee et al. 1998; DeVos 1999).

   Therefore, it appears that the presence of a single fence (which may occur in an area having extremely low road density) could be a critical factor in pronghorn habitat suitability. We're aware that a comprehensive fence data layer is unavailable. However, given the critical nature of fences in determining habitat suitability, the models should be refined to more accurately reflect the limitations a fence and other barriers to movement have on pronghorn occurrence and movement.

The models being developed for the pronghorn and tule elk should also incorporate the occurrence of water, as water is another factor known to limit (or potentially limit) the distribution and movement patterns of the species. Water bodies are critically important to habitat suitability for pronghorn; water is especially important seasonally. Hoover et al. (1959) reported that some pronghorn herds in Colorado were never observed drinking water. However, later studies indicated that pronghorn need water during dry weather in some areas. Beale and Smith (1970) found that when forbs were abundant, and their moisture content was 75% or greater, pronghorns in Utah did not drink although water was readily available. However, during extremely dry periods, water consumption reached 3 liters per day per animal. Sundstrom (1968) observed a close relationship between pronghorn distribution and water beginning in July in Wyoming, with most pronghorns occurring within 6 km of water. These studies suggest water availability is not only an important consideration, but also that vegetation composition (not just vegetation type) is an important variable in habitat suitability.

Human predation (hunting and poaching) is the greatest cause of mortality in antelope. Fences and other man-made barriers to pronghorn movements are the second greatest decimating factor to pronghorn populations (Kitchen and O'Gara 1982). Such barriers are especially damaging when combined with overgrazing, other types of habitat destruction (e.g., development), unusual weather conditions, and high densities of predators. Further, fences used to control livestock apparently facilitate coyote and bobcat predation on pronghorn.

At the end of a drought in 1957, the pronghorn population of the Trans Pecos region of Texas was about 7,300 animals (Hailey 1977). The herd increased to over 12,000 during years of normal precipitation. Another drought from 1961 to 1964 depleted the herd to 5,000. During the drought individuals were forced to subsist on inadequate and sometimes toxic vegetation because they could not cross woven-wire fences constructed to control domestic livestock. Buechner (1950) noted that historically pronghorns of the Trans Pecos region had moved to ranges with better forage conditions during years of low precipitation.

Omission of fence data layers from the habitat suitability and permeability also applies to effects on elk. Fences create a barrier to movement as animals seek to meet their daily needs for water, shade and food. Winter migration is affected by fences, which pose a risk of entanglement and may affect the vigor of animals already stressed by harsh winter conditions (this is especially true for young animals). Fences have been known to block elk from critical winter ranges and prohibit herds from accessing the food and water necessary for survival. Such a phenomenon may compromise the long-term viability of the herd.

The models being developed for the pronghorn and tule elk should incorporate the occurrence of water, as well as fences and other significant barriers to movement, as these factors are known to limit (or potentially limit) the distribution and movement patterns of the species. According to the report, recent high-resolution aerial photographs were used for the modeling exercise. The locations of water bodies, fences, and other barriers should be attainable through interpretation of the photographs. Additionally, a tremendous amount of effort has been devoted to mapping water in California and a water data layer should be available to the modelers.

5. Sensitivity analysis is a technique that enables the modeler to examine how dependent the model is on slight differences in the variables altered. Model sensitivity is valuable for judging how much the response information may change if the assumptions about source variables (e.g., their particular magnitudes or variability) do not hold exactly (Anderson and Gutzwiller 2005). The report should discuss the results of any sensitivity analyses conducted for the 3 models that were developed.

6. Numerous anthropogenic and environmental factors (e.g., weather, disease, predators, and competitors among others) not associated with specific habitat features affect wildlife populations and communities directly, indirectly, or both. Thus, models that incorporate only habitat features are sometimes inadequate (O'Neil and Carey 1986) and more careful analyses of the many influences on an organism are necessary (Danchin et al. 1998, Martin 2001). According to the Recovery Plan for Upland Species of the San Joaquin Valley (USFWS 1998), preliminary population viability analyses conducted for the kit fox suggest

the Carrizo Plain population is not viable by itself, nor in combination with populations in western Kern County and the Salinas Valley. Rather, viability of the Carrizo Plain population requires maintaining an extensive network of corridors among metapapulations, including populations in the San Joaquin Valley (USFWS 1998). Given the importance of maintaining connectivity among metapopulations, it appears additional considerations (e.g., model variables) and analyses are warranted (at least for the kit fox model).

7. Whereas models can serve as valuable predictive tools, they incorporate a certain amount of uncertainty. Gutzwiller and Barrow (2001) discuss 4 sources of uncertainty in predictive models (interannual variation, environmental variation, structural uncertainty, partial observability) and they present approaches for dealing with these uncertainties (e.g., incorporation of stochastic simulation models to account for environmental variation). The report should provide a more thorough discussion of the uncertainties associated with the models that have been developed and any efforts that will be devoted to reducing these uncertainties (including but not limited to model validation and fitting).

8. The least-cost corridor analyses for pronghorn, tule elk, and kit fox used the most permeable 5%, 2%, and 1% portion of the landscape, respectively. These values were used to calculate least-cost corridors; however, their context in relation to the objectives of the modeling exercise is not explained. The report should explain and justify the percentage values used and provide a discussion of how the results of this exercise will be applied.

9. The report acknowledges pronghorn and tule elk are gregarious animals that typically occur in groups. As a result, it is unclear why minimum patch size was defined as an area that could support as little as 2 individuals. Defining patch as an area suitable for 2 individuals likely overestimates the abundance of suitable habitat and it may be unrealistic based on behavior of the species. The report should address this issue. In doing so, it may be useful to provide a discussion of group sizes observed (through aerial observations and telemetry work) when animals were clearly moving (i.e., dispersing, migrating, or shifting range).

   The maps provided of potential "cores" and "patches" depict them as occurring in distinct units (i.e., patches do not occur within a larger matrix of cores). Therefore, the occurrence of patches may be irrelevant to the models at the scale being examined. If that's true, we recommend revising the report to reflect the relative insignificance of patches. That is, there is little utility is justifying how a patch was defined if patches are irrelevant to the exercise. In addition to improving the readability of the report, clarifying the significance of patches would promote more effective review by the reader.

10. The models that have been developed do not appear to take into account seasonal or sex-specific (e.g., calving, fawning, or lambing) life history needs of the focal species. The effectiveness of the models in predicting use patterns should be enhanced by incorporating these life history requirements.

11. Habitat use, selection, availability, and animal preference are complicated and often multi-dimensional. Many studies have looked at the complexities of habitat selection in animals. Often, habitat selection is far more complex than what can be predicted through 2 or 3 input variables. Although the modeling team used "high-tech" methods (i.e., high-resolution aerial

photos, satellite images, complex GIS models, etc.), habitat suitability and permeability was predicted through use of 3 variables for pronghorn and kit fox, and only 2 variables for tule elk.

Because animals often choose habitat based on the temporal or non-structural components of an area, we believe the models that have been developed are far too simplistic to accurately predict use patterns, and they should be refined to incorporate additional variables (e.g., predator and prey abundance, phenology of vegetation, competition with wildlife and domestic livestock, barriers, disturbance).

12. Maps provided in the report should include a land ownership layer that can be used to evaluate the potential (or lack thereof) that areas designated as highly permeable will be conserved and remain viable for focal species use.

13. Maps provided in the report should include the proposed project areas to facilitate a cumulative impact analysis.

Sincerely,

Scott Cashen, M.S.

Literature cited

Anderson, SH and KJ Gutzwiller. 2005. Wildlife habitat evaluation. Pages 489-502 *in* CE Braun, editor. Techniques for wildlife investigations and management. The Wildlife Society, Bethesda (MD)

Beale, DM and AD Smith. 1970. Forage use, water consumption, and productivity of pronghorn antelope in western Utah. J. Wild. Manage. 34(3): 570-582.

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Gutzwiller, KJ and WC Barrow. 2001. Bird-landscape relations in the Chihuahuan Desert: coping with uncertainties about predictive models. Ecological Applications 11:1517-1532.

Hailey, TL. 1977. Handbook on pronghorn antelope management. Texas Parks and Wildl. Dept. Austin 47pp.

Hoover, RL, EE Till, and S Ogilivie. 1959. The antelope of Colorado. Colorado Game Fish Tech. Bull. 4:110.

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Lee, RM, JD Yoakum, BW O'Gara, TM Pojar, and RA Ockenfels, eds. 1998. Pronghorn management guides. 18th Pronghorn Antelope Workshop, Prescott, AZ. 110 pp.

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Schuetze, SM., and WH. Miller. 1992. Seasonal habitat preferences of pronghorn antelope in central Arizona. Proc. Pronghorn Antelope Workshop 15: 30-39.

Sundstrom, C. 1968. Water consumption by pronghorn antelope and distribution related to water in Wyoming's Red Desert. Proc. Antelope States Workshop. 3:39-46.

Ticer, CLD, SR Boe, RA Ockenfels, and JC DeVos. 1999. Factors affecting home ranges and movements of pronghorn on a shortgrass prairie in northern Arizona. Pages 84-90 *in* Proceedings of the 18th Biennial Pronghorn Antelope Workshop.

[USFWS] U.S. Fish and Wildlife Service. 1998. Recovery plan for upland species of the San Joaquin Valley, California. Region 1, Portland, OR. 319 pp.

Scott Cashen, M.S.

Senior Biologist / Forester

15 Years
Professional Experience

3264 Hudson Avenue, Walnut Creek, CA 94597. (925) 256-9185. scashen@comcast.net

Employment:

Nov 2007 to Present

Independent Consultant — Walnut Creek, CA

- Litigation support
- Science review team – Quincy Library Group Act
- Grant writing

Feb 2005 to Oct 2007

Senior Biologist / Forester
TSS Consultants — Walnut Creek, CA

- Project management
- Supervision of biological staff
- Technical writing and editing
- Biological resources litigation support
- Biological resource assessments
- Wildlife surveys (including special-status species)
- Forest resource management
- Litigation support

Apr 2000 to Feb 2005

Senior Biologist / Forester / Office Manager
ECORP Consulting, Inc. — Oakland, CA

- Project Management
- Supervision of biological staff
- Technical writing and editing
- Wildlife and fisheries inventories
- Special-status species surveys
- Biological resource assessments
- Natural resource studies and management plans
- Forest management
- Scientific studies
- Mitigation monitoring

Jan 2000 to Apr 2000

Biologist — San Francisco Bay Area
Point Reyes Bird Observatory

- Bird surveyor for Tidal Salt Marsh Bird Study
- Bird banding of song sparrows

May to July 1999

Biologist
National Park Service — Yukon-Charley Rivers Preserve, AK

- Selected as member of survey team to conduct first inventory of bird species in the Preserve.

Jan to May 1998

Instructor
The Pennsylvania State University — DuBois, PA

- Instructor for Wildlife Management Techniques course.

May 1995 to June 1998	**Graduate Research Assistant** **The Pennsylvania State University**	University Park, PA

- Conducted original research on avian use of restored wetlands. First study of its kind in PA, and one of the most comprehensive studies nationwide examining bird use of restored wetlands. Information is currently being used by the US Fish and Wildlife Service to enhance restored wetlands for select species.

Spring 1996, 1997	**Teaching Assistant** **The Pennsylvania State University**	University Park, PA

- Teaching Assistant for Ornithology course.

Sep 1992 to Apr 1995	**Consulting Forester** **Pacific Meridian Resources**	Emeryville, CA

- Timber Harvest Plans
- Forest inventory
- Forest erosion control
- Supervision of logging operations

Summer 1992	**Wildlife Technician** **University of California**	Tahoe National Forest

- Conducted surveys of bird, mammal, and plant species to validate California's Wildlife Habitat Relationship model.

Jan to May 1992	**Wildlife Rehabilitator** **California Marine Mammal Center**	Marin Headlands, CA

Education:

M.S. — Wildlife and Fisheries Science, The Pennsylvania State University, 1998.
B.S. — Resource Management, The University of California-Berkeley, 1992.
Diploma — Groton School

Specialized Training:

U.C. Forestry Field Program. Six week program included field courses in ecology, wildlife management, and silviculture (among others).

The Wildlife Society two-day course on the identification and natural history of the California red-legged frog.

The Wildlife Society two-day course on the identification and natural history of the California tiger salamander.

The Wildlife Society two-day course on the identification and natural history of California reptiles and amphibians.

OSHA 40-hour "HAZWOPPER" training

ABAG Storm Water Pollution Prevention training

Scott Cashen, M.S.
Senior Biologist / Forest Ecologist
3264 Hudson Avenue, Walnut Creek, CA 94597. (925) 256-9185. scashen@comcast.net

In his 16 years in the profession, Scott Cashen has consulted on projects pertaining to wildlife and fisheries ecology, avian biology, wetland restoration, and forest management. Because of his varied experience, Mr. Cashen is knowledgeable of the link between the various disciplines of natural resource management, and he is a versatile scientist.

Mr. Cashen's employment experience includes work as a wildlife biologist, consulting forester, and instructor of Wildlife Management. He has worked throughout California, and he is knowledgeable of the different terrestrial and aquatic species and habitats present in the state.

Mr. Cashen is an accomplished birder and is able to identify bird species by sight and sound. His knowledge has enabled him to survey birds throughout the United States and instruct others on avian identification. Mr. Cashen's research on avian use of restored wetlands is currently being used by the United States Fish and Wildlife Service to design wetlands for specific "target" species, and as a model for other restored wildlife habitat monitoring projects in Pennsylvania. In addition to his bird experience, Mr. Cashen has surveyed for carnivores and other mammals, special-status amphibian species, and various fish species.

PROFESSIONAL EXPERIENCE

Project Management

Mr. Cashen has managed several large-scale and high profile natural resources investigations. High profile projects involving multiple resources often require consideration of differing viewpoints on how resources should be managed, and they are usually subject to intense scrutiny. Mr. Cashen is accustomed to these challenges, and he is experienced in facilitating the collaborative process to meet project objectives. In addition, the perception of high profile projects can easily be undermined if inexcusable mistakes our made. To prevent this, Mr. Cashen bases his work on solid scientific principles and proven sampling designs. He also solicits input from all project stakeholders, and provides project stakeholders with regular feedback on project progress. Mr. Cashen's educational and project background in several different natural resource disciplines enable him to consult on multiple natural resources simultaneously and address the many facets of contemporary land management in a cost-effective manner.

REPRESENTATIVE EXPERIENCE

- Forest health improvement projects – Biological Resources *(CDF: San Diego and Riverside Counties)*
- San Diego Bark Beetle Tree Removal Project – Biological Resources, Forestry, and Cultural Resources *(San Diego Gas & Electric: San Diego Co.)*
- San Diego Bark Beetle Tree Removal Project - Forestry *(San Diego County/NRCS)*
- Mather Lake Resource Management Study and Plan – Biological Resources, Hydrology, Soils, Recreation, Public Access, CEQA compliance, Historic Use *(Sacramento County: Sacramento)*
- "KV" Spotted Owl and Northern Goshawk Inventory *(USFS: Plumas NF)*
- Amphibian Inventory Project *(USFS: Plumas NF)*
- San Mateo Creek Steelhead Restoration Project – TES species, Habitat Mapping, Hydrology, Invasive Species Eradication, Statistical Analysis *(Trout Unlimited and CA Coastal Conservancy: Orange County)*
- Hillslope Monitoring Project – Forest Practice Research *(CDF: throughout California)*
- Placer County Vernal Pool Study – Plant and Animal Inventory, Statistical Analysis *(Placer County: throughout Placer County)*
- Weidemann Ranch Mitigation Project – Mitigation Monitoring and Environmental Compliance *(Toll Brothers, Inc.: San Ramon)*
- Delta Meadows State Park Special-status Species Inventory – Plant and Animal Species Inventory, Special-status Species *(CA State Parks: Locke)*
- Ion Communities Biological Resource Assessments – Biological Resource Assessments *(Ion Communities: Riverside and San Bernardino Counties)*
- Del Rio Hills Biological Resource Assessment – Biological Resource Assessments *(The Wyro Company: Rio Vista)*

Biological Resources

Mr. Cashen has a diverse background in biology. His experience includes studies of a variety of fish and wildlife species, and work in many of California's ecosystems. Mr. Cashen's specialties include conducting comprehensive biological resource assessments, habitat restoration, species inventories, and scientific investigations. Mr. Cashen has led investigations on several special-status species, including ones focusing on the foothill yellow-legged frog, mountain yellow-legged frog, steelhead, burrowing owl, California spotted owl, northern goshawk, willow flycatcher, and forest carnivores. Mr. Cashen was responsible for the special-status species inventory of Delta Meadows State Park, and for conducting a research study for Placer County's Natural Community Conservation Plan.

REPRESENTATIVE EXPERIENCE

Avian

- Study design and Lead Investigator - Delta Meadows State Park Special-status Species Inventory *(CA State Parks: Locke)*
- Study design and lead bird surveyor - Placer County Vernal Pool Study *(Placer County: throughout Placer County)*
- Surveyor - Willow flycatcher habitat mapping *(USFS: Plumas NF)*
- Independent surveyor - Tolay Creek, Cullinan Ranch, and Guadacanal Village restoration projects *(Ducks Unlimited/USGS: San Pablo Bay)*
- Study design and Lead Investigator - Bird use of restored wetlands research *(Pennsylvania Game Commission: throughout Pennsylvania)*
- Study design and surveyor - Baseline inventory of bird species at a 400-acre site in Napa County *(HCV Associates: Napa)*
- Surveyor - Baseline inventory of bird abundance following diesel spill *(LFR Levine-Fricke: Suisun Bay)*
- Study design and lead bird surveyor - Green Valley Creek Riparian Restoration Site *(City of Fairfield: Fairfield, CA)*
- Surveyor - Burrowing owl relocation and monitoring of artificial habitat *(US Navy: Dixon, CA)*
- Surveyor - Pre-construction raptor and burrowing owl surveys *(various clients and locations)*
- Surveyor - Backcountry bird inventory *(National Park Service: Eagle, Alaska)*
- Lead surveyor - Tidal salt marsh bird surveys (Point Reyes Bird Observatory: throughout Bay Area)

Amphibian

- Crew Leader - Red-legged frog, foothill yellow-legged frog, and mountain yellow-legged frog surveys *(USFS: Plumas NF)*
- Surveyor - Foothill yellow-legged frog surveys *(PG&E: North Fork Feather River)*
- Surveyor - Mountain yellow-legged frog surveys *(El Dorado Irrigation District: Desolation Wilderness)*
- Crew Leader - Bullfrog eradication *(Trout Unlimited: Cleveland NF)*

Fish and Aquatic Resources

- Surveyor - Hardhead minnow and other fish surveys *(USFS: Plumas NF)*
- Surveyor - Weber Creek aquatic habitat mapping (El Dorado Irrigation District: Placerville, CA)
- Surveyor - Green Valley Creek aquatic habitat mapping *(City of Fairfield: Fairfield, CA)*
- GPS Specialist - Salmonid spawning habitat mapping *(CDFG: Sacramento River)*
- Surveyor - Fish composition and abundance study (PG&E: Upper North Fork Feather River and Lake Almanor)
- Crew Leader - Surveys of steelhead abundance and habitat use *(CA Coastal Conservancy: Gualala River estuary)*
- Crew Leader - Exotic species identification and eradication *(Trout Unlimited: Cleveland NF)*

Mammals

- Scientific Advisor – Red Panda survey and monitoring methods *(The Red Panda Project: CA and Nepal)*
- Surveyor - Forest carnivore surveys *(University of CA: Tahoe NF)*
- Surveyor - Relocation and monitoring of salt marsh harvest mice and other small mammals *(US Navy: Skagg's Island, CA).*

Natural Resource Investigations / Multiple Species Studies

- Team Member – Member of the science review team assessing the effectiveness of the US Forest Service's implementation of the Herger-Feinstein Quincy Library Group Act.
- Lead Consultant - Baseline biological resource assessments and habitat mapping for CDF management units *(CDF: San Diego, San Bernardino, and Riverside Counties)*

- Professional Expert – Peer review of CEQA documents *(Adams Broadwell Joseph & Cardoza: California)*
- Lead Consultant - Pre- and post harvest biological resource assessments of tree removal sites *(SDG&E: San Diego County)*
- Crew Leader - T&E species habitat evaluation for BA in support of a steelhead restoration plan *(Trout Unlimited: Cleveland NF)*
- Lead Investigator - Resource Management Study and Plan for Mather Lake Regional Park *(County of Sacramento: Sacramento, CA)*
- Lead Investigator - Wrote Biological Resources Assessment for 1,070-acre Alfaro Ranch property *(Yuba County, CA)*
- Lead Investigator - Wildlife Strike Hazard Management Plan *(HCV Associates: Napa)*
- Lead Investigator - Del Rio Hills Biological Resource Assessment *(The Wyro Company: Rio Vista, CA)*
- Lead Investigator – Ion Communities project sites (Ion Communities: Riverside and San Bernardino Counties)
- Surveyor – Tahoe Pilot Project: CWHR validation *(University of California: Tahoe NF)*

Forestry

Mr. Cashen has five years of experience working as a consulting forester on projects throughout California. During that time, Mr. Cashen has consulted with landowners and timber harvesters on best forest management practices; and he has worked on a variety of forestry tasks including selective tree marking, forest inventory, harvest layout, erosion control, and supervision of logging operations. Mr. Cashen's experience with many different natural resources enable him to provide a holistic approach to forest management, rather than just management of timber resources.

REPRESENTATIVE EXPERIENCE

- Lead Consultant - CDF fuels treatment projects *(CDF: San Diego, Riverside, and San Bernardino Counties)*
- Lead Consultant and supervisor of harvest activities – San Diego Gas and Electric Bark Beetle Tree Removal Project *(SDG&E: San Diego)*
- Crew Leader - Hillslope Monitoring Program *(CDF: throughout California)*
- Consulting Forester – Inventory and selective harvest projects *(various clients throughout California)*

EDUCATION / SPECIAL TRAINING

M.S. Wildlife and Fisheries Science, The Pennsylvania State University (1998)
B.S. Resource Management, The University of California-Berkeley (1992)
Forestry Field Program, Meadow Valley, California, Summer (1991)

PROFESSIONAL ORGANIZATIONS / ASSOCIATIONS

The Wildlife Society
Association of Field Ornithologists
Society of American Foresters

TEACHING EXPERIENCE

Instructor: Wildlife Management, The Pennsylvania State University, 1998
Teaching Assistant: Ornithology, The Pennsylvania State University, 1996-1997

PROOF OF SERVICE

I, Bonnie Heeley, declare that on April 8, 2009, I served and filed copies of the attached **Gulesserian Letter to John Kessler and attached Comments on Revised Habitat Connectivity Planning for Selected Focal Species in the Carrizo Plain – Task 1.** The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list. The document has 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:

The documents was also sent electronically to all email addresses on the Proof of Service list and by U.S. Mail at South San Francisco, California, with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list to those addresses NOT marked "email preferred." An original paper copy and one electronic copy were mailed and emailed respectively to the Docket Office of the California Energy Commission.

CALIFORNIA ENERGY COMMISSION Attn: Docket No. 07-AFC-8 1516 Ninth Street, MS-4 Sacramento, CA 95814-5512 docket@energy.state.ca.us	Perry H. Fontana, QEP Vice President-Projects Ausra, Inc. 2585 East Bayshore Road Palo Alto, CA 94303 perry@ausra.com
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Mr. John A. Ruskovich 13084 Soda Lake Road Santa Margarita, CA 93453 agarnett@tcsn.com	Mr. Michael Strobridge 9450 Pronghorn Plains Road Santa Margarita, CA 93453 Mike_76@live.com

California Unions for Reliable Energy c/o Tanya Gulesserian Adams Broadwell Joseph & Cardozo 601 Gateway Boulevard, Suite 1000 South San Francisco, CA 94080 tgulesserian@adamsbroadwell.com	John Burch Traditional Council Lead Salinan Tribe 8315 Morro Road #202 Atascadero, CA 93422 salinantribe@aol.com
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Gary Fay Hearing Officer California Energy Commission 1516 Ninth Street Sacramento, CA 95814 Gfay@energy.state.ca.us	John Kessler Project Manager California Energy Commission 1516 Ninth Street Sacramento, CA 95814 jkessler@energy.state.ca.us
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Elena Miller Public Adviser California Energy Commission 1516 Ninth Street Sacramento, CA 95814 publicadviser@energy.state.ca.us	

I declare under penalty of perjury that the foregoing is true and correct. Executed at South San Francisco, CA this 8th day of April, 2009.

Bonnie Heeley

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

DOCKET
07-AFC-8
DATE DEC 29 2008
RECD. DEC 29 2008

December 29, 2008

Wendy Lee Bogdan
Downey Brand Attorneys LLP
621 Capitol Mall, 18th Floor
Sacramento, CA 95814

RE: Carrizo Energy Solar Farm (07-AFC-8)

Dear Ms. Bogdan:

Thank you for your letter of December 11, 2008, sent on behalf of your client, Ausra CA II, LLC (Ausra), requesting information regarding the proposed multi-agency wildlife corridor modeling process.

As I have not seen your name associated with this proceeding previously, it may be that you are not aware of the repeated efforts the California Energy Commission (Energy Commission) staff and the wildlife agencies have made to include your client in the proposed modeling process. Therefore, I'd like to take this opportunity to summarize for you how the corridor modeling process developed and the multiple opportunities your client has had, and continues to have, to participate.

On March 26, 2008, the California Department of Fish and Game (CDFG) submitted a letter to the Energy Commission regarding the Carrizo Energy Solar Farm project. See http://www.energy.ca.gov/sitingcases/carrizo/documents/intervenors/2008-03-27_DEPT_FISH+GAME_TN-45781.PDF. The letter was served on the Carrizo service list, including Perry H. Fontana, QEP, Vice President-Projects of Ausra, Inc., Angela Leiba, GISP, Senior Project Manager of URS Corporation, and Jane Luckhardt, Esq. of Downey Brand, and was publicly posted on the Energy Commission's Docket. The letter stated, among other things:

> The Project is proposed in an area which supports one of the highest concentrations of special status species in California, as well as uncommon native game populations for which the State has committed considerable effort and public funds to re-establish and manage. The site is also in an area identified as critical for the recovery of Federally listed species and is a crucial wildlife movement corridor. The biological studies do not adequately consider this setting. . . . Following are the primary reasons why we have determined the application information is incomplete: . . .
>
> - The biological impact analysis lacks a correct assessment of effects on wildlife movement.

- The cumulative impacts analysis does not consider impacts from specific, known, probable future projects. . . .

San Joaquin Kit Fox: The Project is at the south end of the corridor linking the Carrizo Plains Natural Area (now Carrizo Plains National Monument) to the satellite populations in the Salinas River and Pajaro River watersheds. The recovery plan identifies this corridor as essential to maintaining and recovering those populations and the species. The specified recovery action which applies to this site is as follows:

> *Protect and enhance corridors for movement of kit foxes through the Salinas-Pajaro Region and from the Salinas Valley to the Carrizo Plain and San Joaquin Valley.* (USFWS 1998).

The impact analysis and mitigation must consider the potential impacts to the corridor and corridor functions. The "Wildlife Corridors" section in the application does not recognize the kit fox corridor and mischaracterizes the site as an east-west corridor connecting the Temblor and Caliente mountain ranges. Potential corridor impacts to be evaluated should include, but not be limited to, loss of prey base and refugia for immigrating, emigrating, and dispersing individuals, reduced capacity for individuals to reside in the corridor, reduced genetic flow, increased predation resulting from impermeable fences (blocked escape routes), increased exposure to predation due to night lighting, increased exposure to traffic on the highway due to the impermeable fence, reduced corridor width, and increased animal/vehicle traffic collisions due to traffic increases. . . .

To comply with CESA permitting standards, the Department would have to conclude that kit fox impacts are fully mitigated. Corridor impacts and mitigation would have to be evaluated in a cumulative impact context, including quantified effects of the photovoltaic solar power installation proposed for the same vicinity.

On August 5, 2008, a public Data Response Workshop was held at which the wildlife corridor impact issue was discussed. The workshop was attended by numerous representatives of Ausra. At the workshop, Mr. David Hacker of CDFG discussed the use of corridor modeling to predict how animals move. Ms. Luckhardt stated that this was a cumulative concern, and that the county would be permitting the much larger photovoltaic projects proposed for the region. Energy Commission biological resources staff acknowledged the cumulative nature of the corridor concerns, and stated that the Energy Commission staff would be coordinating with the appropriate agencies to ensure that an appropriate analysis was completed. Mr. Hacker referred to the work of South Coast Wildlands as a model for the application of GIS-based tools to analyze the impacts of development and habitat change on wildlife corridors.

As a result of the above, a meeting was scheduled to arrange for a coordinated approach for the analysis of wildlife corridors through the project area. Invitations to the meeting were extended

to Mr. Fontana on behalf of Ausra and to principals of the other two solar projects proposed in the Carrizo Plain region, Optisolar, and SunPower. Ausra, declined to attend, as did SunPower and Optisolar, therefore the meeting took place on October 2nd, 2008 without them.

At this initial meeting, the involved agencies discussed a broad overview of the proposed solar projects and their potential impacts to biological resources. The corridor modeling approach developed by Mr. Paul Beier and others, as outlined at www.corridordesign.org was discussed. The applicability of the corridor modeling approach, and the use of kit fox, tule elk, and pronghorn as focal species was agreed upon. The group further agreed that the modeling effort would benefit from technical assistance from South Coast Wildlands, the leading organization in conducting corridor analyses in California. It is unfortunate that Ausra declined to attend, because Ausra's participation in this meeting would have been informative and helpful in addressing many of the concerns you raise in your letter.

On November 17, 2008, there was a public hearing on California Unions for Reliable Energy's (CURE's) motion to compel further responses from Ausra as to certain data requests. In response to a statement by Ausra counsel that Ausra had only heard of a corridor study, but been offered no opportunity to comment on its development, the Energy Commission's Project Manager for CESF, John Kessler, responded in relevant part as follows:

> MR. KESSLER: We want to be clear that the process, this habitat corridor, may be a new process to the Energy Commission, but it's one that we feel is relevant and necessary for this project in looking at the cumulative effects, direct and cumulative effects of this, as well as the two PV projects.
>
> There are other areas where this type of corridor modeling has been applied and successfully used. And we're bringing on board a specialist in that arena.
>
> . . . [W]e've made available to the parties and anyone who's requested it, or we've distributed copies to them, copies of previous studies and research, write-ups on this subject, just so they could get onboard with it.
>
> We've invited the applicant, as well as the two PV developers, to participate in this process. The first concept of that process was to hold it as a public meeting in the Carissa Plains. And all three applicants chose not to participate.
>
> So instead of that we held just an agency meeting in San Luis Obispo County --
>
> HEARING OFFICER FAY: Just a what meeting?
>
> MR. KESSLER: An agency meeting, --
>
> HEARING OFFICER FAY: Um-hum.

> MR. KESSLER: -- which included San Luis Obispo County, Fish and Game, Fish and Wildlife, and ourselves. And so we are still generating the protocol and the process that we will undertake, the scope of those studies. And as that information is developed we will make it available to all. But I don't think it's accurate to say that the applicant didn't have the opportunity to participate in this process.

Ms. Luckhardt acknowledged the accuracy of Mr. Kessler's comments regarding the invitation extended to Ausra, as follows:

> MS. LUCKHARDT: And I think there's a lot more to that story, as Mr. Kessler's well aware, in that, you know, we were going to participate, but for the other projects not being going to participate. And so we didn't feel it was appropriate to have the smallest of the three projects the only one present at a meeting of this sort where the impact is really being driven by the larger projects. So, you know, -- and I do understand Mr. Kessler gave us that opportunity. But we didn't feel that the opportunity was appropriate, given that the larger projects would not be in attendance at that event. . . .

On December 5, 2008, a telephone conference call was held among representatives of the Energy Commission, CDFG, the United States Fish and Wildlife Service, (USFWS), County of San Luis Obispo staff and South Coast Wildlands (SCW) concerning corridor modeling. The purpose of this teleconference was to initiate the model development in coordination with the agencies and the Energy Commission's newly hired consultant, SCW, and to establish data exchange channels from the agencies to SCW.

As you know, on December 15, 2008 a workshop was held near the project site. This workshop was particularly significant because participating representatives of the Energy Commission, CDFG, USFWS attended and were prepared to address any corridor modeling issues, including those set forth in your letter of December 11, 2008. The Energy Commission came with a handout containing the latest information about its proposed corridor analysis approach. This handout was provided to your client and its counsel. The transcript of that workshop is not yet available, but Energy Commission staff have advised me that it will demonstrate the fact that Ausra declined to participate in any detailed discussion of corridor modeling issues at the workshop. Given Ausra's decision not to participate in discussion about the corridor issue with Energy Commission staff or the wildlife agencies, I find it surprising that Ausra is "startled" about any resulting schedule slippage.

Please be advised that on January 7, 2009, the Energy Commission will be holding a web-based meeting at which corridor modeling issues will again be addressed and discussed. On December 24, 2008 we were informed that Ausra intends to participate in this upcoming meeting. We are hopeful that the developers of the other two solar projects proposed for the Carrizo area will also participate. This is probably the single most effective thing Ausra can do to expedite the project.

We would value Ausra's input into this important issue that many large solar-thermal projects may soon be required to address.

Your December 11, 2008 letter evidences a concern on the part of Ausra with exactly how and when the details of the corridor modeling plan will be developed. While some of the modeling steps associated with your questions are still under development, we have provided an attached document that lists your questions and provides responses to the extent currently possible.

Some of the questions you have posed about the timing of the corridor modeling analysis depend to a significant degree on the degree and timing of the participation and cooperation the Energy Commission receives from other involved parties, specifically including Ausra but also including the involved government agencies. As to such questions we are not yet able to provide a specific date when we believe the modeling will be complete. In general we can state that the current schedule listed on the Energy Commission website provides for the Final Staff Assessment to be completed by February or March 2009. Although that is an ambitious schedule, we hope that with Ausra's full cooperation and participation we can make that date. Therefore we again respectfully request that Ausra begin cooperatively participating in the corridor modeling process.

We look forward to working with Ausra, to efficiently process and complete the CESF Application for Certification proceeding.

Sincerely,

TERRENCE O'BRIEN
Deputy Director
Siting, Transmission and Environmental Protection Division

cc: Docket (07-AFC-8)
Proof of Service List
Perry Fontana, Ausra
Susan Jones, USFWS
Dave Hacker, CDFG
Mark D'Avignon, U.S. Army Corps of Engineers
John McKenzie, SLO County
John Kessler
Darren Bouton, Deputy Cabinet Secretary, Governor's Office
Jane Luckhardt
Caryn Holmes
Michael Doughton

ATTACHMENT A
RESPONSE TO QUESTIONS

Question 1 - Prior discussions and decisions between and by the Energy Commission, USFWS and CDFG regarding the wildlife corridor modeling process, as well as an estimate of when future discussions will be held and the subject of those discussions.

Response 1 – Prior discussions regarding the wildlife corridor study were as follows:

1. August 5, 2008 – Public Data Response and Issue Resolution Workshop held in the Carrizo Plain for the CESF Project, at which time. Mr. David Hacker of CDFG identified the need for corridor modeling;
2. October 2, 2008 – Initial meeting of San Luis Obispo County, CDFG, the Energy Commission and USFWS at the county offices to lay groundwork for cooperatively developing the model; All 3 solar developers declined to participate.
3. December 5, 2008 – Teleconference between the above listed agencies and SCW to identify information needs and establish data exchanges to enable setup for the modeling; (This was the earliest opportunity to teleconference following the Energy Commission's contract procurement process that established SCW as the modeling consultant.)
4. December 15, 2008 – Public Preliminary Staff Assessment (PSA) Workshop for the CESF Project held in the Carrizo Plain to discuss comments on the PSA, including potential wildlife mitigation measures; The draft modeling scope of work was distributed for review and comment (*Draft Habitat Connectivity Planning for Selected Focal Species in the Carrizo Plain*). At this meeting, CEC staff encouraged the three solar applicants to participate in the corridor modeling process, hoping that the draft scope of work would encourage input and alleviate earlier concerns that the process had not yet been described.

Question 2 –The study's commencement and estimated completion date, as well as the basis used to calculate those dates. USFWS indicated that the process will be complete in January of 2009, but we would like confirmation from the other agencies as to their estimate of the completion date and the basis for the estimate.

Response 2 – Based on the chronology above, the first meeting commencing the corridor study was held on October 2, 2008. Energy Commission staff hopes to complete the initial modeling by January 30, 2009, with possible additional analysis carrying into February to explore mitigation options. Because CEC staff has no prior experience with this type of corridor modeling, we are unable to be absolute about schedule. Another factor driving schedule will be the level of cooperation extended by the three solar applicants.

Question 3 – Any assumptions held by the agencies regarding the project and the other two solar development projects, which assumptions will be used to provide inputs for the modeling.

Response 3 – Energy Commission staff believes that while specific assumptions are not currently available, some general principles can be highlighted as follows:

1. The three proposed solar developments will be evaluated on a CESF only basis to establish the project's direct impacts, and then with all three projects combined to analyze the CESF's contribution to cumulative impacts.
2. The analysis approach noted above will provide a basis to apportion the mitigation according to the individual project's contribution to direct and cumulative impacts.
3. The mitigation approach will include consideration of a potential suite of measures.

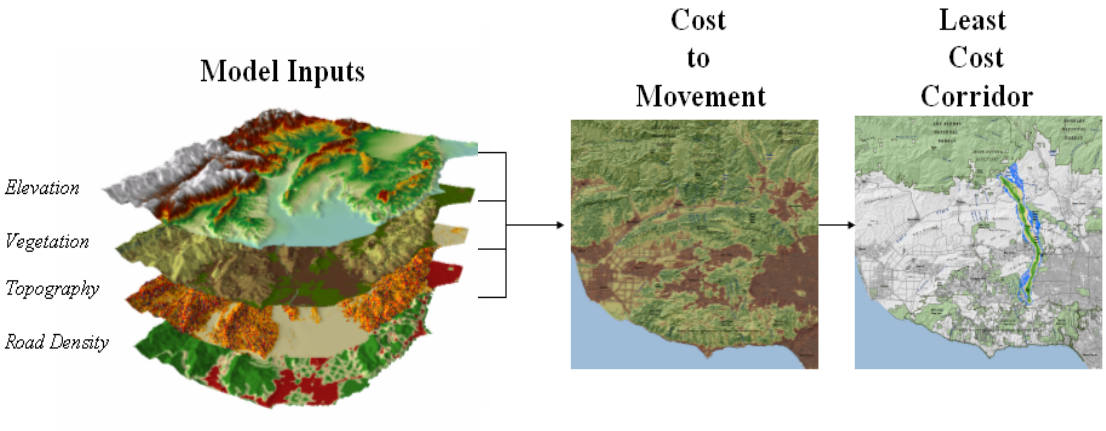
Question 4 - The model's methodology, landscape context, alternative routes in the vicinity to be assessed, as well as historical use of the model relative to agricultural landscapes.

Response 4 – We will first evaluate baseline conditions. Then the project footprints of each of the three proposed solar projects will be evaluated individually and collectively to assess cumulative impacts. A description of the approach developed by SCW follows:

Task 1: Model Baseline Conditions of Habitat Connectivity in the Carrizo Plain for Select Focal Species.

Step 1: Landscape Permeability Analysis & Coordination with Experts

Landscape permeability analysis is a GIS technique that models the relative cost for a species to move between core areas based on how each species is affected by habitat characteristics, such as slope, elevation, vegetation composition, and road density. This analysis identifies a least-cost corridor, or the best potential route for each species between targeted core areas (Walker and Craighead 1997, Craighead et al. 2001, Singleton et al. 2002). The purpose of the analysis is to identify land areas, which would best accommodate select focal species living in or moving through the linkage (Beier et al. 2005).



Permeability Model Inputs: elevation, vegetation, topography, and road density. Landscape permeability analysis models the relative cost for a species to move between core areas based on how each species is affected by various habitat characteristics.

The relative cost of travel will be assigned for each species based upon its ease of movement through a suite of landscape characteristics (vegetation type, road density, and topographic features). The

following spatial data layers will be assembled at 30-m resolution: vegetation, roads, elevation, and topographic features. If necessary, data layers (i.e., vegetation, roads) will be updated using recent 1-m resolution aerial photographs prior to conducting the analyses. We derived four topographic classes from elevation and slope models: canyon bottoms, ridgelines, flats, or slopes. Road density will be measured as kilometers of paved road per square kilometer. Within each data layer, we will have experts rank all categories between 1 (preferred) and 10 (avoided) based on focal species preferences as determined from available literature and expert opinion regarding how movement is facilitated or hindered by natural and urban landscape characteristics. Each input category will be ranked and weighted, such that: (Vegetation * w%) + (Road Density * x%) + (Topography * y%) + (Elevation * z%) = Cost to Movement, where w + x + y + z = 100%.

Weighting allows the model to capture variation in the influence of each input (vegetation, road density, topography, elevation) on focal species movements. A unique cost surface is thus developed for each species. A corridor function is then performed to generate a data layer showing the relative degree of permeability between core areas.

Running the permeability analysis requires identifying the endpoints to be connected. Usually, these targeted endpoints are selected as medium to highly suitable habitat within protected core habitat areas (e.g., National Forests, State Parks) that needed to be connected through currently unprotected lands. However, since habitat areas to the north of the proposed project are not currently protected, we will need to define a targeted core habitat area in order to give the model broad latitude in interpreting functional corridors across the entire study area.

For each focal species, the most permeable area of the study window will be designated as the least-cost corridor. The least-cost corridor output for all focal species will then be combined to generate a Least Cost Union. The biological significance of this Union can best be described as the zone within which all three modeled species would encounter the least energy expenditure (i.e., preferred travel route) and the most favorable habitat as they move between targeted areas. The output does not identify barriers, mortality risks, dispersal limitations or other biologically significant processes that could prevent a species from successfully reaching a core area. Rather, it identifies the best zone available for focal species movement based on the data layers used in the analyses.

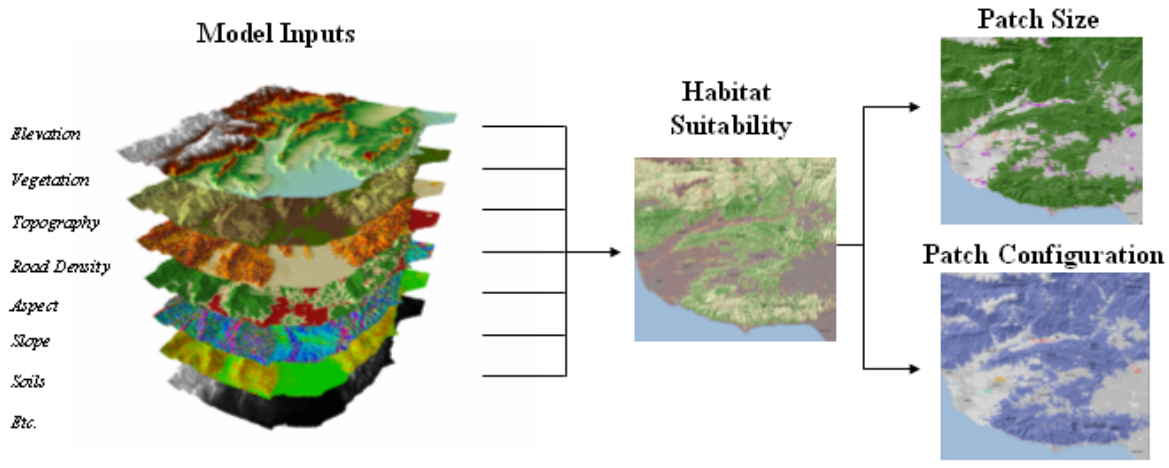
We will coordinate with biologists in the region who are considered experts on the selected focal species to rank the criteria for the analyses. Clevenger et al. (2002. Expert-based models for identifying linkages. Conservation Biology 16:503-514) found that expert-based models that did not include a literature review performed significantly worse than literature-based expert models. Therefore, we ask each participating expert to assemble all papers on habitat selection by the focal species or closely-related species. This is important because we want to document how our models were parameterized. Careful use of, and citation of, the literature will give us a more credible product, and one that is more likely to influence conservation decisions.

Step 2: Habitat Suitability, Patch Size & Configuration Analyses

Although the Least-Cost Union identifies the best zone available for movement based on the data layers used in the analyses, it does not address whether suitable habitat in the Union occurs in large enough patches to support viable populations and whether these patches are close enough together to allow for inter-patch dispersal. We therefore conduct patch size and configuration analyses for all focal species and adjust the boundaries of the Least Cost Union where necessary to enhance the likelihood of movement.

A habitat suitability model forms the basis of the patch size and configuration analyses. Habitat suitability models will be developed for each focal species using the literature and expert opinion. Spatial data layers used in the analysis will vary by species. We will generate a spectrum of suitability scores that will be divided into five classes using natural breaks: low, low to medium, medium, medium to high, or high. Suitable habitat will be identified as all land that scored medium, medium to high, or high.

To identify areas of suitable habitat that are large enough to provide a significant resource for individuals in the linkage, we will conduct a patch size analysis. The size of all suitable habitat patches in the planning area will be identified and marked as potential cores, patches, or less than a patch. *Potential core areas* will be defined as the amount of contiguous suitable habitat necessary to sustain at least 50 individuals. A *patch* will be defined as the area of contiguous suitable habitat needed to support at least one male and one female, but less than the potential core area. Potential cores are probably capable of supporting the species for several generations (although with erosion of genetic material if isolated). Patches can support at least one breeding pair of animals (perhaps more if home ranges overlap greatly) and are probably useful to the species if the patch can be linked via dispersal to other patches and core areas.



Model Inputs to Patch Size and Configuration Analyses vary by species. Patch size delineates cores, patches, and stepping-stones of potential habitat. Patch configuration evaluates whether suitable habitat patches and cores are within each species dispersal distance.

To determine whether the distribution of suitable habitat in the linkage supports meta-population processes and allows species to disperse among patches and core areas, we will conduct a configuration analysis to identify which patches and core areas were functionally isolated by distances too great for the focal species to traverse. Because the majority of methods used to document dispersal distance underestimate the true value (LaHaye et al. 2001), we assumed each species can disperse twice as far as the longest documented dispersal distance. This assumption is conservative in the sense that it retains habitat patches as potentially important to dispersal for a species even if it may appear to be isolated based on known dispersal distances.

For each species we compare the configuration and extent of potential cores and patches, relative to the species dispersal ability, to evaluate whether the Least Cost Union will likely serve the species. If necessary, we add additional habitat to help ensure that the linkage provides sufficient live-in or "move-through" habitat for the species' needs.

The analyses described above will be performed for the selected focal species to determine baseline conditions.

Task 2: Evaluate Three Proposed Solar Projects in Relation to Baseline Conditions to Measure and Illustrate the Impacts to Connectivity

To quantify impacts of the three proposed solar projects we will evaluate the configuration and extent of each project as proposed in relation to baseline conditions for the selected focal species to measure and illustrate impacts to connectivity, and to determine each project's proportion of the cumulative impacts. We will provide maps and spatially-explicit descriptions of existing and proposed impediments to wildlife movement through the assessment area.

Task 3: Model Proposed Mitigation Strategies to Evaluate their Effectiveness to Offset Habitat Loss and Fragmentation

We will model proposed mitigation strategies to evaluate their effectiveness to offset habitat loss and fragmentation caused by the proposed solar projects. We will provide a description and mapping of alternative mitigation strategies to maintain adequate buffer width and habitat connectivity, with a recommended strategy for conservation action.

Task 4: Draft Report and Peer Review

We will coordinate with the scientists who provided the rankings for each focal species to review the results of the model output for scientific accuracy. Draft reports will be circulated to all project partners and to our Science Advisory Panel to review the conclusions and provide comments on the report.

Task 5: Final Report

The final report will incorporate comments from project partners and peer reviewers. We will provide a digital version of the final document, along with one hard copy.

Question 5 – Any basis that supports using the model, assumptions, inputs, and methodology to predict the Project's impacts on highly disturbed agricultural land located within a landscape dominated by agriculture as opposed to landscapes with less disturbed land.

Response 5 – The extent of the analysis window will be at the landscape scale, far beyond the boundaries of the three proposed solar developments, thus encompassing a diversity of habitat types in addition to agricultural lands. However, it is not likely that all agricultural lands will be ranked the same for each focal species. Some types of cultivated lands may provide forage for pronghorn, while elk may prefer areas that are ungrazed by cattle. Thus, we will differentiate between the various types of agricultural land in the vegetation/land cover data input.

Question 6 – The inputs that will be used for the model and how they will be weighted (land cover, focal species, elevation/topography, drainages, etc.).

Response 6 – The primary model inputs for the landscape permeability analysis are vegetation/land cover, road density, topography, and elevation. Species experts will rank and weight the criteria for each of the selected focal species (e.g., Dr. Brian Cypher for kit fox).

The primary model inputs for habitat suitability will vary by focal species and will be based on the literature and expert opinion.

The primary model input for the patch size analysis is home range size of each of the selected focal species.

The primary model input for the patch configuration analysis is dispersal distance of each of the selected focal species.

Questions 7 – How agricultural lands will be weighted against other lands.

Response 7 – The factors that are weighted for the landscape permeability analysis are vegetation/land cover, road density, elevation, and topography. Each vegetation or land cover type will be ranked by a species expert on a scale of 1 to 10 with 1 being best and 10 being worst. As mentioned above, some of the selected focal species may utilize some types of cultivated lands, which would likely get a lower score.

Question 8 – How the model will prioritize public and private property?

Response 8 – The models are all based on biology irrespective of public versus private property.

Question 9 – The expected outputs of the model.

Response 9 – Please refer to the reports for the South Coast Missing Linkages project on our website at http://www.scwildlands.org/reports.aspx

Question 10 – Who will be performing the modeling task?

Response 10 – South Coast Wildlands, with Kristeen Penrod acting as the principal consultant, will be performing the modeling in coordination with review and input from the agencies, applicants and public along various stages of the process. In addition, Ester Rubin and Wayne Spencer of the Conservation Biology Institute would serve in an advisory role to the modeling effort.

Question 11 – Whether the model has ever been applied to a landscaped dominated by agricultural lands.

Response 11 – The model has previously been applied to landscapes that have an agricultural component (e.g., Tehachapi Connection, Santa Ana-Palomar).

Question 12 – URS provided a wildlife movement figure in their cumulative assessment – how the model output may differ from what has already been assessed.

Response 12 – We are not currently at a stage where we can compare the model's output to URS's wildlife movement figure and assessment.

Question 13 – How the model may differ from what has already been assessed in the USFWS Recovery Plan for San Joaquin Valley upland species.

Response 13 – The model is not expected to differ with the general principles established in the USFWS Recovery Plan for San Joaquin Valley upland species, but instead will serve to refine in greater detail the principles for the three focal species of this study.

Ausra has been invited to participate in the upcoming web-based workshop scheduled for January 7, 2009 at which such questions may be further addressed.

State of California
Department of Fish and Game

Memorandum

DOCKET
07-AFC-8
DATE MAR 26 2008
RECD. MAR 26 2008

To: Mary Dyas
California Energy Commission
Environmental Office, Siting Division
1516 Ninth Street, MS-40
Sacramento, California 95814

Date: March 26, 2008

From: W. E. Loudermilk, Regional Manager **Original initialed by Jeff Single for W. E. Loudermilk**
Department of Fish and Game – Central Region

Subject: Review of Carrizo Energy Solar Farm Project Application for Certification

The Department of Fish and Game has reviewed the information provided by Ausra CA II, LLC (applicant) in support of the Carrizo Energy Solar Farm (CESF) Project's Application for Certification. The Department reviewed the application contents to assist in the California Energy Commission's (Commission) Preliminary Assessment for the Project and to determine whether the application contains sufficient information to proceed with impact analysis. This memorandum further intends to identify the requirements of applicable State laws and regulations that the Department administers. It is our understanding that the Warren-Alquist Act (Public Resources Code Section 25000 et seq.) may exempt the Project from State permits which would normally be required, however, if this exemption does in fact apply, the Commission will include enforceable conditions of approval such that the Project will conform to the requirements of applicable State laws. It is important to note that the Department is currently evaluating the applicability of the Warren-Alquist Act and the Department's regulatory authority under the California Endangered Species Act (CESA); a decision and guidance is forthcoming. Similarly, it is our understanding that the Preliminary Assessment process is a California Environmental Quality Act (CEQA) equivalent. As such, this letter approaches the Project from the Department's CEQA Trustee and Responsible Agency perspective, while recognizing that a parallel process may actually occur.

Project implementation would result in construction of approximately 195 Compact Linear Fresnel Reflector solar concentrating lines and associated steam drums, steam turbine generators, air-cooled condensers, and infrastructure, producing up to a nominal 177 megawatts net. The CESF site would encompass approximately 640 acres in Section 28, Township 29 South, Range 18 East, in the California Valley and La Panza NE United States Geological Survey (USGS) 7.5 minute quadrangle maps (Quad), adjacent to California State Route 58 (SR-58). The 640-acre site would be fenced. An additional 380-acre "construction laydown area" would be located entirely in Section 33, Township 29 South, Range 18 East, in the California Valley Quad, which is directly south of the solar farm site, and across SR-58. It is our understanding that Section 33 would also be utilized as an employee parking area during construction and operation of the facility.

CEQA and Department of Fish and Game (DFG) Code

The Department is a Trustee Agency with the responsibility under CEQA for commenting on projects that could impact plant and wildlife resources. Pursuant to Fish and Game Code Section 1802, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. As a Trustee Agency for fish and wildlife resources, the Department is responsible for providing, as available, biological expertise to review and comment on environmental documents and impacts arising from project activities, as those terms are used under CEQA.

The Department is a Responsible Agency when a subsequent permit or other type of discretionary approval is required from the Department, such as an Incidental Take Permit, pursuant to CESA, or a Streambed Alteration Agreement issued under Fish and Game Code Section 1600 et seq. Both actions by the Department would be considered "projects" (CEQA Guidelines Section15378) and would be subject to CEQA.

Pursuant to Fish and Game Code Section 1600 et seq., the Department has regulatory authority with regard to activities occurring in streams and/or lakes that could adversely affect any fish or wildlife resource. Placing temporary crossings in the creek present in Section 33 would normally be conducted under a 1600 Agreement, and the Project proponent would be required to submit a Stream Alteration Notification to the Department for this Project. We encourage the applicant to avoid impacting the streambed in this area by reconfiguring the laydown area to avoid use of the area south and west of the drainage; or, alternatively, by placing temporary structures, such as railroad flatcars, to span the small creek channel and avoid impacts to aquatic and semi-aquatic species which may utilize the creek, including western spadefoot toad (*Spea hammondii*), which is a State Species of Special Concern.

The biological studies found that this Project would likely result in "take" of the State threatened and Federally endangered San Joaquin kit fox (*Vulpes macrotic mutica*), and depending on the outcome of other studies, may affect other listed species. Pursuant to Fish and Game Code Section 2081 (CESA), an Incidental Take Permit is required for any otherwise lawful activities which could result in "take" (as defined by Section 86 of the Fish and Game Code) of any species listed under CESA. The Department typically relies on the Lead Agency's CEQA compliance to make our own findings. For the Lead Agency's CEQA document to suffice for permit/agreement issuance, it must fully describe the potential Project-related impacts to stream/riparian resources and listed species, as well as commit to measures to avoid, minimize, and mitigate impacts to these resources. Impacts to State-listed species must be "fully mitigated" in order to comply with CESA, which is a much more stringent standard than the "mitigate to less than significant level" criteria of CEQA. If a CEQA document does not contain this information, the Department may need to act as a Lead CEQA Agency and complete a subsequent CEQA document. This could significantly delay permit issuance and, subsequently, Project implementation. In addition, CEQA grants Responsible Agencies authority to require changes in a project to lessen or avoid effects of that part of the project which the agency will be called on to approve, such as the proposed bridge and channel widening (CEQA Guidelines Section 15041).

California Endangered Species Act Compliance: The Department has regulatory authority over projects that could result in the "take" of any species listed by the State as threatened or endangered, pursuant to Fish and Game Code Section 2081. If the Project could result in the "take" of any species listed as threatened or endangered under CESA, the Department may need to issue an Incidental Take Permit for the Project. CEQA requires a Mandatory Finding of Significance if a project is likely to substantially impact threatened or endangered species (Sections 21001{c}, 21083, Guidelines Sections 15380, 15064, 15065). Significant impacts must be avoided or mitigated to less than significant levels, unless the CEQA Lead Agency makes and supports a Statement of Overriding Considerations (SOC). Be advised that CESA does not allow issuance of "take" authorization if there are significant unmitigated impacts to listed species or utilization of an SOC regarding listed species.

The CEQA Lead Agency's SOC does not eliminate the Project proponent's obligation to comply with Fish and Game Code Section 2081, under which impacts to State threatened and endangered species must be minimized and fully mitigated. In other words, compliance with CESA does not automatically occur based on local agency project approvals or CEQA compliance; consultation with the Department is warranted to ensure that Project implementation does not result in unauthorized "take" of a State-listed species.

Incidental "take" authority is required prior to engaging in "take" of any plant or animal species listed under CESA. Plants listed as threatened or endangered under CESA cannot be addressed by methods described in the Native Plant Protection Act. No direct or indirect disturbance, including transplantation, may legally occur to State-listed species prior to the applicant obtaining incidental "take" authority in the form of an Incidental Take Permit.

The Project applicant will need to 1) provide an analysis of the impact of the proposed taking; 2) provide an analysis of whether issuance of an Incidental Take Permit would jeopardize the continued existence of kit fox and any other State-listed species for which "take" coverage is being sought; 3) propose measures that minimize and fully mitigate the impacts of the proposed taking; 4) provide a proposed plan to monitor compliance with the minimization and mitigation measures; and 5) provide a description of the funding source and level of funding available for implementation of the minimization and mitigation measures. The Department can provide a complete list of required Incidental Take Permit application components upon request.

Analysis

The Project is proposed in an area which supports one of the highest concentrations of special status species in California, as well as uncommon native game populations for which the State has committed considerable effort and public funds to re-establish and manage. The site is also in an area identified as critical for the recovery of Federally listed species and is a crucial wildlife movement corridor. The biological studies do not adequately consider this setting. In summary, the Department has determined that the biological inventory work is incomplete and provides insufficient information to determine the impacts, the significance of the impacts, and the mitigation required to fully mitigate the impacts. Following are the primary reasons why we have determined the application information is incomplete:

- A botanical inventory was not completed.
- The blunt-nosed leopard lizard survey was incomplete and did not follow protocol.
- No conclusive surveys were performed to identify small mammal species occupying the site.
- The biological impact analysis lacks a correct assessment of effects on wildlife movement.
- The cumulative impacts analysis does not consider impacts from specific, known, probable future projects.
- At least ten special status species that are known to utilize the site or that most likely utilize the site were not addressed.
- Project details which are mentioned in the text are not sited on maps, and/or impacts of those portions of the project are not analyzed in the document, in particular, parking areas and detention basins.

The following paragraphs discuss these items and several other essential details which are lacking.

Botanical Inventory: Botanical surveys should follow guidelines developed by the Department (CDFG, 2000) and the United States Fish and Wildlife Service (USFWS) (USFWS, 2000). Botanical surveys should cover the entire property and should be timed appropriately to detect all species which may occur on the property before impact analysis occurs. Use of reference sites is recommended, particularly for seasonably variable, often difficult to detect species. A site's disturbed nature does not preclude it from supporting special status plant species. This is especially true of areas such as this, where intensive agriculture has historically been inconsistent, allowing native plant and animal species to persist in a dryland grain crop and grazing lands matrix.

The botanical surveys did not follow either protocol referenced above. These protocols are the standard for impact assessment in California and were recommended to the applicant in May 2007 by Deborah Hillyard of the Department; the applicant was further advised that surveys conducted in 2007 would not likely not be sufficient to determine the presence or absence of special status plant species, given the below-average rainfall that occurred during 2007; many areas had little to no germination of annual plant species. In addition, surveys completed thus far were conducted on two consecutive days in April, which even in a good rainfall year would not capture the blooming seasons of many special-status plant species which occur in the vicinity. In addition, plants were not identified to species and subspecies levels. *Eriogonum sp., Plagiobothrys sp.,* and *Cryptantha sp.* were all identified only to the generic level. All of these genera contain special status taxa which could occur on-site. No reference sites were used for any rare plants to ensure that they were detectable during the survey period, which would be especially important in 2007 since it was an especially poor year for plant surveys in this area.

Blunt-Nosed Leopard Lizard (BNLL): Volume 1 of the application states that eight surveys for the State endangered and Fully Protected and Federally Endangered blunt-nosed leopard lizard (*Gambelia sila*) were completed in Section 28 and five in Section 33. Based on the data sheets

provided by URS, ten adult surveys were performed in Section 28 and five were performed in Section 33. Table 5.6.2 is misleading because it lists 14 adult survey days but does not communicate that each day apparently covered only portions of the Project site. The table also lists surveys on June 12, 18, and 20, which do not have supporting data sheets. The discrepancies between the application's discussion, Table 5.6.2, and the data sheets should be clarified. Regardless of which is correct, it appears that the survey protocol was not followed. The surveys deviated from the protocol (CDFG 2004) in the following manner:

1. The required 12 adult surveys were not completed for any portion of the site.
2. The required Elkhorn Plain voucher/reference site was not used to determine whether lizards were detectable during surveys.
3. Level II survey personnel were not present on June 27, 2007, and August 20, 2007
4. The adult season surveys exceeded the protocol limit of ten surveys per 30-day period and four surveys per 7-day period

The application generally relies more on characterizing the site as highly disturbed, rather than providing defensible survey data, to rule out species' presence. According to the data sheets, BNLL adult surveys were completed in Section 28 between June 15 and July 5, and in Section 28 between July 9 and July 13. These surveys were performed at the end of the adult survey season when lizards in the Carrizo Plain area are typically the least detectable, even in good survey years. Information provided to the applicant by Dr. David Germano indicated that the dry winter of 2006-2007 resulted in poor survey results elsewhere in 2007 and that surveys in 2007 may not detect the species (letter to Wesley Rhodehamel, Live Oak Associates, June 9 2007).

Whiptails (*Aspidoscelis tigris*) were observed during the surveys. This species is usually found inhabiting the same habitat types as BNLL in the California Valley/Carrizo Plain area. This observation indicates that historic land uses have not precluded those species which have similar habitat requirements to BNLL (e.g., open foraging ground, underground refugia, and invertebrate and smaller lizard prey base).

Based on the limited survey effort, poor survey conditions, and deviation from Department survey protocol, the Department does not concur that the survey effort was adequate to detect presence of this species within the Project area for the previously stated reasons. Because the BNLL is Fully Protected and therefore no "take," incidental or otherwise, can be authorized by the Department (or any other entity), protocol-level surveys must be conducted prior to any ground-disturbing activities, in all areas of suitable habitat. Suitable habitat includes all grassland and shrub scrub habitat that contains required habitat elements, such as small mammal burrows. These surveys, the parameters of which were designed to optimize detectability, must be conducted to reasonably assure the Department that "take" of this Fully Protected species will not occur as a result of disturbance associated with Project implementation. In the event that this species is detected during protocol-level surveys or during incidental observations, consultation with the Department is warranted to discuss how to implement the Project and avoid "take." Ground-disturbing activities must be avoided in all areas occupied by BNLL.

Birds: The application lacks discussion of potential impacts to avifauna within the facility. Specifically, the Department recommends an analysis of whether the extensive guy wire system, which supports the water lines above the reflectors, presents a threat to raptors and other large birds which are likely to fly into the site below the 56-foot tall water lines. The impact analysis should also determine whether the concentrated light and heat poses a risk to birds that would fly between the reflectors and water lines. If monitoring data are not available from similar facilities, then we recommend a predictive analysis that quantifies the light and heat levels that birds would encounter. If it appears that this could result in an adverse impact, then we recommend developing an adaptive management program, designed to avoid impacts to birds, to be approved by the Department. It is important to note that the Fish and Game Code protects birds, their eggs, and nests including: Sections 3503 (regarding unlawful "take," possession or needless destruction of the nest or eggs of any bird), 3503.5 (regarding the "take," possession or destruction of any birds-of-prey or their nests or eggs), and 3513 (regarding unlawful "take" of any migratory nongame bird). These Fish and Game Code Sections do not allow for "take" nor is there a mechanism (permitting process) to allow for "take" unless a species is also listed under CESA. As a result, the Project and associated conditions of approval must include measures that prevent "take" of birds.

San Joaquin Kit Fox: The Project is at the south end of the corridor linking the Carrizo Plains Natural Area (now Carrizo Plains National Monument) to the satellite populations in the Salinas River and Pajaro River watersheds. The recovery plan identifies this corridor as essential to maintaining and recovering those populations and the species. The specified recovery action which applies to this site is as follows:

> *Protect and enhance corridors for movement of kit foxes through the Salinas-Pajaro Region and from the Salinas Valley to the Carrizo Plain and San Joaquin Valley.* (USFWS 1998).

The impact analysis and mitigation must consider the potential impacts to the corridor and corridor functions. The "Wildlife Corridors" section in the application does not recognize the kit fox corridor and mischaracterizes the site as an east-west corridor connecting the Temblor and Caliente mountain ranges. Potential corridor impacts to be evaluated should include, but not be limited to, loss of prey base and refugia for immigrating, emigrating, and dispersing individuals, reduced capacity for individuals to reside in the corridor, reduced genetic flow, increased predation resulting from impermeable fences (blocked escape routes), increased exposure to predation due to night lighting, increased exposure to traffic on the highway due to the impermeable fence, reduced corridor width, and increased animal/vehicle traffic collisions due to traffic increases.

The application characterizes the kit fox habitat as low-quality and recommends a 1:1 mitigation ratio. Based on past habitat evaluations prepared for the County of San Luis Obispo in this vicinity, the County and the Department have concluded that projects of *less than 40 acres* in this area require a 4:1 ratio. Due to the potential for substantial direct impacts (over 1,000 acres), indirect impacts, habitat fragmentation, and the critical location identified as essential to the species' recovery, the mitigation ratio would likely be higher than 4:1 to fully mitigate the habitat loss. Habitat of equal or greater biological value would be required for off-site mitigation.

Preservation or conservation bank credits may offset the direct habitat loss, but would not likely mitigate the habitat connectivity impacts (or offset similar impacts to the other species discussed in this letter). All opportunities to maintain habitat connectivity though the site should be explored. Analysis may find that on-site actions are infeasible or do not address the impacts. Actions which preserve and enhance the corridor, such as purchase and management of adjacent parcels, might be required to fully mitigate the corridor degradation. To comply with CESA permitting standards, the Department would have to conclude that kit fox impacts are fully mitigated. Corridor impacts and mitigation would have to be evaluated in a cumulative impact context, including quantified effects of the photovoltaic solar power installation proposed for the same vicinity.

Pronghorn: The application characterizes the pronghorn (*Antilocapra americana*) habitat losses and habitat connectivity effects as insignificant. It is the Department's opinion that the Project has the potential to substantially restrict pronghorn movement, reduce pronghorn habitat, and threaten this population's viability.

The Department's bi-annual aerial counts have established that the specific pronghorn group which inhabits the northern California Valley, where the Project is proposed, frequently utilizes the Project site and crosses SR-58 at or near the Project site. This area has the fewest buildings and cross-fences near the highway, making it the most likely highway crossing area within this group's range. For this group to remain viable, free movement across the highway and within its range is essential to access seasonably variable water and food sources. Maintaining connectivity between this group, the Carrizo Plain National Monument groups, and the Cholame Valley group will be essential to maintaining the overall San Luis Obispo County pronghorn population. The fact that the affected group so regularly crosses the highway and its associated fences speaks to its requirement to access all of its territory to obtain necessary resources; pronghorn road avoidance behaviors and difficulties in crossing fences are well documented in the literature. The Project would create a substantial, permanent, impermeable barrier for pronghorn at the highway and within the core of one group's home range. It would further degrade connectivity between all of the pronghorn groups in San Luis Obispo County.

Loss of foraging area and habitat connectivity would extend well beyond the Project footprint. Pronghorn are inherently wary of human activity and structures. Light, noise, buildings, reflectors, and human activity would likely cause pronghorn to avoid the Project area during and after construction by a wide margin, rendering much of the area surrounding the site unusable. Increased traffic on SR-58 would also reduce the crossing opportunities and increase the road kill risk for this diurnal species.

The proposed impermeable fencing is also likely to inhibit fawns and adults during pursuits, thereby increasing coyote predation. This is a known effect on pronghorn of livestock fencing and would be even greater with the proposed chain-link fence.

We recommend that the impact analysis consider an additional buffer, supported by literature on pronghorn behavior, around the Project site as permanently unusable for pronghorn. Then the impact analysis should assess the viability of this population considering the population size, recruitment rates, existing and proposed land uses (cumulative effects), forage and fawning

opportunities, watering sites, traffic increases, and the Project's direct and indirect habitat impacts. The Department can provide bi-annual herd counts, Global Positioning System (GPS) locations, sex ratios, and fawn count data.

Tule Elk: The application characterizes the tule elk (*Cervus elaphus*) habitat losses and habitat connectivity effects as insignificant. The Project would permanently displace a square mile of habitat, reducing the area's capacity to support tule elk. Direct impacts, cumulative habitat losses, and habitat connectivity impacts should be addressed as discussed above for pronghorn.

Pallid Bat: The application states that no pallid bat (*Antrozous pallidus)* a State Species of Special Concern roost sites were found on-site. The application and impact assessment should also address the permanent loss of one square mile of foraging habitat. Pallid bats forage mostly in grasslands and agricultural areas, such as those which occur within the Project site.

Water Use: The application documents a proposed substantial increase in ground water use compared to existing conditions. The impact analysis should address how this substantial increase would affect the ground water basin and biological resources. For example, would this affect watering sites for pronghorn and tule elk? Would drawdown increase percolation/infiltration rates and therefore decrease runoff, which could affect the hydroperiod of surface water bodies such as nearby vernal pools and Soda Lake? Is there a risk of subsidence on- or off-site?

Western Spadefoot Toad: The applicant notes that the California Natural Diversity Database (CNDDB) contains a record of this species breeding in a small drainage near the Project and states that the Project site is unsuitable habitat. The CNDDB record is from the same creek which crosses the construction laydown area. In the Project area, that creek appears to provide seasonal pools suitable for breeding, and the affected uplands are suitable for burrowing. Surveys for spadefoot toad should be completed for this Project. At a minimum, the applicant should search for spadefoot larvae during the appropriate season to determine potential impacts to breeding sites. The impact analysis should also evaluate the permanent effects on burrowing opportunities on Section 28. Soil compaction in the proposed construction laydown area and/or future use as a parking area may reduce future burrowing potential and directly affect toads which are already burrowed on-site.

Small Mammals: The application states that the site is unlikely to support Tulare grassphopper mouse (*Onychomus torridus tularensis)*, a State Species of Special Concern; the State and Federally endangered Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*); the State and Federally endangered giant kangaroo rat (*D.ingens*); and the State threatened San Joaquin antelope squirrel (*Ammospermophilus nelsoni*). With the exception of Tipton kangaroo rat, the site is suitable habitat for all of these species, as well as for short-nosed kangaroo rat (*Dipodomys nitratoides brevinasus)* which is a State Species of Special Concern, which was not addressed. "Mice" burrows were observed on-site, but no trapping was performed to determine which small mammal species were present. Due to the potential for several special status small mammal species to occur on-site, the Department recommends small mammal trapping and focused San Joaquin antelope squirrel surveys. This will determine which species are using the

burrows observed on-site. The applicant should prepare a small mammal trapping proposal for Department approval. The proposal should include at least four consecutive nights of trapping by permitted individuals, and trap density and placement should be sufficient to detect presence of all nocturnal species discussed herein across the entire Project site, including the temporary impact areas. Focused surveys for San Joaquin antelope squirrel should coincide with their most active season, April 1 to September 30, and should be conducted only when air temperatures are between 20-30 C (68-86 F). Surveys should be conducted using daytime line transects with 10 to 30 meter spacing.

Pesticides, Herbicides, and Other Constituents of Concern: The application provides no information about how vegetation and burrowing animals would be controlled on-site. The impact analysis should disclose the anticipated use of herbicides and pesticides, compare the use to current levels on-site, assess the potential for these to affect native species (including all species discussed in this letter and the application), and assess the potential for such materials to migrate off-site via runoff, wind, and animals.

Information about the chemicals which will be used to clean the reflectors should also be included. The impact analysis should include the parameters mentioned above.

California Condor: The Project site lies within the State and Federally endangered and Fully Protected California condor (*Gymnogyps californianus*) range. The application states that the Project would not affect foraging habitat or roost sites. Condors foraged in California Valley following releases in the 1990s (Jesse Grantham, US Fish and Wildlife Service Condor Recovery Program, personal communication). Therefore, California Valley, with its herds of cattle, pronghorn, and elk as carrion sources, should be considered foraging habitat. Condors are likely to resume foraging in this vicinity in the future when their feeding sites are less controlled through the recovery program. Like the BNLL, this species is Fully Protected and "take" must be avoided.

Vernal Pool Branchiopods: The Project should address potential indirect impacts to vernal pool branchiopods off-site. Would the Project change hydrology with the watersheds of vernal pools or other occupied habitats that are off-site? The supplemental application information provided to the CEC predicts that the Project would result in a 36% runoff increase from the site. This runoff increase, and the potential contaminants in the runoff (e.g., vehicle contaminants and herbicides), should be discussed in the context of biological impacts. The effects of storm water flows exiting the detention basins are unclear.

Construction Laydown Area: The construction laydown area is intended to accommodate a fueling station adjacent to the intermittent creek in Section 33. We recommend that this facility be relocated in order to minimize the potential for spills or leakage to adversely affect the adjacent stream, and downstream resources. As noted above, relocating this facility away from that area would have the added advantage of obviating the need for crossings that may require permits, pursuant to Fish and Game Code Section1600 et seq.

We could not locate any discussion about the construction laydown area following construction. The impact analysis should disclose site restoration, planned uses, and ownership of that site following construction.

Storm Water Management: The application indicates that stormwater, which is considered a wastewater stream, will be collected and directed to locations away from the facility. It further indicates that stormwater will be detained in a series of catch basins, swales, and detention basins. However, even though the application references a storm water drainage system, we did not note a plan, schematics or specifications in the application. Although the application characterizes the 50-year, 24-hour storm event as a "low intensity rainfall", such an event could overwhelm the storm water management facilities; the application indicates that such runoff would be subsequently released from the detention basins to "established water courses in the area". Please note that Fish and Game Code Section 5650 prohibits the discharge of specific materials and substances into "Waters of the State," including those which are deleterious to fish and wildlife resources. The Department recommends that the applicant more fully characterize the storm water management system.

Avoidable Wildlife Impacts from Erosion Control Mesh Products: Due to this Project site's extensive wildlife habitat interface, the Department recommends that erosion control and landscaping specifications allow only natural-fiber, biodegradable meshes and coir rolls. "Photodegradable" and other plastic mesh products have been found to persist in the environment, ensnaring and killing terrestrial wildlife. Herpetofauna kills are well-documented (Barton and Kinkead 2005, Walley et al. 2005, Washington State Department of Transportation 2005). Plastic mesh erosion control products would likely cause unanticipated, avoidable impacts and potential "take" of listed species.

Indirect Land Conversion Effects: The impact analysis should explore whether permanently removing one land section from agricultural production would lead to converting another section to agricultural production, which would lead to more indirect effects on plants and wildlife. When assessed cumulatively, the two proposed solar installations in California Valley would remove nine sections from agricultural production. This is a substantial portion of the actively farmed lands in California Valley. If this leads to existing grazing lands being put into crop production, then the Project would further, indirectly, degrade wildlife habitat.

Similar land pressures resulting from conversions to biofuel crops have been demonstrated. Two studies recently found that market pressure to convert croplands and uncultivated areas to biofuel crops results in a net increase in atmospheric carbon due to the initial carbon release from plowing soils and the long-term loss of carbon sequestration provided by plant communities, despite the reduced emissions from using the biofuels (Fargione et al. 2008, Searchinger et al. 2008). Similarly, the proposed solar energy production may not offset the loss of carbon sequestration from displaced grasslands and dryland crops. This should be assessed in terms of cost versus public benefit, where costs are the carbon sequestration losses, wildlife impacts, and other environmental impacts, and the public benefits are reduction of carbon emissions and increased energy supply. In an Environmental Impact Report, this analysis would be in a Statement of Overriding Considerations, which documents why the potentially significant impacts cannot be avoided and how the "identified expected benefits from the Project outweigh the policy of reducing or avoiding significant environmental impacts of the project" (CEQA Guidelines Section 15043).

Species Not Addressed in the Application: The following species are known to occur on-site or nearby in California Valley and would likely be affected by the Project. The applicant's biological studies did not consider impacts to these species. The impact analysis and mitigation should address these species in addition to those already discussed:

Table 1. Additional Species Not Addressed in Applicant's Information

Species	Status*	Notes on Species Presence
short-nosed kangaroo rat	SSC	suitable habitat, species known from vicinity
bald eagle (nesting and wintering)	SE, FP	observed near site February 2008 by DFG staff
ferruginous hawk (wintering)	WL, BCC	known to hunt on-site
golden eagle (nesting and wintering)	BCC, WL, FP	known to be on-site
loggerhead shrike (breeding)	SSC, BCC	known to hunt on-site, suitable nesting sites in
mountain plover (wintering)	BCC, SSC	suitable habitat, species known from vicinity
San Joaquin whipsnake	SSC	suitable habitat, species known from vicinity
Kern primrose sphinx moth	FT	host plants (*Camissonia spp.*) likely on-site
coast (California) horned lizard	SSC	suitable habitat, species known from vicinity
Oregon vesper sparrow (wintering)	SSC	suitable habitat, species known from vicinity

*BCC: USFWS Birds of Conservation Concern. SSC: DFG Species of Special Concern. WL: DFG Watch List. FP: DFG Fully Protected. FT: Federal Threatened. FE: Federal Endangered. SE: State Endangered. ST: State Threatened.

Cumulative Biological Impacts: The application makes no statement about cumulative biological impacts. In addition, it considers only "permitted" projects and no other probable future projects, such as other solar power facilities proposed for the area. Further, the analysis does not describe the impacts of any of the projects identified, which makes it impossible to determine if there is a cumulative impact. Cumulative impact analyses should be species and habitat specific and should be quantified. This includes all the species and habitats discussed above and any others which the Project's biological inventories may reveal. CEQA requires that the cumulative impacts analysis identify past, present, and probable future projects which would affect the same resources (CEQA Guidelines Section 15130). The cumulative effects analysis should also identify the potential for increasing the area's greenhouse gas (GHG) emissions as it applies to the proposed Project's construction and operation, including worker's vehicle trips, and potential offsets in order to be consistent with AB 32, which commits to monitoring and reduction of GHG in the State.

Conclusions

In summary, the biological inventory work is incomplete to support a sufficient impact analysis. Inventory work should include complete surveys for BNLL, a botanical inventory, focused San Joaquin antelope squirrel surveys, a spadefoot toad breeding survey, and small mammal trapping to determine which species are present. The impact analysis should be based on complete inventory work and should expand on the other potential impacts discussed in this letter.

Thank you for the opportunity to comment on the Application for Certification. Depending upon the results of the described biological surveys, actual Project configuration, and other details which will be disclosed in the Preliminary Analysis, we may have additional comments and recommendations during the public comment period regarding avoidance, minimization, and mitigation of Project impacts to habitat and special status species. If you have any questions regarding these comments, please contact Dave Hacker, Environmental Scientist, at 3196 Higuera Street, Suite A, San Luis Obispo, California 93401, by telephone at (805) 594-6152, or email at dhacker@dfg.ca.gov.

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BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION *For the CARRIZO ENERGY SOLAR FARM* **PROJECT**	**Docket No. 07-AFC-8** **PROOF OF SERVICE** (Revised 2/5/2008)

INSTRUCTIONS: All parties shall either (1) send an original signed document plus 12 copies or (2) mail one original signed copy AND e-mail the document to the address for the Docket as shown below, AND (3) all parties shall also send a printed or electronic copy of the document, which includes a proof of service declaration to each of the individuals on the proof of service list shown below:

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DECLARATION OF SERVICE

I, Christina Flores, declare that on March 27, 2008, I deposited copies of the attached Agency Comments – Department of Fish and Game in the United States mail at Sacramento, CA with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

[Original Signed in Dockets]

Christina Flores

Habitat Connectivity Planning for Selected Focal Species in the Carrizo Plain

Draft Outline of Full Report

1. Executive Summary
2. Introduction
   - 2.1. Background and Project Need
   - 2.2. Objectives of the Project
3. Project Setting
   - 3.1. The Study Area
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4. The Focal Species
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Appendices

Appendix A: Digital Data Sources Used

Appendix B: Species-specific Model Input
(other appendices to be added as other tasks are completed)

Section 4
The Focal Species

4.1 Pronghorn antelope

Distribution and Status: Pronghorn antelope (*Antilocapra americana*) are widely distributed in the western United States, Canada, and Mexico. In 1997, it was estimated that there were nearly one million pronghorn distributed among 15 U.S. states and two Canadian provinces (Byers 1997). Historically, pronghorn were common in southern, central, and northeastern California (Yoakum 2004a), and grasslands of the San Joaquin Valley once supported exceptional numbers (Newberry 1855, cited in Yoakum 2004b). Brown et al. (2006) reported that pronghorn were once widely-distributed in plains and valleys on both sides of the Coastal and Peninsular ranges, from Monterey south as far as the Magdalena Plain in Mexico. According to ranchers, pronghorn herds once numbered in the hundreds at the north end of Carrizo Plain (Koch and Yoakum 2002).

However, pronghorn disappeared from many parts of California, including the Carrizo Plain, by the 1940s due to over-hunting and the conversion of native grasslands to croplands (Yoakum 2004b). California Department of Fish and Game (CDFG) has since reintroduced pronghorn throughout portions of their historic range, including the Carrizo Plain. In 1987, 1988, and 1990, a total of over 200 pronghorn were translocated from the shrub-steppes of northeastern California to the Carrizo Plain and surrounding rangelands (Koch and Yoakum 2002, Yoakum 2004b, Longshore and Lowrey 2008). Koch and Yoakum (2002) estimated population size to fluctuate around 50 animals during 1999-2003. In 2008, the population was estimated at approximately 100 animals (R. Stafford, CDFG, unpublished data).

Whereas pronghorn of the Sonoran Desert (*A. a. sonoriensis*) are Federally listed as endangered, pronghorn in some portions of California are a game species subject to regulated hunting. Limited (bucks only) pronghorn hunting occurred on Carrizo Plain during 1996-2001 (Koch and Yoakum 2002).

Habitat Associations: Pronghorn avoid predators by visual detection and speed, and therefore prefer open grasslands and shrub communities with good horizontal visibility, gentle slopes, and few movement obstacles. They inhabit a variety of low-growing vegetation communities, including sagebrush, bitterbrush, grassland, open pinyon-juniper, and alkali desert scrub. Although they typically occupy open, gentle terrain (<10% slope; Ockenfels et al. 1994), pronghorn require some rolling topography or shrubs for cover from inclement weather and concealment of young (Barrett 1981, Ryder and Irwin 1987, Yoakum 2004a). In general, preferred vegetation height averages 38-61 cm, and shrublands with vegetation >88 cm are used less frequently than areas with shorter vegetation (Yoakum 2004a). Based on a literature review, Longshore and Lowrey (2008) suggested that high quality habitat is characterized by slopes $\leq$ 5%, medium quality habitat typically includes slopes between 5% and 20%, and areas with slopes >20% are low quality. Pronghorn have been documented at elevations from below sea level to 3,353 meters (Yoakum 2004a).

Pronghorn are opportunistic feeders that select forage based on nutritional value, availability, and palatability (Yoakum 2004d). In grasslands, they generally prefer forbs and shrubs over grasses (Yoakum 2004d). Optimal habitat has been described as approximately 40-60% grass, 10-30% forbs, and 5-20% shrubs (Sundstrom et al. 1973, Autenrieth 1978, Yoakum 1978). Pronghorn have been documented to feed on alfalfa and other cultivated plants in California (Hopkins, No date). Use of agricultural fields appears to depend on their proximity to natural lands (Sexton et al. 1981). Pronghorn in Montana were observed to use grain fields within 0.8 km (0.5 mi) of natural rangelands more frequently than grain fields farther from natural rangelands (Cole and Wilkins 1958). In the Carrizo Plain, CDFG biologists also observed pronghorn to restrict use of irrigated agricultural fields to areas within about 0.8 km (0.5 mi) of suitable natural habitat (R. Stafford, CDFG, personal communication).

Pronghorn water requirements are not well understood, and it is likely that needs are related to forage quality and moisture content (Yoakum 2004a). Yoakum (2004a) stated that rangelands with year-round surface water every 1.6 – 3.2 km will support higher densities than areas with fewer water sources. Fences can impede movements, reduce habitat quality, and cause mortalities, depending on fence design, because pronghorn do not readily jump fences (Byers 1997, Yoakum 2004c). Pronghorn movement in Arizona was not impacted by unfenced, paved two-lane roads, but fenced rights-of-way including two- and four-lane roads and railroads acted as barriers and influenced shapes of pronghorn home ranges (Ockenfels et al. 1997).

Spatial Patterns: Pronghorn are gregarious animals found in a wide range of group sizes, depending on such factors as forage quality and quantity, population density, season, and predation risk. On the Carrizo Plain, pronghorn tend to be most gregarious during winter, and are observed in smaller groups during the remainder of the year (R. Stafford, CDFG, unpublished data). The degree of territoriality among males varies among populations, and may be influenced by habitat quality, density, and home range size. Maher (1994) found males on the Carrizo Plain to be less territorial than those in a second research population in Nevada, possibly because the Carrizo Plain population was small, widely dispersed, and recently introduced.

Home range size varies considerably with habitat quality. Annual home range estimates of eight male pronghorn monitored in the rolling plains of Texas ranged from 600 to 1,800 ha (Aiken 2005), whereas another study in semi-desert shrub/grassland habitat in western Texas reported average 3-year home range sizes of 2,509 ha and 4,238 ha for 8 males and 28 females, respectively (Canon 1993). In grassland and juniper habitat in northern Arizona, home ranges of 20 radio-collared animals averaged 8,200 ha for 5 males and 12,400 ha for 15 females (Ockenfels et al. 1997). Although home range estimates are not available for individual pronghorn on the Carrizo Plain, herd range size was estimated at 13,000 ha, based on flight surveys conducted during 1999-2008 (R. Stafford, CDFG, unpublished data). In some populations, territorial males use smaller home ranges than females, and female ranges may overlap multiple male home ranges. For example, in semi-desert shrub/grassland habitat in western Texas, Canon (1993) observed significantly larger home ranges among females than males. In other areas, no gender-based home range differences were detected (O'Gara 2004).

Dispersal distances are not available for individual pronghorn on the Carrizo Plain, but translocated animals in other populations have been documented to travel 50 km and swim

across a river to return to their natal ranges (Byers 2003). Pronghorn are seasonally migratory in some regions, and have been reported to move up to 258 km between seasonal ranges (Sawyer et al. 2005).

4.2 Tule elk

Distribution and Status: The tule elk (*Cervus elaphus nannodes*) is the smallest of all elk subspecies in North America. Although the species as a whole is widespread throughout north temperate zones of the world, tule elk are endemic to valleys and foothills of coastal and central California. In the early 1800s, tule elk were found in large numbers in the Sacramento Valley as far north as Red Bluff (Maloney 1945, cited in McCullough 1969) and in large valleys to the west of the Sacramento Valley (McCullough 1969). Along the coast, they were documented in the San Francisco Bay region and in the southern Coast Range, with abundant records in the Monterey Bay area. Historically, elk also occurred in large numbers in the San Joaquin Valley, in particular in the Sacramento-San Joaquin Delta. Tule elk occurred as far south as the Tehachapi Mountains, which apparently form the southern boundary of their distribution, and east to the foothills of the Sierra Nevada (McCullough 1969).

Historically, tule elk were reported to be the predominant herbivore of California's grasslands, sharing the range with deer (*Odocoileus hemionus*), pronghorn antelope, and domestic cattle. Herds of 2000 animals were reported, and it was estimated that 500,000 tule elk may have inhabited the State (McCullough 1969). However, a combination of competition from domestic livestock, market hunting, and land conversion to agriculture caused their numbers to decline precipitously. By 1870, tule elk were nearly extinct, with only one small population remaining in the Buena Vista Lake area in the San Joaquin Valley (McCullough 1969). Subsequent translocations were able to save this subspecies from extinction, and by 1969 three small populations existed in California. By 1996, additional translocations had resulted in 22 populations, distributed primarily across the coastal regions of central California, with one population in Owens Valley to the east (McCullough et al. 1996). In 2007 the state-wide estimate was 3,800 animals (Greco et al. 2009). Tule elk have become a popular game animal in the State, and hunting is allowed at a number of locations, including Carrizo Plain National Monument.

Habitat Associations: In terms of habitat use, tule elk are a specialized subspecies because they inhabit open habitat in semi-arid environments, whereas the species has a whole typically inhabits temperate climates and uses areas of heavy vegetation at least seasonally (McCullough 1969). Typical habitat of tule elk includes large grassland areas, which range from grasslands interspersed with marshy habitats in floodplains to relatively xeric rolling grasslands interspersed with trees and brush stands (McCullough 1969). Tule elk use brush and chaparral habitats if they are in proximity to grasslands (McCullough 1969). Historical records described elk habitat as consisting of "open lands," including extensive plains with rich alluvial soil, interspersed with limited numbers of oaks, sycamores, and ash, and with grasses sometimes knee- or breast-height (McCullough 1969). McCullough (1969) further noted that this subspecies is typically found in areas subject to periodic drought.

Greco et al. (2009) modified existing elk habitat suitability ratings presented in the California

Wildlife Habitat Relationships System (CDFG 2009) to specifically address tule elk habitat needs. They identified annual grasslands, fresh emergent wetlands, and valley foothill riparian habitats as having the highest suitability for tule elk. Other important habitat types included irrigated hayfields, grain crops, row and field crops, and pastures—used primarily for feeding—as well as eucalyptus groves—used primarily for cover. On the Carrizo Plain, CDFG biologists observed tule elk using irrigated agricultural fields within about 0.8 km (0.5 mi) of suitable natural habitat (R. Stafford, CDFG, personal communication).

Tule elk feed on a wide variety of plant species, including annual forbs and grasses, perennial forbs, grasses, and grass-like plants, browse, and even acorns (McCullough 1969). Annual forbs are an important diet item in the spring and early summer, and grasses and sedges are eaten throughout the year (McCullough 1969). Tule elk also eat aquatic vegetation when available. Water requirements likely vary with season, temperature, and moisture content of vegetation.

The impact of fences on tule elk distribution is not well understood. Elk can cross over or go under fences, depending on fence design; however, elk have been known to run into and damage fences when alarmed (McCullough 1969, Ferrier and Roberts 1973). On the Carrizo Plain, as in other tule elk habitat in California, paved roads appear to hinder elk movement, with the result that they often delimit herd ranges (R. Stafford, CDFG, personal communication). Only 13 out of more than 30,000 point locations gathered using GPS collars showed that elk had crossed paved roads, and nearly all observed road crossings occurred immediately after translocated elk were released (R. Stafford, personal communication).

Spatial Patterns: Home range size depends on habitat quality, gender, and annual precipitation (McCullough 1969, Peek 2003). O'Connor (1988) reported mean home range of nine tule elk females in Cache Creek to range from 2,309 to 4,141 ha depending on analysis method used. In comparison, tule elk herds in Contra Costa County (central California) and at Point Reyes National Seashore were reported to use areas of 869 ha and 359 ha, respectively (Pomeroy 1986, Gogan 1986, cited in O'Connor 1986). On the Carrizo Plain, home ranges of radio-collared females ranged from 3,618 ha to 12,640 ha based on minimum convex polygons (R. Stafford, CDFG, unpublished data).

Tule elk are highly social, and may be found in large groups that are dynamic in terms of size and composition (McCullough 1969). Group size depends on season, sex, population, and vegetation density, with the largest groups often observed in open habitats (Knight 1970). Tule elk exhibit pronounced periods of sexual segregation, with males segregated from females for most of the year outside of the autumn breeding period (Peek and Lovaas 1968). Females may be found in large groups with calves and young animals for most of the year, but disperse into smaller groups of 2-10 animals during the spring parturition season (McCullough 1969).

Tule elk do not exhibit the extensive seasonal ranges shifts observed in some other elk subspecies, and are thus not typically considered to be migratory (McCullough 1969). However, herds may exhibit seasonal shifts in response to local forage conditions and annual patterns of plant productivity (McCullough 1969).

Tule elk are capable of moving great distances in short time periods. McCullough (1969) reported that bull elk introduced near the center of the Owens Valley in the 1930s were observed at the north and south ends of the valley, approximately 230 km apart, within one year of release, indicating dispersal of approximately 115 km. On the Carrizo Plain, elk in established herds were observed to move 20 km during a 2-year period, whereas some animals were observed to move 40 km after their initial release (D. Hacker, CDFG, personal communication).

4.3 San Joaquin kit fox

Distribution & Status: Historically, San Joaquin kit foxes were distributed throughout the San Joaquin Valley and adjacent low foothills, from the vicinity of Byron in Contra Costa County to the foothills of the Tehachapi Mountains (Grinnell et al. 1937). By 1930, their range had been reduced by more than half due to habitat conversion to agriculture and other uses, with the largest areas of occupied habitat remaining in the southern and western portions of their original range (Grinnell et al. 1937). By 1975 the pre-1930 estimate of population size (about 8,700 to 12,100) was reduced by 20-43% (USFWS 1983). San Joaquin kit foxes were Federally-listed as endangered in 1967 and State-listed as threatened in 1971, and the population is believed to have declined even more since the 1970s (USFWS 1998). Currently, kit foxes have a very limited range, mostly in foothill areas and arid valleys of the coastal ranges, western Sierra Nevada, and the Tehachapi Mountains (USFWS 1998, Koopman et al. 1998, Thelander et al. 1994). The largest extant populations are in western Kern County in the vicinity of the Elk Hills and Buena Vista Valley, and in the Carrizo Plains area of San Luis Obispo County (USFWS 1998). The Carrizo Plain population is one of three populations designated a high priority for enhancement and protection by the U.S. Fish and Wildlife Service (USFWS 1998).

Habitat Associations: Kit fox distribution is strongly influenced by topography, vegetative cover, prey availability, and predator densities (Grinnell et al. 1937, Egoscue 1962, Daneke et al. 1984, cited in Warrick and Cypher 1998; Haight et al. 2002, Zoellick et al. 1989). Kit foxes primarily inhabit annual grasslands and sparsely vegetated scrub habitats such as alkali sink scrub, saltbush scrub, and chenopod scrub. Other habitats such as open oak savannah, vernal pools, perennial grasslands, alkali meadows and playas are also used (USFWS 1998, B. Cypher, California State University, Stanislaus, personal communication). Kit foxes prefer areas with abundant rodent populations and open environments where they can detect and evade coyotes and other predators (Warrick and Cypher 1998). High kit fox capture rates have been documented in recently burned areas, which was attributed to the openness of the habitat and its affect on predator evasion (Zoellick et al. 1989). Kit foxes can also persist in and adjacent to agricultural areas, such as row crops, irrigated pastures, orchards, and vineyards, as well as vacant lands or open spaces (e.g., parks, golf courses, and flood control areas) within urban areas (USFWS 1998, Cypher and Frost 1999). Among grasslands, kit foxes prefer more open, low-growing, and sparsely vegetated areas, such as *Bromus*-dominated grasslands in drier regions, and tend to avoid taller, denser grasslands such as *Avena*-dominated communities in moister areas (B. Cypher, personal communication).

Kit foxes use dens year-round to escape predators, bear young, and as daytime resting places. Kit foxes may be found on a wide variety of soils, but they prefer loose-textured soils (USFWS 1998) which facilitate burrow construction and tend to support more rodents that are kit fox prey.

San Joaquin kit foxes are typically associated with low elevations on valley floors. Grinnell et al. (1937) placed the upper elevation limit at about 1,200 feet (366 m), but Laughrin (1970) observed kit foxes at 2,400-ft (732 m) elevations during spotlighting surveys, and estimated that kit foxes in the southwestern portion of their range, south of Highway 46, range up to about 2,500 feet (762 m). They are mainly associated with gently sloping and flat terrain. The literature suggests that slopes of 0-5% are ideal, slopes of 5-15% provide fair habitat, and areas with slopes >15% are largely unsuitable (B. Cypher, personal communication). Warrick and Cypher (1998) found a negative relationship between topographic ruggedness and capture rates of kit foxes in Elk Hills and Buena Vista Hills of the Temblor Range.

Spatial Patterns: Kit fox pairs remain together all year and share a home range (USFWS 1998). Home range estimates vary from less than 260 ha to approximately 3,100 ha (Morrell 1972, Knapp 1978, cited in USFWS 1998, Zoellick et al. 1987, Spiegel and Bradbury 1992, White and Ralls 1993). Home range sizes at the Naval Petroleum Reserve averaged 460 ha (Zoellick et al. 2002), whereas home range size of 21 animals on the Carrizo Plain averaged 1,160 ha (White and Ralls 1993). Home range size is largely dependent on prey availability, which can vary annually in relation to precipitation (Haight et al. 2002). The sexes typically do not differ in home range size (White and Ralls 1993, Zoellick et al. 2002). Haight et al (2002) assumed two kit foxes per home range, which they estimated to average 390 ha in good habitat and 780 ha in fair habitat. In optimal habitat, each kit fox family requires approximately 486 ha, with larger space requirements in suboptimal habitats (Cypher et al. 2007).

Dispersal distances vary widely, with male foxes known to travel over 40 km (Haight et al. 2002) and juvenile dispersal from natal dens documented to range from 8 to 96 km (Thelander et al. 1994). Mean dispersal distance of 48 kit foxes at the Naval Petroleum Reserves was 7.8 $\pm$ 1.1 km, with no sex-based differences observed (Scrivner et al. 1987 cited in Koopman et al. 2000). Koopman et al. (2000) found that 33% of animals dispersed from their natal territory, and significantly more males (49%) dispersed than females (24%). Average nightly distance moved during the breeding period (14.6 $\pm$ 1.1 km) was greater than during the pup-rearing (10.7 $\pm$ 1.0 km), and pup dispersal periods (9.4 $\pm$ 1.1 km; Zoellick et al. 2002).

Adult and juvenile kit foxes are known to move through disturbed habitat, including agricultural fields, oil fields, and rangelands, and across highways and aqueducts (Haight et al. 2002). However, major highways and heavily traveled road are obstacles to movement (Cypher et al. 2000). Vehicles are the greatest source of mortality in urban areas, whereas predation, primarily by coyotes, is the primary cause of mortality in most other areas (Cypher et al. 2000, B. Cypher, personal communication). Cypher et al. (2005) examined the effects of 2-lane highways on kit foxes in the Lokern Natural Area, and found no significant negative effects on fox demography or ecology. However, the authors cautioned that increased road density could have a negative impact, citing studies that reported increased swift fox (*Vulpes velox*) mortality with increasing road density (Cypher et al. 2005), selection by bobcats of habitat with lower road density (Lovallo and Anderson 1996), and declining gray wolf habitat suitability with increased road density (Thiel 1985, Jensen et al. 1986).

Section 5
Conservation Planning Approach

5.1 Modeling baseline conditions of habitat suitability and connectivity for each focal species

5.1.1 Compilation and refinement of digital data layers

We compiled GIS data layers for the study area, including the following (see Appendix A for details concerning the source, type, scale, and date of each data layer):

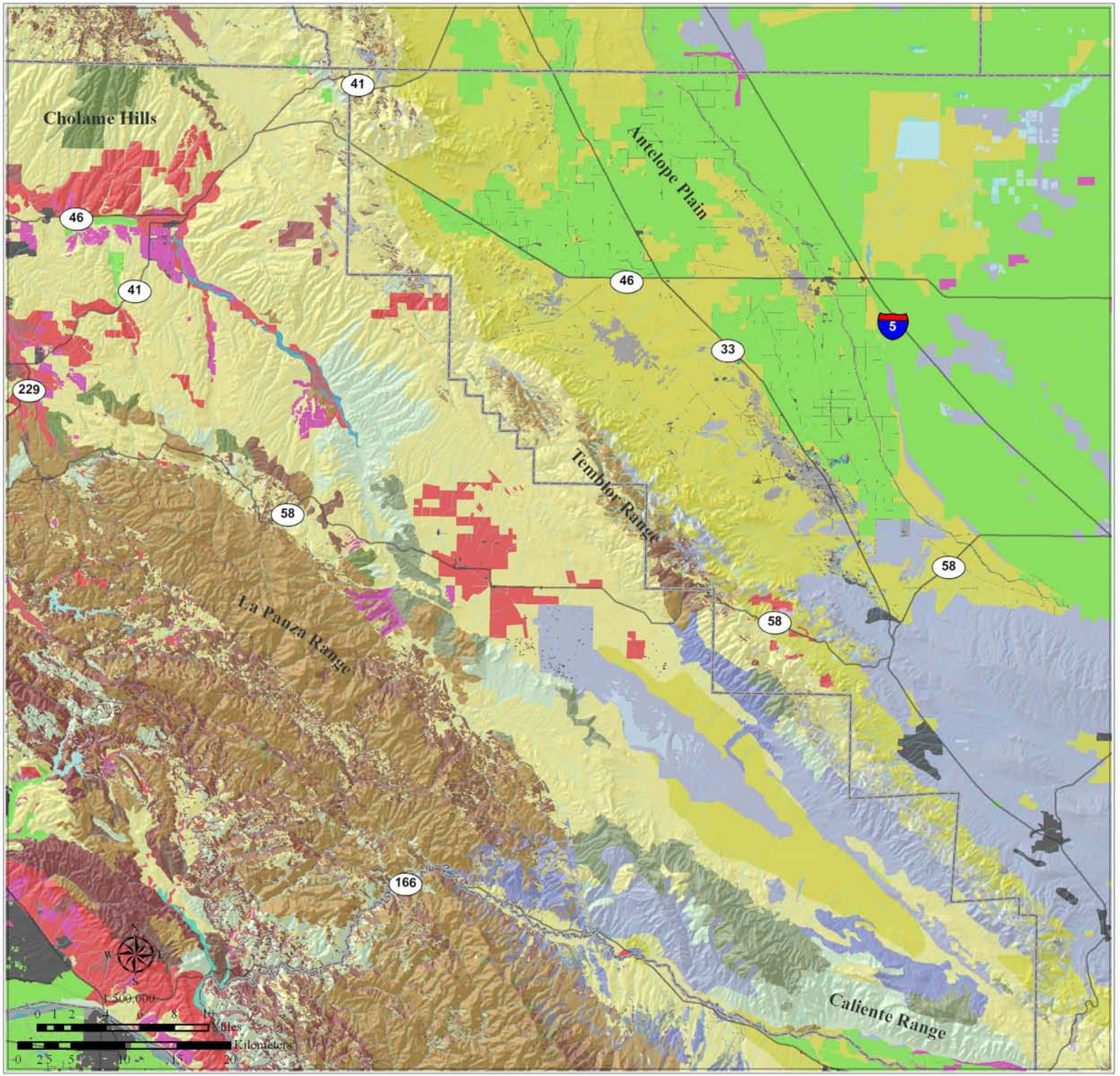
- recent high-resolution aerial photos,
- digital elevation models,
- roads,
- vegetation (including crop and agriculture data from San Luis Obispo and Kern counties),
- protected lands,
- species occurrence data from wildlife agencies, Endangered Species Recovery Program, and California Natural Diversity Database, and
- project boundary data from project proponents.

We manually updated the road and vegetation layers within the study area to be as up-to-date and accurate as possible. For the refined vegetation layer (Figure 1), we compiled vegetation data available from the County of San Luis Obispo website, crop data from San Luis Obispo and Kern counties, and regional vegetation data compiled by the state (CalVeg). We evaluated this compiled vegetation layer in relation to recent high-resolution aerial imagery and made changes where necessary to reflect the most recent land use status. Particular emphasis was placed on agricultural and urban land cover types. For example, we corrected the vegetation classification of some lands that had recently been converted to agriculture or urban but were still shown as natural vegetation in the compiled vegetation data layer. Conversely, areas shown as agriculture or urban within the compiled vegetation layer that had not actually been converted to either land use were changed back to the vegetation type in either the CalVeg or County Vegetation data layer.

Further refinements were made based on input received during the comment period:

- Polygons identified as "undefined agriculture" were assigned specific categories, such as dryland grain crops, irrigated row and field crops, vineyards, and orchards based on aerial imagery and review by CDFG biologists familiar with the area.
- Polygons defined as pasture were examined using imagery to determine if they were irrigated or non-irrigated. All non-irrigated pasture polygons were changed to annual grassland; all irrigated pasture polygons remained as pasture.
- Based on input from field biologists familiar with vegetation in the study area, (B. Cypher, personal communication) we differentiated *Avena*- and *Bromus*-dominated grasslands using precipitation data. Cypher and colleagues (personal communication) had found the 9-inch annual precipitation isocline to be a good threshold for differentiating denser, taller grasses, usually dominated by *Avena*, and generally avoided

Figure 1.
Vegetation
in the Study Area



Vegetation
- Alkali Desert Scrub
- Annual Grassland - Avena
- Annual Grassland - Bromus
- Barren
- Blue Oak Woodland
- Blue Oak-Foothill Pine
- Chamise-Redshank Chaparral
- Closed-Cone Pine-Cypress
- Coastal Oak Woodland
- Coastal Scrub
- Cropland
- Desert Riparian
- Desert Wash
- Dryland Grain Crops
- Eucalyptus
- Freshwater Emergent Wetland
- Irrigated Row and Field Crops
- Juniper
- Lacustrine
- Mixed Chaparral
- Montane Chaparral
- Montane Hardwood
- Montane Hardwood-Conifer
- Orchard and Vineyard
- Pasture
- Perennial Grassland
- Pinyon-Juniper
- Sagebrush
- Sierran Mixed Conifer
- Urban
- Valley Foothill Riparian
- Valley Oak Woodland
- Vineyard
- Wet Meadow
- Highways
- Rivers & Streams
- Hydrography
- County Boundaries

Map Produced By:

SC Wildlands
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by kit fox, from sparser, shorter grasslands, typically dominated by *Bromus*, and generally favored by kit foxes. We therefore downloaded and processed PRISM precipitation data (gridded 30 arc-second [800m] annual normals) for 1971-2000 and classed annual grassland vegetation as *Bromus*-dominated (< 9 inches precipitation) or *Avena*-dominated (≥ 9 inches precipitation).

To create and update the road layer, we first downloaded 2007 Tiger Line road data and evaluated them using recent high-resolution aerial imagery, adding dirt roads not captured by the 2007 Tiger Line data. To delineate paved roads, we used Caltrans highway data and input from CDFG biologists. We then re-evaluated the study area using recent high resolution aerial imagery to identify other paved roads not captured in the Caltrans data. All other roads in the 2007 Tiger Line Data were delineated as dirt roads (Figure 2).

5.1.2 Modeling habitat suitability

We created habitat suitability models for each species by estimating how the species responded to different habitat factors that were mapped at a 30 x 30-m cell resolution. The actual spatial data layers used in each habitat suitability model depended on the species. For example, factors incorporated into the pronghorn antelope model were vegetation type, slope, and road density. (Details of the species-specific models are described in Section 5.1.4.) Within each factor, suitability scores were assigned to each category (e.g., each vegetation type) on a scale of 0 (unsuitable) to 1 (most suitable). For pronghorn and tule elk, habitat suitability was calculated for each 30-m^2 pixel using a Weighted Geometric (Multiplicative) Mean:

$$\text{Suitability} = (S_A^{WA}) * (S_B^{WB}) * (S_C^{WC})$$

where S_A, S_B, and S_C are suitability ratings for factors A, B, and C, respectively, and WA, WB, and WC are the factor weightings.

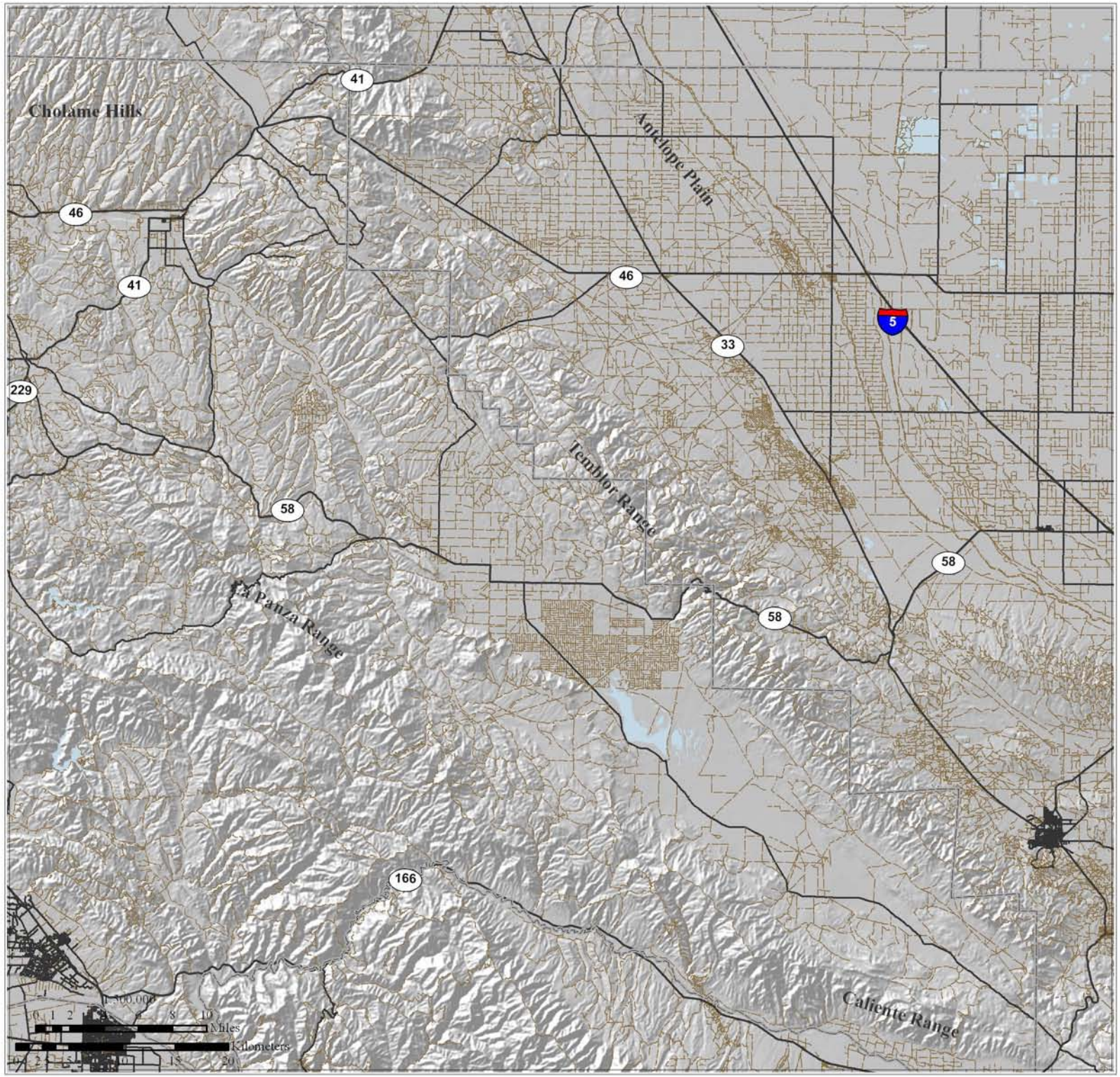
The Weighted Geometric Mean is strongly influenced by low suitability ratings, such that if a score for any class is 0, then suitability of the pixel remains 0 regardless of factor weight or scores for other factors. We divided the resulting suitability values using natural breaks into five classes (low, low to medium, medium, medium to high, and high) for both species.

The habitat suitability model for San Joaquin kit fox applied the model structure and values of Cypher et al. (2007) using our refined map layers. This model used a Weighted Arithmetic (Additive) Mean:

$$\text{Suitability} = (S_A * WA) + (S_B * WB) + (S_C * WC).$$

The Weighted Arithmetic Mean is more compensatory than the Weighted Geometric Mean in that factors with low values can be offset by factors with higher values. Following Cypher et al. (2007) the output was divided into three defined classes: high (≥0.9); medium (≥0.6 but <0.9); and low (<0.6). Additional details concerning habitat suitability analyses are in Section 5.1.4 and Appendix B.

Figure 2.
Roads in the Study Area



Roads

- Highway
- Other Paved Roads
- Dirt Roads
- County Boundaries
- Hydrography

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Lands rated as medium to high by each habitat suitability model were used to identify species-specific habitat *patches* and habitat *cores* based on contiguous area. *Potential core areas* were defined as the amount of contiguous suitable habitat necessary to sustain at least 50 individuals (Beier et al. 2006). Potential cores are probably capable of supporting the species for several generations. A *patch* was defined as the area of contiguous suitable habitat needed to support at least one male and one female, but less than the potential core area. Patches can support at least one breeding pair of animals (perhaps more if home ranges overlap greatly) and are probably useful to the species if the patch can be linked via dispersal to other patches and core areas.

To determine whether the distribution of suitable habitat allows species to disperse among patches and core areas, we conducted a configuration analysis to identify which patches and core areas were functionally isolated by distances too great for the focal species to traverse. Because the majority of methods used to document dispersal distance underestimate the true value (LaHaye et al. 2001), we assumed each species can disperse twice as far as the longest documented dispersal distance.

5.1.3 Modeling landscape permeability

Landscape permeability analysis is a GIS technique that models the relative cost for a species to move between target areas based on how each species is affected by habitat characteristics, such as topography, elevation, vegetation composition, and road density. This analysis identifies a least-cost corridor, or the best potential route for each species between targeted areas (Craighead et al. 2001, Singleton et al. 2002). The purpose of the analysis is to identify land areas which would best allow the focal species to live in or move through the linkage (Beier et al. 2006).

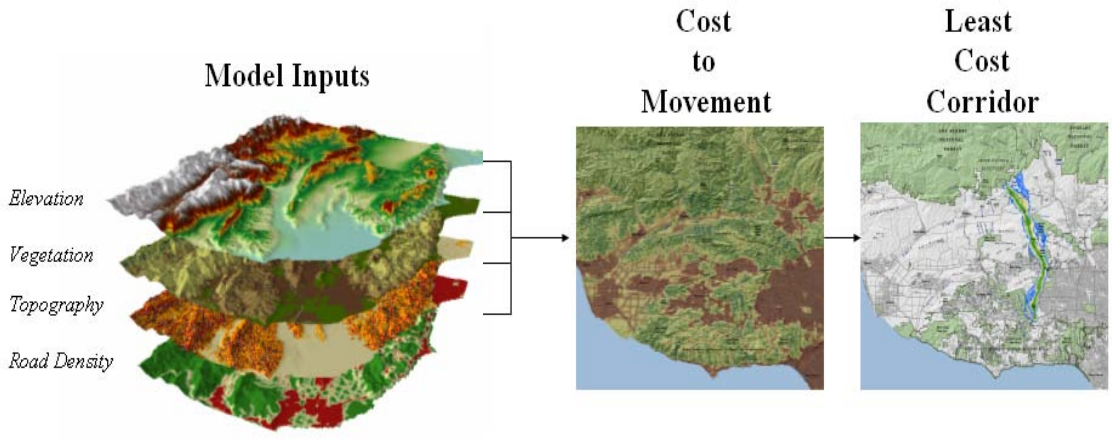


Figure 3. Example permeability model inputs: elevation, vegetation, topography, and road density. Landscape permeability analysis models the relative cost for a species to move between target areas based on how each species is affected by various habitat characteristics.

For each species, the relative cost of travel was calculated using habitat factors considered most influential on that species' movements (selected from among the factors vegetation type, vegetation density, road density, elevation, topographic position, and terrain ruggedness). The

factors, class rankings, and weighting values may therefore differ from those used for each species in determining habitat suitability. We derived four topographic classes from elevation and slope models: canyon bottoms, ridgelines, flats, or slopes. Terrain ruggedness was measured as the variance in elevation between each grid cell and its neighboring cells. For tule elk and kit fox, road density was measured as kilometers of paved road per square kilometer (averaged over a 1-km^2 moving window), whereas for pronghorn, road density was measured using both paved and dirt roads. Vegetation density was based on reflectance data derived from satellite imagery (see Section 5.1.4.3 for additional details on this index).

Within each factor, experts assigned each category (e.g., various vegetation categories or categories of road density) a rating between 1 (preferred) and 10 (avoided) based on each species ability to move through areas with these characteristics, as determined from available literature and expert opinion. Cost to movement was then calculated as the Weighted Arithmetic Mean for each species (where cost of movement can be thought of as the inverse of permeability). A unique cost surface (cost raster) was thus developed for each species. The least-cost corridor analysis then maps the relative degree of permeability for a species based on the cumulative travel cost calculated using the cost raster and distance between targeted core areas. We then used a "slice" (or cost contour) of the resulting cost surface based on expert opinion to delineate a least cost corridor that is biologically meaningful for the species.

Performing permeability analyses requires identifying the endpoints (or targets) to be connected. Target Zones were identified at the southern and northern extent of the study area, and target endpoints were selected as medium to high suitable habitat for each focal species within each Target Zone. We used the same Target Zones for all three species. However, we tested some alternative target endpoints within the southern Target Zone for kit foxes. For kit fox, our original southern target endpoint included medium to high quality habitat on both sides of the Temblor Range, which strongly influenced predicted movement corridors to cross from the Carrizo Plain over the Temblor Range to include large swaths of the San Joaquin Valley floor. Kit fox biologists found this result biologically untenable, as they consider the Temblor Range a strong obstacle to kit fox movement, and no kit foxes have ever been observed crossing the range during telemetry studies. We therefore modified the southern target by using only high suitability contiguous core kit fox habitat in the southern Target Zone, and modified the factor ratings and weightings to better reflect kit fox avoidance of very rugged terrain.

Appendix B and Section 5.1.4 describe species-specific model input data and additional details concerning the habitat suitability and landscape permeability analyses.

5.1.4 Species-specific model input data and conceptual basis for model development

5.1.4.1 Pronghorn antelope

Habitat Suitability: We developed a Weighted Geometric (Multiplicative) Mean GIS habitat suitability model using vegetation type, slope, and road density as primary variables, based on information summarized in Section 4.1 and discussions with species experts. The model reflects that pronghorn prefer open terrain, short vegetation, few barriers, and gentle slopes. Because pronghorn use a wider range of elevations (0 to 3,353 meters) than occurs in the study area,

elevation was not an input factor.

Habitat suitability ratings (from 0 to 1, with 1 being most suitable and 0 being unsuitable) for individual vegetation, road density, and slope classes were provided by CDFG biologists most familiar with this species on the Carrizo Plain (R. Stafford and D. Hacker; Appendix B). Suitability ratings shown in Appendix B were further refined as follows:

- Within the factor "Slope", categories were based on recommendations by Longshore and Lowrey (2008): slopes > 5% and ≤ 20% were rated as medium suitability (rating = 0.6) and slopes > 20% were rated as low suitability (rating = 0.3). "Flats," ≤ 5% slope by definition, were rated as high suitability (rating = 1.0).
- Irrigated agricultural lands within 0.8 km (0.5 mi) of suitable natural habitat areas (suitability ≥ 0.5) were rated as shown in Appendix B; but irrigated agriculture more than this distance from suitable natural habitat was rated as unsuitable (rating = 0), based on observations that pronghorn only use such fields in proximity to suitable natural habitats (Cole and Wilkins 1958, R. Stafford, CDFG, personal communication).

Habitat use by pronghorn on the Carrizo Plain may not be directly affected by roads, per se, but habitat use may be adversely affected by fences (Ockenfels et al. 1997). Because many roads in the study area, both paved and unpaved, are accompanied by fences, and because a comprehensive fence data layer was not available, the pronghorn habitat suitability model considered areas with a high road density to be less suitable than less-roaded areas, and this factor did not differentiate between paved and unpaved roads.

Although distance to water may influence pronghorn habitat suitability, especially during summer (Yoakum 2004a; Section 4.1), a complete map of water sources (including both natural and artificial water sources) was not available for this study area and we thus did not include water in our model.

Appendix B lists the category scores and factor weights for each factor, provided based on expert opinion by R. Stafford and D. Hacker (CDFG, personal communication). Each factor was weighted from 0% to 100%, such that all weights must sum to 100%. Habitat suitability was calculated for each 30-m^2 pixel in the study area as the weighted geometric mean of scores for that pixel:

$$(\text{Vegetation Score}^{0.35}) * (\text{Road Density Score}^{0.10}) * (\text{Topography Score}^{0.55}) = \text{Habitat Suitability}.$$

Habitat Patches and Cores: Potential Habitat Patches and Cores were identified as contiguous polygons of medium, medium-high, and high suitability habitat meeting the following size criteria. Minimum patch size (defined as the area of suitable habitat capable of supporting at least two individuals) was estimated as 13,000 ha based on estimated herd range size on the Carrizo Plain (R. Stafford, CDFG, unpublished data). Core areas (defined as areas potentially supporting 50 or more individuals) were estimated to be ≥ 65,000 ha (herd range x 5) based on expert opinion (R. Stafford and D. Hacker). Thus, patch size was defined as ≥ 13,000 ha but < 65,000, and core areas were defined as ≥ 65,000 ha. Any suitable habitat < 13,000 ha was defined as less than a patch. These areas may serve as stepping stones between potential patches

and core areas. Dispersal distance was defined as 100 km for the patch configuration analysis for pronghorn.

Landscape Permeability: For permeability analysis, we identified areas to be connected as habitat of medium to high suitability within two Target Zones: one in the southeastern portion of the study area (including Carrizo Plain National Monument [CPNM], Carrizo Plain Ecological Reserve, Bureau of Land Management parcels contiguous with the National Monument and Ecological Reserve, and small portion of the Bittercreek National Wildlife Refuge) and one in the northwestern portion of the study area, north of the westernmost extent of State Route 46 and west of State Route 33. These Target Zones were selected to represent large intact landscapes that included important habitat for each species and that should remain connected to assure long-term population viability. The Target Zone in the southeast is known to support a population of pronghorn, and current pronghorn distribution is known to extend from this area northwest beyond the State Route 46-State Route 41 intersection. Although the Target Zone in the northwestern portion of the study area is not currently protected, it represents a large intact landscape that connects to intact lands beyond the northwest extent of our study area. As such, maintenance of connectivity from CPNM to the northwestern zone is assumed to provide pronghorn with important connectivity to areas beyond this zone.

Permeability ratings were provided by CDFG biologists most familiar with pronghorn on the Carrizo Plain (R. Stafford and D. Hacker; Appendix B). They were combined using the following Weighted Arithmetic Mean equation, which represents cost of movement (the inverse of permeability):

(Vegetation Score * 35%) + (Road Density Score * 10%) + (Topography Score * 55%) = cost.

The equation reflects that pronghorn are most likely to move through open terrain, with short vegetation, few barriers, and gentle slopes, but that these variables may influence pronghorn movements in a more compensatory way than was assumed for defining suitable habitat for foraging, breeding, etc. Because pronghorn use a wider range of elevations (0 to 3353 meters) than occur in the study area, elevation was not an input factor into the permeability model.

5.1.4.2 Tule elk

Habitat Suitability: We developed a Weighted Geometric (Multiplicative) Mean GIS habitat suitability model using vegetation type and road density as primary variables, based on information summarized in Section 4.2 and discussions with species experts. The model reflects that tule elk prefer large grassland areas, freshwater emergent wetlands, and valley foothill riparian habitat, but that they also use a wide variety of other habitats including agricultural lands, open brush habitats, and dispersed stands of oaks, sycamore, eucalyptus and other trees. The presence of paved roads influences tule elk movement and appears to delimit some herd ranges on the Carrizo Plain (Section 4.2); thus the model includes density of paved roads as a key input. The habitat suitability model considered areas with a high road density to be less suitable than less-roaded areas.

Habitat suitability ratings (from 0 to 1, with 1 being most suitable and 0 being unsuitable) for individual vegetation and road density classes were provided by CDFG biologists most familiar with this species on the Carrizo Plain (R. Stafford and D. Hacker; Appendix B). Suitability ratings shown in Appendix B were further refined as follows:

- Irrigated agricultural lands within 0.8 km (0.5 mi) of suitable natural habitat areas (suitability $\geq$ 0.3) were rated as shown in Appendix B; but irrigated agriculture more than this distance from suitable natural habitat was rated as unsuitable (rating = 0), based on observations that tule elk only use such fields in proximity to suitable natural lands (R. Stafford, CDFG, personal communication).

Tule elk use a variety of topographic land forms and a wide range of elevations relative to areas available within our study area, so topographic position and elevation were not included in the model. Because the impact of fences on tule elk habitat suitability is not well understood, and a comprehensive fence data layer was not available for the study area, we did not include fences as an input to our model. Similarly, because water needs of tule elk are not well understood, and a complete map of water sources (including both natural and artificial water sources) was not available for this study area, we did not include water in our model.

Appendix B lists the category scores and factor weights for each factor, provided based on expert opinion by R. Stafford and D. Hacker (CDFG, personal communication). Each factor was weighted from 0% to 100%, such that all weights must sum to 100%. Habitat suitability was calculated for each 30-m^2 pixel in the study area as the weighted geometric mean of scores for that pixel:

$$(\text{Vegetation Score}^{0.50}) * (\text{Road Density Score}^{0.50}) = \text{Habitat Suitability}$$

Habitat Patches and Cores: Habitat Patches and Cores were identified as contiguous polygons of medium, medium-high, and high suitability habitat meeting the following size criteria. Minimum patch size (defined as the area of suitable habitat capable of supporting at least two individuals) was estimated as 3,600 ha based on the minimum home range size observed on the Carrizo Plain (R. Stafford, CDFG, unpublished data). Because elk are gregarious, and home range estimates come from animals living in natural groups, we assumed that one home range could support at least two individuals. Core areas (defined as areas potentially supporting 50 or more individuals) were estimated to be $\geq$ 63,000 ha (the largest home range observed on the Carrizo Plain x 5) based on expert opinion (R. Stafford and D. Hacker). Thus, patch size was defined as $\geq$ 3,600 ha but < 63,000, and core areas were defined as $\geq$ 63,000 ha. Any suitable habitat < 3,600 ha was defined as less than a patch; these areas may serve as stepping stones between potential patches and core areas. Dispersal distance was defined as 80 km for the patch configuration analysis for tule elk.

Landscape Permeability: For permeability analysis, we identified areas to be connected as habitat of medium to high suitability within two Target Zones: one in the southeastern portion of the study area (including Carrizo Plain National Monument [CPNM], Carrizo Plain Ecological Reserve, Bureau of Land Management parcels contiguous with the National Monument and Ecological Reserve, and small portion of the Bittercreek National Wildlife Refuge) and one in the northwestern portion of the study area, north of the westernmost extent of State Route 46 and

west of State Route 33. These Target Zones were selected to represent large intact landscapes that included important habitat for each species and that should remain connected to assure long-term population viability. The Target Zone in the southeast is known to be used by tule elk, and elk distribution extends from this area northwest beyond the State Route 46-State Route 41 intersection. Although the Target Zone in the northwestern portion of the study area is not currently protected, it represents a large intact landscape that connects to intact lands beyond the northwest extent of our study area. As such, maintenance of connectivity from CPNM to the northwestern zone is assumed to provide tule elk with important connectivity to areas beyond this zone.

Permeability ratings were provided by CDFG biologists most familiar with tule elk on the Carrizo Plain (R. Stafford and D. Hacker; Appendix B) and combined using the following Weighted Arithmetic Mean equation, which represents cost of movement (the inverse of permeability):

(Vegetation Score * 50%) + (Road Density Score * 50%) = cost.

The equation reflects that elk movement will mostly be influenced by vegetation and density of paved roads and that the influence of these two factors should be relatively equal and compensatory. Because tule elk use a wide range of elevation and topographical terrain types, relative to what is available in our study area, elevation and topographical position were not used as input factors into the permeability model.

5.1.4.3 San Joaquin Kit fox

Habitat Suitability: We determined habitat suitability for San Joaquin kit fox using methods developed by Cypher et al. (2007). This habitat suitability model was found to have good predictive power when compared to field data on fox distribution (B. Cypher, personal communication). The model, which was based on the weighted sum of vegetation type, topographic ruggedness, and vegetation density, reflects that kit foxes use gentle open terrain, primarily within grasslands and open scrub habitats, and that they select sparse versus dense grasslands (Section 4.3).

Habitat suitability ratings (from 0 to 1, with 1 being most suitable and 0 being unsuitable) for individual vegetation classes in the study area were provided by kit fox expert, B. Cypher (personal communication; Appendix B).

In addition to vegetation community classes, the model weighted suitability of natural lands by terrain ruggedness (Valentine et. al. 2004, Cypher et al. 2007). Research on kit foxes at Naval Petroleum Reserves in California has shown terrain ruggedness as a "consistent factor that affected capture rates of kit foxes," with foxes most abundant in areas of low topographic ruggedness (Warrick and Cypher 1998). Terrain ruggedness was classified using a 30-m digital elevation model and classifying areas as rugged according to elevation differences between each grid cell and its neighboring cells. The resulting values were then reclassed into four classes with values of 0 to 1 with high values (lowest ruggedness) being the most suitable.

The model used reflectance data based on satellite imagery in the form of a Normalized Difference Vegetation Index [NDVI] as an index of vegetation density. The NDVI was derived from remote sensing imagery that compares visible and near infrared radiation to estimate "greenness" or vegetation density relative to bare ground. Each cell was assigned a value based on a composite dataset of mean values from 2001-2006. NDVI values were then reclassed to suitability values ranging from 0 to 1 with high values being most suitable, using known locations of kit fox to guide classification (Cypher et al. 2007, S. Phillips, California State University, Stanislaus, personal communication).

Although San Joaquin kit fox distribution may be influenced by elevation, we assumed that inclusion of vegetation type and terrain ruggedness in the suitability model would likely account for elevational influences.

Habitat suitability was calculated for each 30-m^2 pixel in the study area using the following weighting equation, based on expert opinion (B. Cypher, personal communication):

(Vegetation Score * 50%) + (Terrain Ruggedness Score * 25%) + (Vegetation Density Score * 25%) = Habitat Suitability.

Following Cypher et al. (2007) we reclassed the continuous habitat suitability scores into three suitability classes: low, medium, and high.

Habitat Patches and Cores: Potential Habitat Patches and Core Areas were identified as contiguous polygons of medium to high suitable habitat meeting the following size criteria. Minimum patch size (defined as the area of suitable habitat capable of supporting at least two individuals) was estimated as 486 ha, based on the estimate that this area could support one kit fox family in optimal habitat (Cypher et al. 2007). Core areas (defined as areas potentially supporting 50 or more individuals) were estimated to be $\geq$ 12,150 ha (family area x 25). Thus, patch size was defined as $\geq$ 486 ha but < 12,150, and core areas were defined as $\geq$ 12,150 ha. Any suitable habitat < 486 ha was defined as less than a patch; these areas may serve as stepping stones between potential patches and core areas. Dispersal distance was defined as 192 km for the patch configuration analysis for kit fox.

Landscape Permeability: For the landscape permeability analysis, we identified areas to be connected as habitat of high suitability core habitat within the Target Zone in the southeastern portion of the study area (including Carrizo Plain National Monument [CPNM], Carrizo Plain Ecological Reserve, Bureau of Land Management parcels contiguous with the National Monument and Ecological Reserve, and small portion of the Bittercreek National Wildlife Refuge), and medium to high suitable habitat within the Target Zone in the northwestern portion of the study area, north of the westernmost extent of State Route 46 and west of State Route 33. These Target Zones were selected to represent large intact landscapes that included important habitat for each species and that should remain connected to assure long-term population viability. The Target Zone in the southeast is known to support kit foxes, and their distribution is known to extend from this area northwest beyond the State Route 46-State Route 41 intersection. Although the Target Zone in the northwestern portion of the study area is not currently protected, it represents a large intact landscape that connects to intact lands beyond the study area. As

such, maintenance of connectivity from CPNM to the northern zone is assumed to provide kit foxes with important connectivity to areas beyond this zone.

Our model for habitat permeability for kit foxes is based on vegetation, terrain ruggedness, vegetation density, and road density to reflect that kit foxes use areas of gentle terrain in open vegetation associations such as grasslands and open scrub habitats, and that they tend to avoid densely vegetated areas. Furthermore this model reflects that increased road density may reduce permeability.

We ran two versions of the landscape permeability model for kit fox, one using factor ratings for habitat suitability, and one using ratings specifically developed for permeability. These sets of ratings can differ because, for example, kit fox may easily move through some habitats they don't generally use for denning or foraging (B. Cypher, personal communications). The suitability and permeability ratings were both provided by kit fox expert, B. Cypher (personal communication; Appendix B). Previous research conducted by Cypher et al. (2007) used permeability ratings rather than habitat suitability ratings for conducting landscape permeability analyses for kit fox. Both versions combined the ratings using the following weighting equation, which represents cost of movement (the inverse of permeability):

(Vegetation Score * 40%) + (Road Density Score * 5%) + (Terrain Ruggedness Score * 50%) + (Vegetation Density Score * 5%) = cost.

Section 6
Results and Discussion

6.1 Task 1: Baseline conditions of habitat suitability and connectivity for each focal species

6.1.1 Habitat Suitability

6.1.1.1 Pronghorn antelope

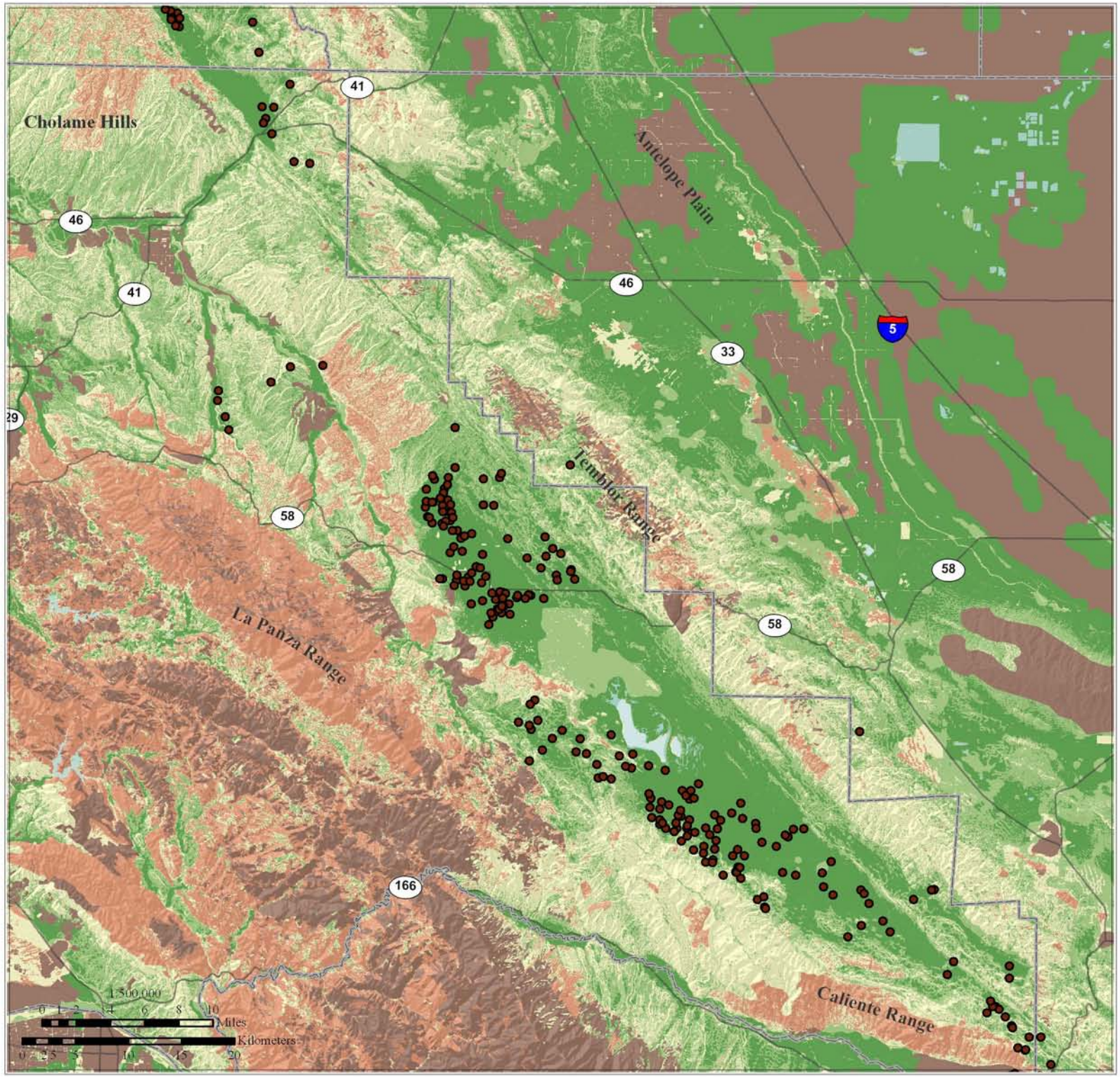
Suitable habitat for pronghorn antelope in the study area is largely restricted to open vegetation communities in gentle terrain. The model identified abundant medium to high suitable habitat for this species on both sides of the Temblor Range (Figure 4). The most extensive areas of highly suitable habitat are in the open grasslands and scrub habitats on the floor of the Carrizo Plain and San Joaquin Valley. Modeled high-value habitat corresponds well with the distribution of sightings in the Carrizo Plain and Cholame Valley. Some agricultural lands were also identified as medium to high suitability, with irrigated row and field crops becoming unsuitable more than 0.8 km from natural suitable lands with suitability ≥ 0.5. Highly roaded portions of the Carrizo Plain, which would otherwise be modeled as high-value habitat, appear as medium-high. Habitat for pronghorn antelope generally becomes less suitable southwest of the La Panza Range in the southwestern portion of the study area and unsuitable in the dense agriculture lands on the San Joaquin Valley floor and in the Santa Maria Valley in the southwestern portion of the study area.

The patch size analysis identified the majority of medium to highly suitable habitat in the study area as potential core areas for pronghorn, with a few patches delineated in the southwestern and northeastern portions of the study area (Figure 5). All potential core areas and habitat patches are within the species dispersal distance (figure not shown), although barriers to movement may exist between areas of suitable habitat.

6.1.1.2 Tule elk

Suitable habitat for tule elk is widespread in the study area in grassland, meadow, scrub, brush, woodland, and riparian communities as well as some agricultural types, such as dryland grain crops and irrigated row and field crops. The most highly suitable habitat primarily follows the *Avena*-dominated annual grasslands and those irrigated row and field crops within 0.8 km of other natural habitats suitable (≥ 0.3) for tule elk (Figure 6). The majority of medium to high suitable habitat occurs in a wide swath from the northwest to southeast of the study area between the La Panza Range and Interstate 5. Other suitable habitats of note occur at the north end of the Caliente Range near Carrizo Canyon; at the base of the La Panza Range on the coastal side along the Salinas River; and along the Cuyama River, Alamo Creek, Nipomo Valley, and Canyon de los Alisos in the southwestern portion of the study area. Areas of medium to high suitable habitat are consistent with sightings of tule elk. Chaparral, montane hardwood and conifer habitats are less suitable for tule elk, as are orchards, vineyards, and dense irrigated agriculture beyond 0.8 km of other suitable natural habitats. Paved roads and habitats in the immediate

Figure 4.
Habitat Suitability
for
Pronghorn antelope



Degree of Suitability

- **High**
- **Med-High**
- **Med**
- **Low-Med**
- **Low**
- **Pronghorn Sightings**
- **Highways**
- **County Boundaries**
- **Hydrography**

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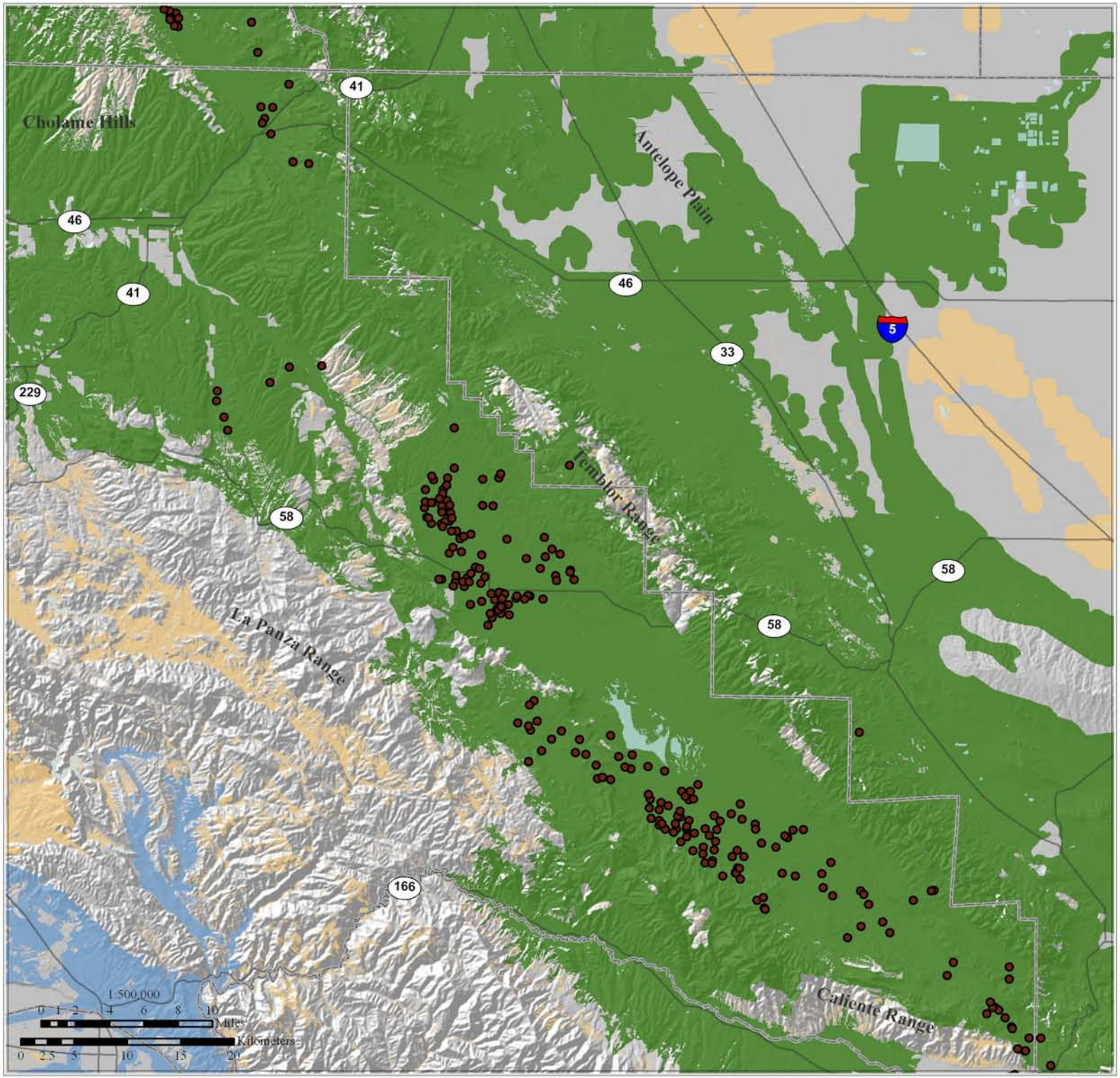
Figure 5.
Potential Cores & Patches
for
Pronghorn antelope



- Core
- Patch
- < Patch
- **Pronghorn Sightings**
- **Highways**
- **County Boundaries**
- **Hydrography**

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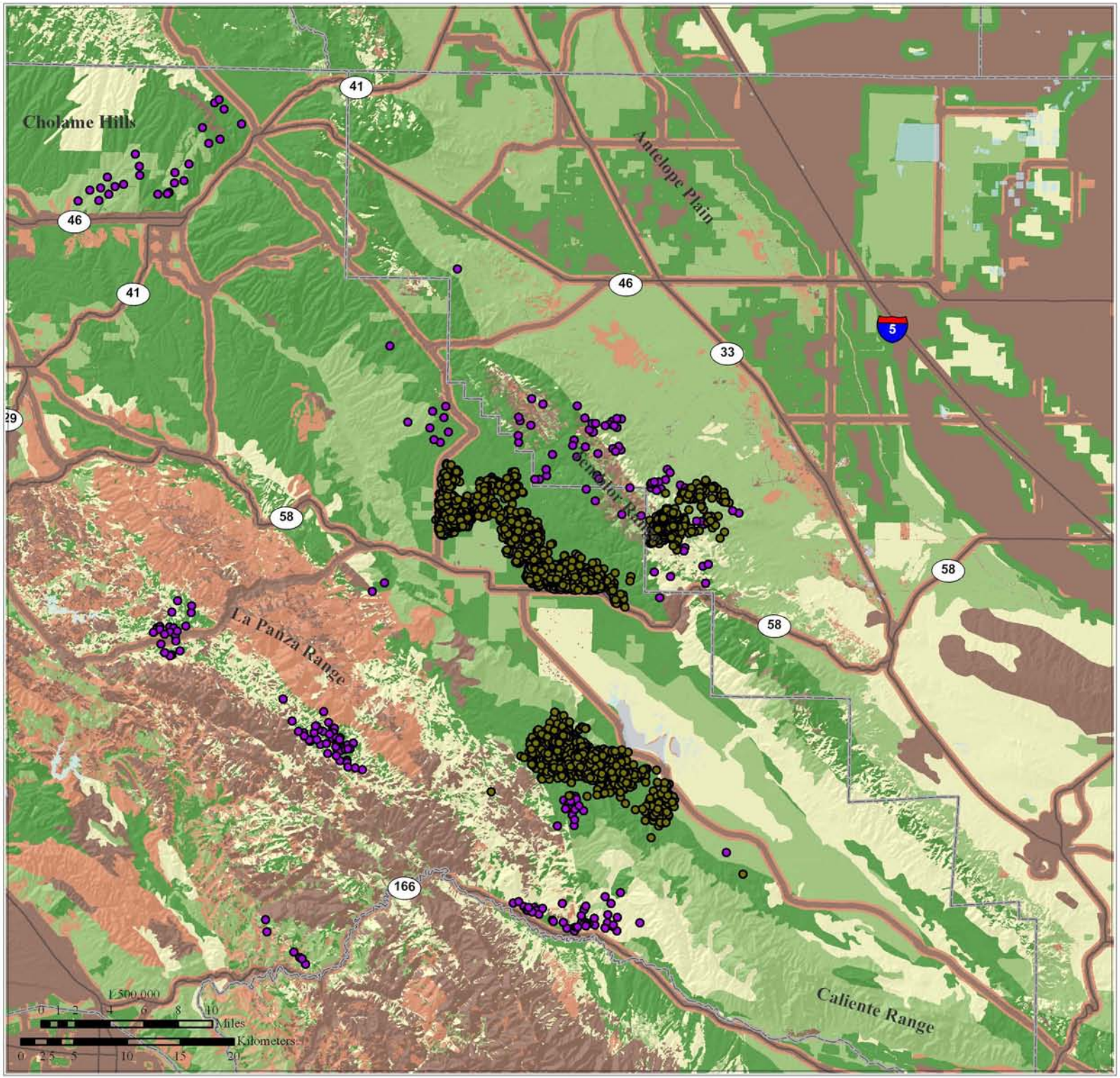
Figure 6.
Habitat Suitability
for
Tule elk



Degree of Suitability

- **High**
- **Med-High**
- **Med**
- **Low-Med**
- **Low**
- **Collared Sightings**
- Flight Sightings
- **Highways**
- **County Boundaries**
- **Hydrography**

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vicinity of these roads are also unsuitable for tule elk and appear to restrict some herd ranges on the Carrizo Plain, which is evident in the road-constrained distribution of telemetry points on Figure 6.

The patch size analysis identified one potential core area within the analysis extent that is generally bound on the north by State Route 46 and Bitterwater Valley Road, on the east by State Route 33, on the south by State Route 166, and on the west by the La Panza Range (Figure 7). Lands northwest of the State Route 46 and 41 intersection, currently identified as a patch, would also be considered a potential core area if the analysis window extended beyond the study area (R. Stafford, personal communication). Other significant patches occur in between these two core areas, between State Route 33 and Interstate 5 and south of State Route 166, which would have been contiguous with the core areas if not for the paved roads that fragment these areas of medium to high suitable habitat. Additional patches were delineated to the southwest of the La Panza Range. All potential core areas and habitat patches are within the species dispersal distance (figure not shown), although barriers to movement may exist between areas of suitable habitat.

6.1.1.3 San Joaquin kit fox

Suitable habitat for kit fox in the study area is somewhat limited, being primarily restricted to grassland and scrub habitats in gentle terrain on valley floors. The most highly suitable habitat largely follows the drier, *Bromus*-dominated annual grassland and alkali desert scrub habitats in the Carrizo Plain south of State Route 58 and on the San Joaquin Valley side of the Temblor Range (Figure 8). Areas identified as medium suitability for kit fox are primarily *Avena*-dominated grassland and scrub habitats with low topographic ruggedness. These habitats generally occur on the lower slopes and at the base of Temblor Range, around the base of the northern extent of the Caliente Range, straddling State Route 58, in the Cholame Valley, and in scattered patches on gentle terrain between State Routes 58 and 46. All other portions of the study area were considered unsuitable for kit fox.

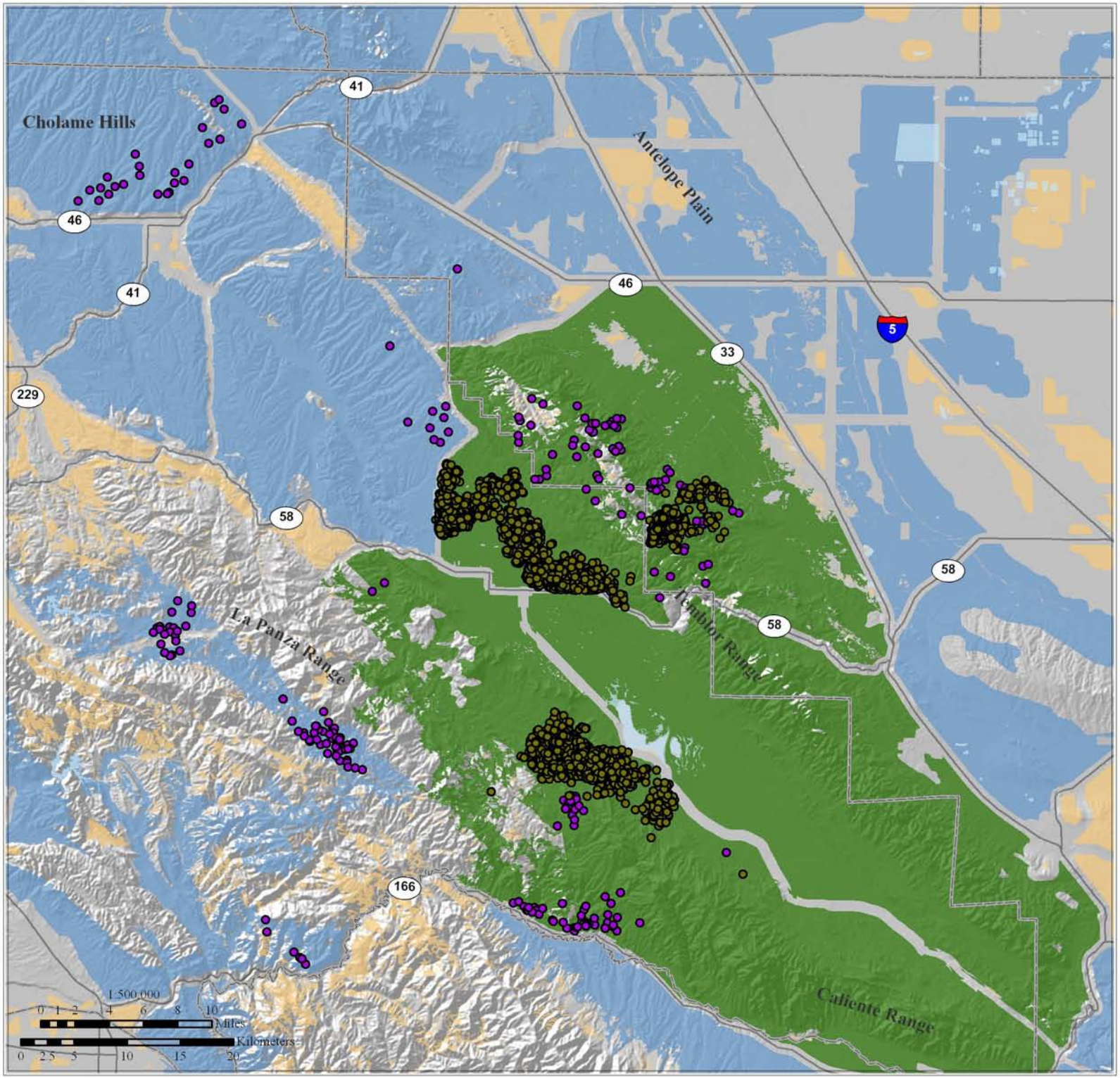
The majority of medium to high suitable habitat in the study area is in large enough continuous areas to serve as potential core areas for kit fox (Figure 9). Some significant patches of suitable habitat were delineated to the west of Simmler Bitterwater Road and to the northeast of the junction of State Routes 46 and 33. All potential core areas and habitat patches are within the species dispersal distance (figure not shown), although barriers to movement may exist between areas of suitable habitat.

6.1.2 Habitat Permeability

6.1.2.1 Pronghorn antelope

The least-cost corridor for pronghorn antelope between the northern and southern Target Zones varies in width from approximately 19 to 26 km using the most permeable 5% portion of the landscape (Figure 10). The most permeable path extends through highly suitable habitat (mostly Avena-dominated annual grassland and dryland grain crops on gentle terrain) from the western

Figure 7.
Potential Cores & Patches
for
Tule elk



- Core
- Patch
- < Patch
- **Collared Sightings**
- Flight Sightings
- **Highways**
- **County Boundaries**
- **Hydrography**

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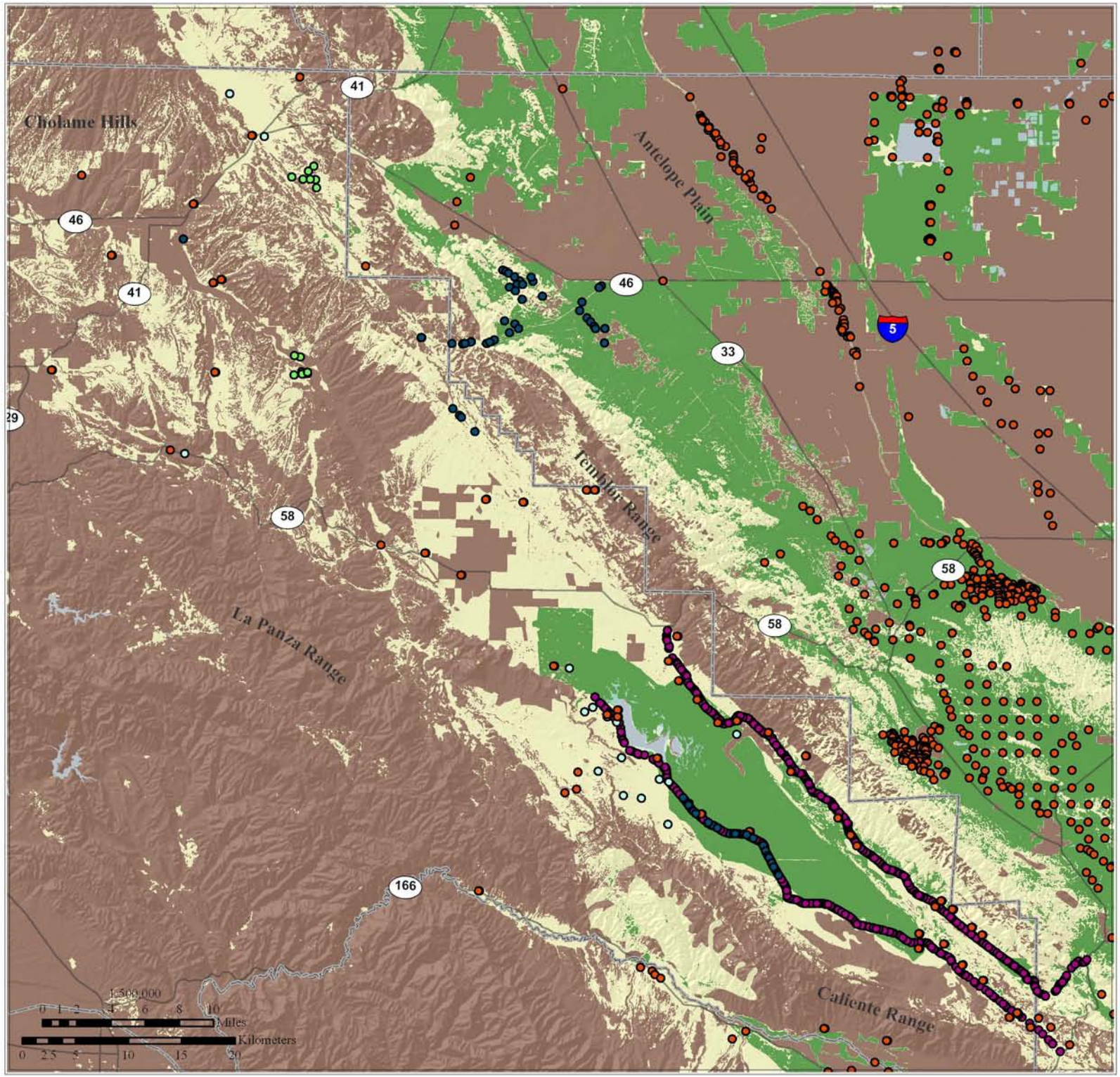
Figure 8
Habitat Suitability
for
San Joaquin kit fox



Degree of Suitability

- **High**
- **Med**
- **Low**
- **Kit Fox Sightings**
- ESRP Kit Fox Sightings
- Spotlight observations
- Incidental observations
- Telemetry locations
- Car Sightings
- CNDDB Kit Fox
- **Highways**
- **County Boundaries**
- **Hydrography**

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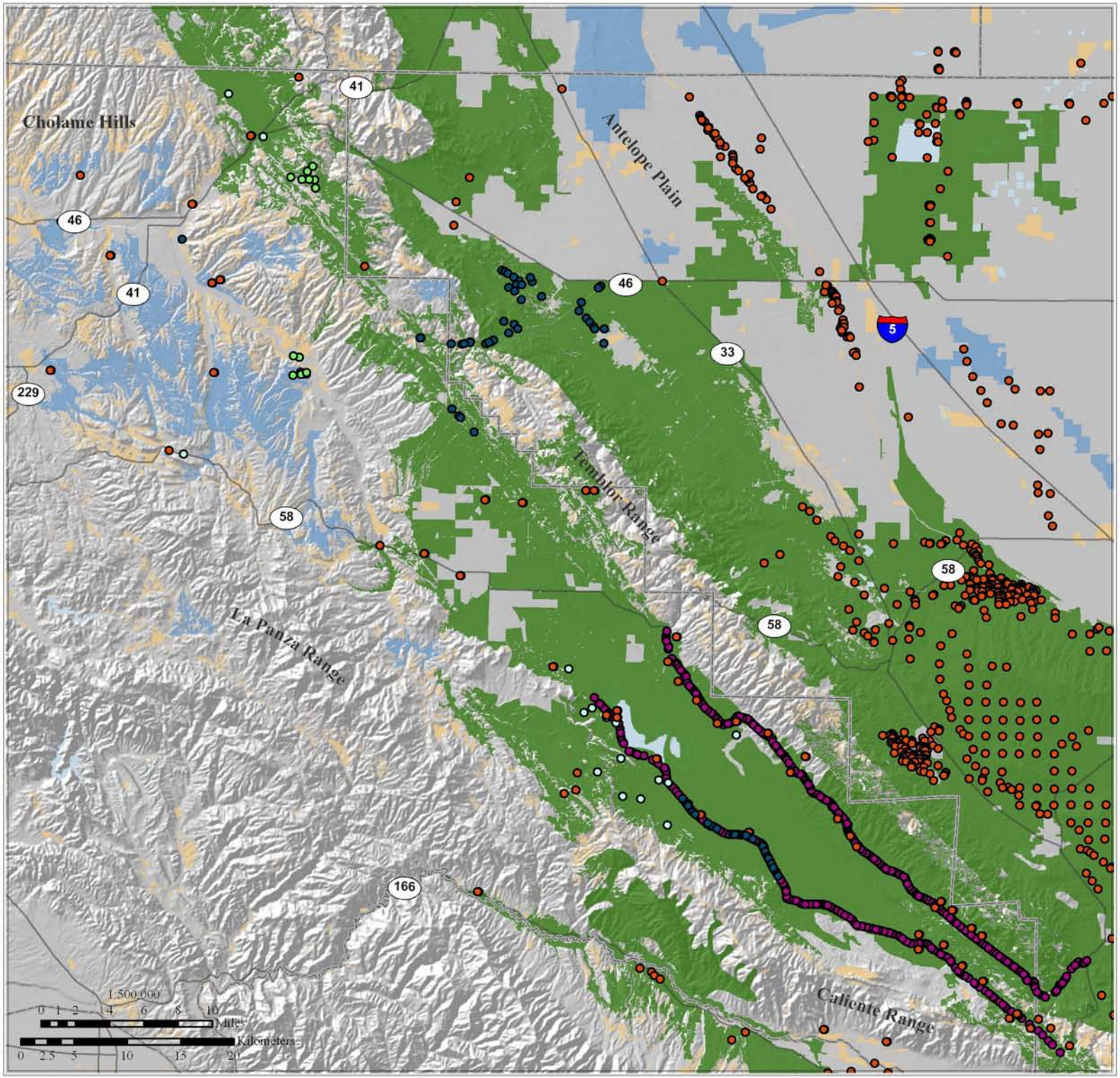
Figure 9.
Potential Cores & Patches
for
San Joaquin kit fox



- Core
- Patch
- < Patch
- Kit Fox Sightings
- ESRP Kit Fox Sightings
- Spotlight observations
- Incidental observations
- Telemetry locations
- Car Sightings
- CNDDB Kit Fox
- Highways
- County Boundaries
- Hydrography

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portion of the southern Target Zone. There are many fences through this area (Figure 10 inset). It is possible that pronghorn may be able to negotiate many of these fences but without more details about their design (height, wire spacing, etc) it is difficult to say anything conclusive. Ongoing efforts, such as those by CDFG and volunteers, to make fences more "pronghorn-friendly" (by raising the bottom wires) and to remove old field fencing, should be continued and expanded. A second, moderately permeable path branches off toward the north over the Temblor Range where grasses predominate, toward the easternmost part of the northern target zone.

6.1.2.2 Tule elk

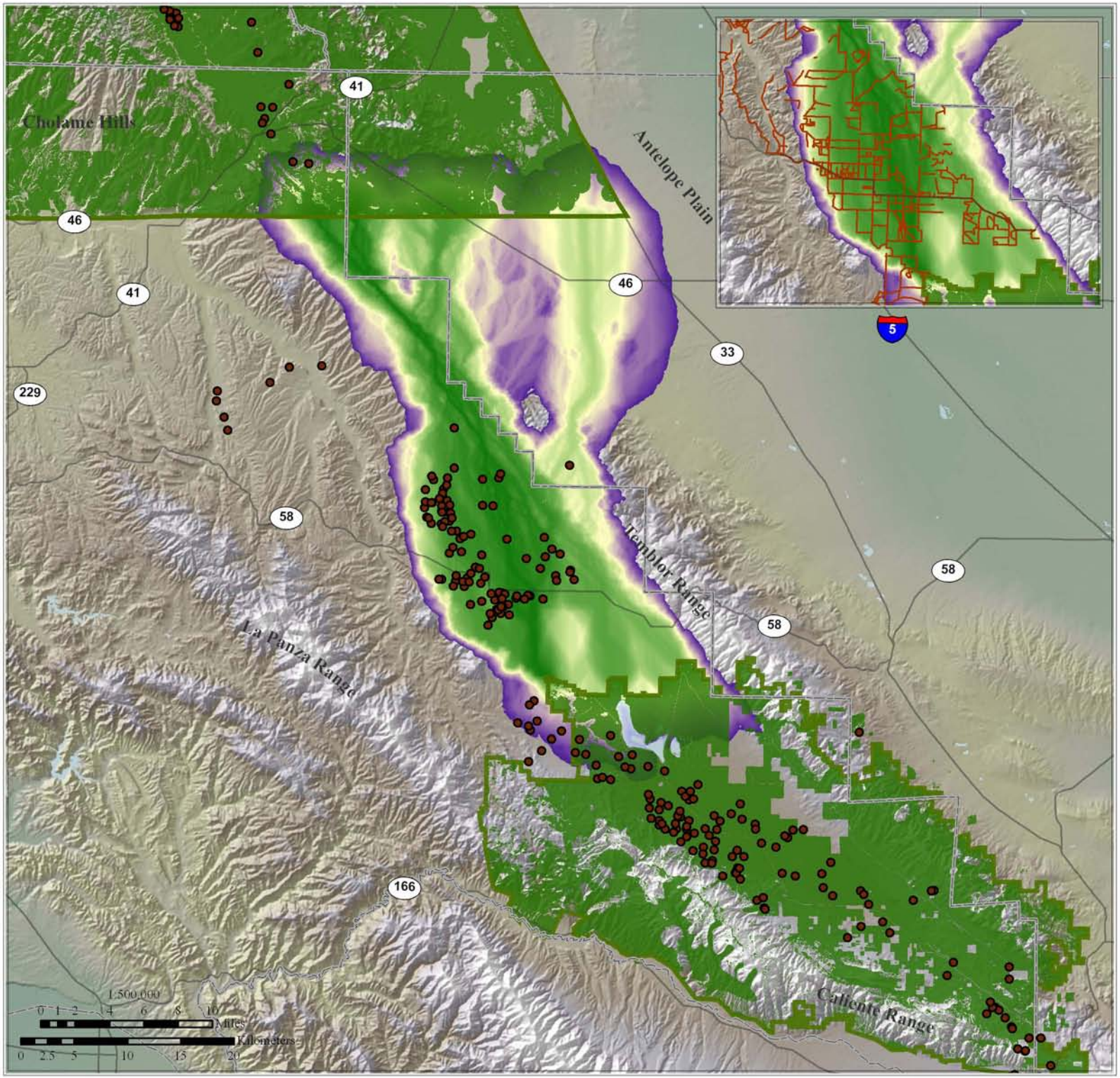
The least cost corridor for tule elk between the northern and southern Target Zones varies in width from about 9 to 17 km using the most permeable 2% portion of the landscape (Figure 11). It is generally bound by the Temblor Range on the east and by the La Panza Range and Bitterwater Road on the west. The most permeable path extends from the center of the southern Target Zone and follows the highest quality habitat between the two Target Zones; it occurs entirely to the east of Bitterwater Road. A secondary route of moderate permeability follows highly suitable habitat to the west of Bitterwater Road.

6.1.2.3 San Joaquin kit fox

The least cost corridor for kit fox based on habitat suitability ratings between the northern and southern Target Zones ranges in width from approximately 5 to 20 km using the most permeable 1% portion of the landscape (Figure 12). The most permeable route follows the alkali desert scrub habitat out of Carrizo Plain National Monument in the southern Target Zone and then heads in a northeastern direction over the Temblor Range following Carneros Canyon to high quality habitat on the San Joaquin Valley side of the Temblors. A secondary route of moderate permeability extends from the eastern side of the southern Target Zone over the Temblor Range via a dirt road called Hurricane Road to high quality habitat on the San Joaquin Valley side of the Temblor Range, which joins the most permeable route. Kit fox biologists found the results of the permeability analysis based on habitat suitability ratings biologically untenable, as they consider the Temblor Range a significant barrier to kit fox movement, and no kit foxes have ever been observed crossing the range during telemetry studies.

The least cost corridor for kit fox based on permeability ratings between the northern and southern Target Zones ranges in width from approximately 7 to 20 km using the most permeable 2% portion of the landscape (Figure 13). The most permeable route follows the alkali desert scrub habitat out of the Carrizo Plain National Monument in the southern Target Zone and then heads in a northwesterly direction following the Carrizo Plain proper. About 5 km north of State Route 58 it starts to head almost due north and then appears to follow Bitterwater Valley Road east into the Shale Hills and then to the Antelope Valley beyond. Kit fox biologists concur that these results are much more biologically meaningful and reflect the most probable route for kit fox traveling between the northern and southern Target Zones.

Figure 10.
Landscape Permeability
for
Pronghorn antelope



- Highly Permeable
- Less Permeable
- Targeted Core Areas
- Core Targets
- Pronghorn Sightings
- Highways
- Fence Lines
- County Boundaries
- Hydrography

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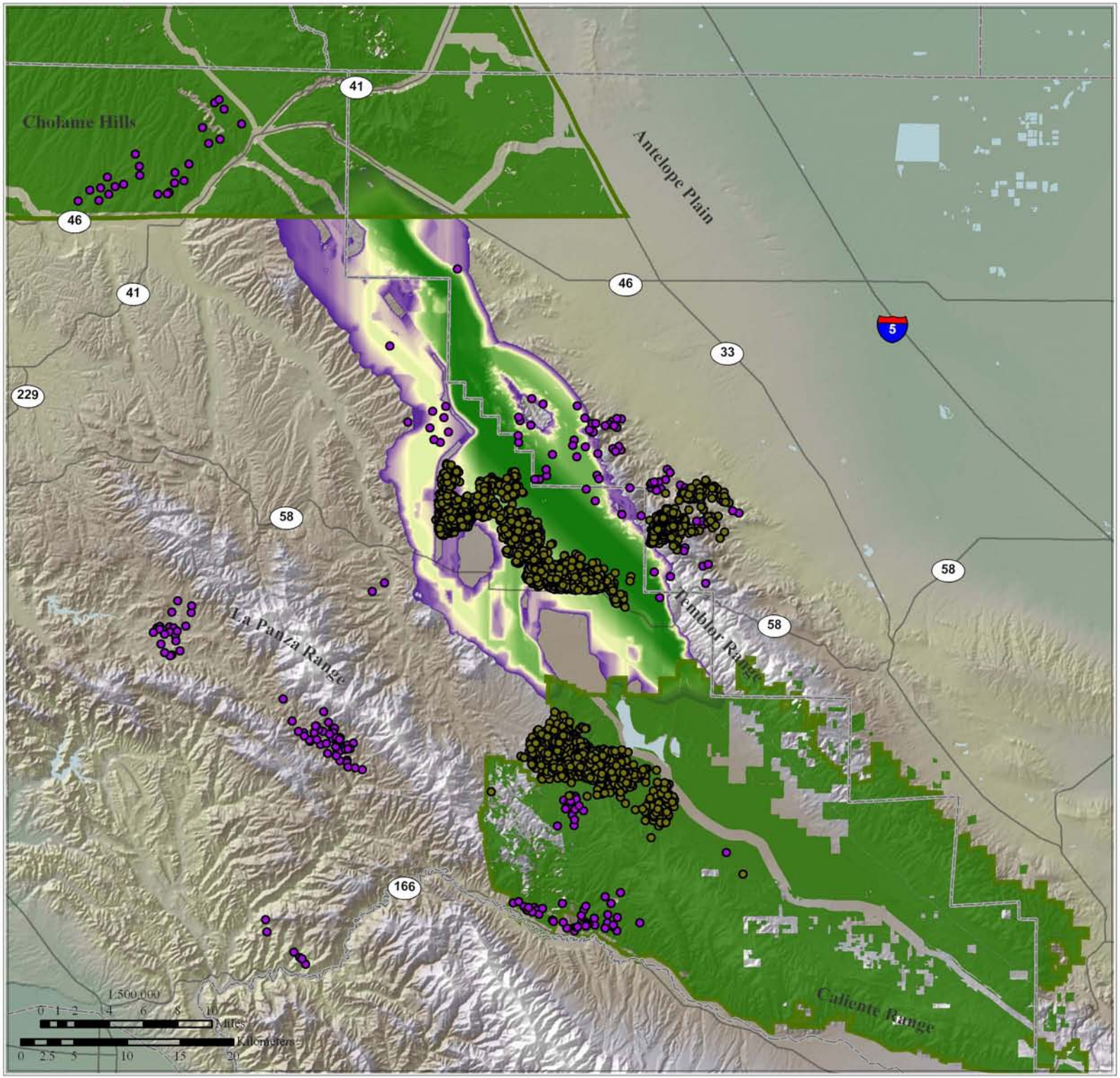
Figure 11.
Landscape Permeability
for
Tule elk



- Highly Permeable
- Less Permeable
- Collared Sightings
- Flight Sightings
- Targeted Core Areas
- Core Targets
- Highways
- County Boundaries
- Hydrography

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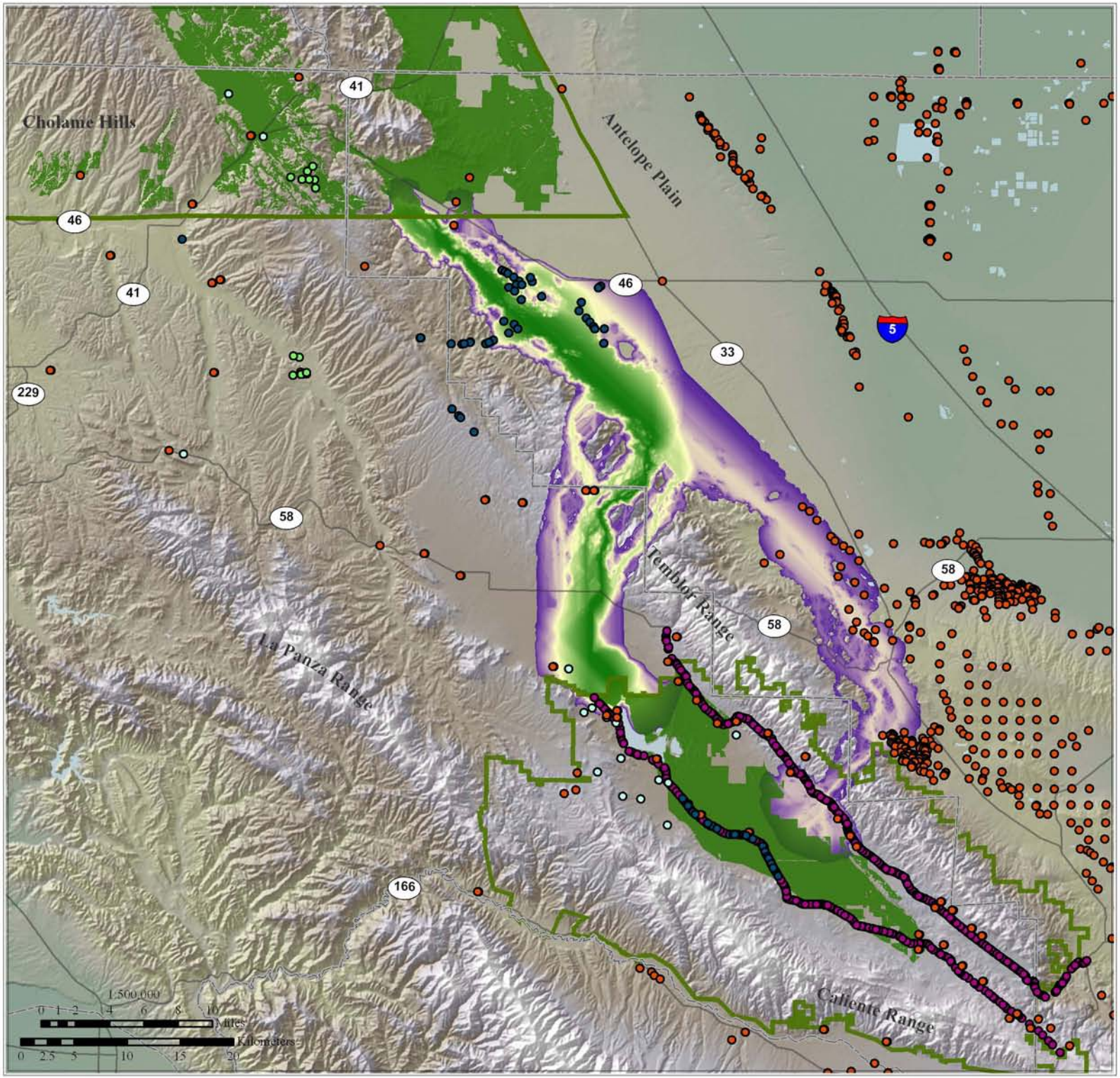
Figure 12.
Landscape Permeability
for
San Joaquin kit fox
(based on suitability ratings)



- Highly Permeable
- Less Permeable
- Core Targets
- Targeted Core Areas
- Kit Fox Sightings
- ESRP Kit Fox Sightings
- Spotlight observations
- Incidental observations
- Telemetry locations
- Car Sightings
- CNDDB Kit Fox
- Highways
- County Boundaries
- Hydrography

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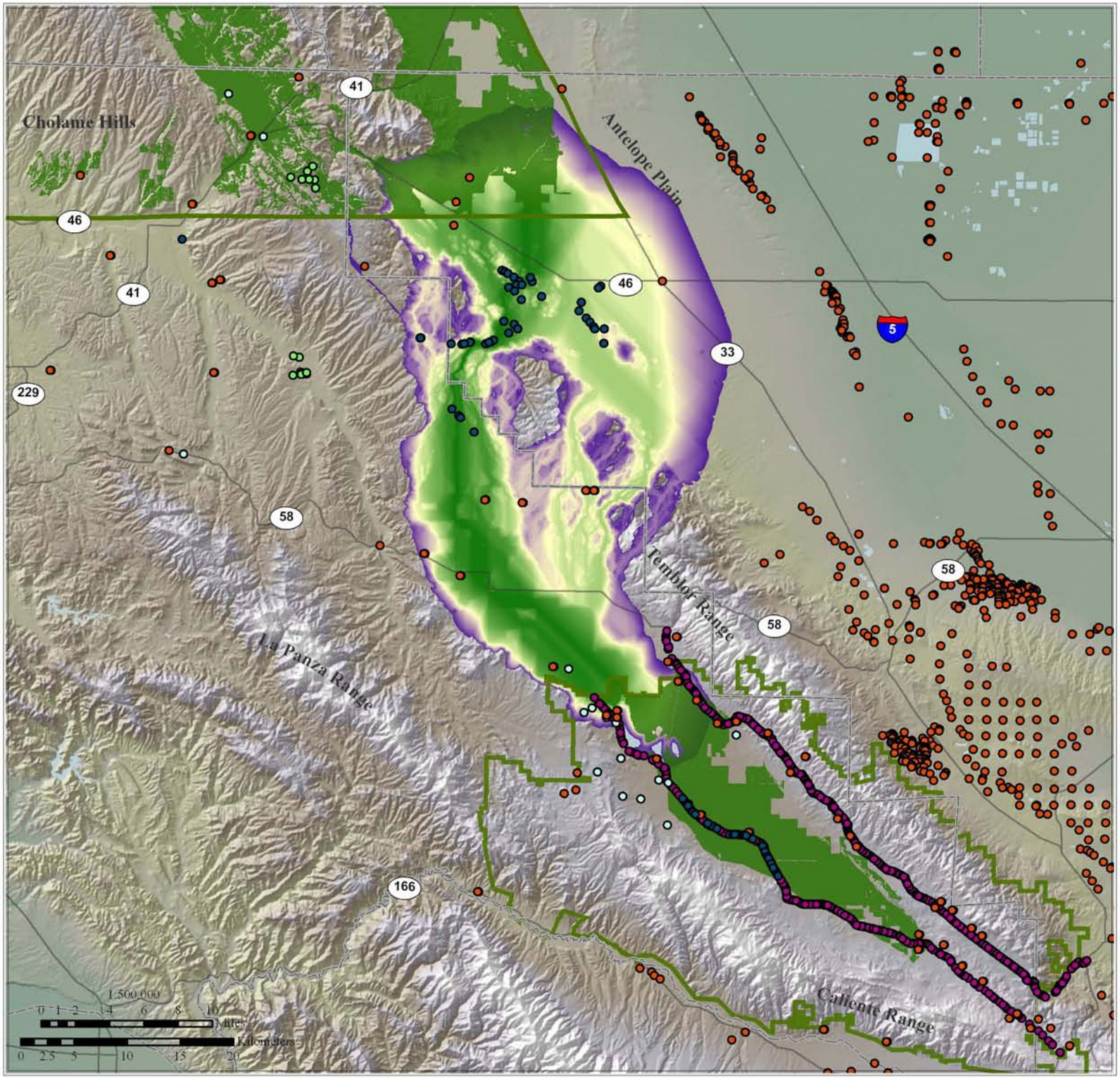
Figure 13.
Landscape Permeability
for
San Joaquin kit fox
(based on permeability ratings)



- Highly Permeable
- Less Permeable
- Core Targets
- Targeted Core Areas
- Kit Fox Sightings
- ESRP Kit Fox Sightings
- Spotlight observations
- Incidental observations
- Telemetry locations
- Car Sightings
- CNDDB Kit Fox
- Highways
- County Boundaries
- Hydrography

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Map Produced By:

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Science & Collaboration for Connected Wildlands

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Appendix A
Digital Data Sources Used

Name	Data Type	Scale	Date	Source
San Louis Obispo Vegetation	Polygon	1:100,000	1998	County of San Luis Obispo
CALVEG Vegetation	Polygon	1:24,000	1997, 2000, 2002	U.S. Forest Service
San Luis Obispo Crops	Polygon		2008	County of San Luis Obispo
Kern Crops	Polygon		2005	County of Kern
TIGER Roads	Line	1:100,000	2007	U.S. Bureau of the Census
California Highways	Line		2001	California Department of Transportation
National Elevation Dataset	Raster	10 meter	1999	U.S. Geological Survey
Conservation Lands (CPAD)	Polygon		2008	GreenInfo Network
Counties	Polygon	1:24,000	2004	California Department of Forestry and Fire Protection
Precipitation Normals	Raster	800 meters	1971-2000	PRISM Group, Oregon State University
National Hydrography Dataset	Line and Polygon	1:100,000	2007	U.S. Geological Survey
San Luis Obispo Aerial Photos			2007	San Luis Obispo County
Terrain Ruggedness	Raster	30 meter	2007	Endangered Species Recovery Program
Vegetation Density	Raster	30 meter	2001-2006	Endangered Species Recovery Program: Generated from Global Land Cover Facility MODIA Normalized Difference Vegetation Index [NDVI]

Appendix B
Species-Specific Model Inputs

Tule Elk Model Inputs

Variable	Permeability	Suitability
Factor Weights (100%)		
Vegetation	50%	50%
Road Density	50%	50%
Vegetation		
Alkali Desert Scrub	6	0.4
Annual Grassland (Avena)	1	0.9
Annual Grassland (Brome)	4	0.6
Barren	9	0.1
Blue Oak-Foothill Pine	7	0.3
Blue Oak Woodland	6	0.4
Chamise-Redshank Chaparral	9	0.1
Closed-Cone Pine-Cypress	9	0.1
Coastal Oak Woodland	9	0.1
Coastal Scrub	4	0.6
Deciduous orchard	10	0
Desert Riparian	10	0
Desert Scrub	6	0.4
Desert Wash	10	0
Dryland Grain Crops	4	0.6
Eucalyptus	10	0
Evergreen orchard	10	0
Freshwater Emergent Wetland	2	0.8
Irrigated Grain Crops	2	0.8
Irrigated Hayfield	3	0.7
Irrigated Row and Field Crops	2	0.8
Juniper	4	0.6
Lacustrine	6	0.4
Mixed Chaparral	10	0
Montane Chaparral	9	0.1
Montane Hardwood	10	0
Montane Hardwood-Conifer	10	0
Orchard-Vineyard	8	0.2
Pasture (Irrigated)	1	0.9
Perennial Grassland	1	0.9
Pinyon-Juniper	10	0
Rice	n/a	n/a
Sagebrush	7	0.3
Sierran Mixed Conifer	10	0

Urban	10	0
Valley Foothill Riparian	5	0.5
Valley Oak Woodland	6	0.4
Vineyard	8	0.2
Wet Meadow	1	0.9
Road Density		
0 – 0.5 km/km^2	1	0.9
0.5 – 1 km/km^2	8	0.2
1 – 2 km/km^2	10	0
2 – 4 km/km^2	10	0
4 – 6 km/km^2	10	0
6 – 8 km/km^2	10	0
8 – 10 km/km^2	10	0
10 km/km^2 and above	10	0

Pronghorn Antelope Model Inputs

Variable	**Permeability**	**Suitability**
Factor Weights (100%)		
Vegetation	35%	35%
Road Density	10%	10%
Topography	55%	-
Slope	-	55%
Vegetation		
Alkali Desert Scrub	3	0.7
Annual Grassland (Avena)	1	0.9
Annual Grassland (Brome)	3	0.7
Barren	9	0.1
Blue Oak-Foothill Pine	7	0.3
Blue Oak Woodland	7	0.3
Chamise-Redshank Chaparral	9	0.1
Closed-Cone Pine-Cypress	9	0.1
Coastal Oak Woodland	9	0.1
Coastal Scrub	6	0.4
Deciduous orchard	10	0
Desert Riparian	10	0
Desert Scrub	3	0.7
Desert Wash	10	0
Dryland Grain Crops	2	0.8
Eucalyptus	10	0
Evergreen orchard	10	0
Freshwater Emergent Wetland	2	0.8
Irrigated Grain Crops	2	0.8
Irrigated Hayfield	1	0.9
Irrigated Row and Field Crops	2	0.8
Juniper	5	0.5

Lacustrine	6	0.4
Mixed Chaparral	10	0
Montane Chaparral	8	0.2
Montane Hardwood	10	0
Montane Hardwood-Conifer	10	0
Orchard-Vineyard	10	0
Pasture (Irrigated)	1	0.9
Perennial Grassland	1	0.9
Pinyon-Juniper	10	0
Rice	n/a	n/a
Sagebrush	3	0.7
Sierran Mixed Conifer	10	0
Urban	8	0.2
Valley Foothill Riparian	6	0.4
Valley Oak Woodland	7	0.3
Vineyard	10	0
Wet Meadow	1	0.9
Road Density		
0 – 0.5 km/km^2	1	0.9
0.5 – 1 km/km^2	2	0.8
1 – 2 km/km^2	2	0.8
2 – 4 km/km^2	6	0.4
4 – 6 km/km^2	7	0.3
6 – 8 km/km^2	8	0.2
8 – 10 km/km^2	9	0.1
10 km/km^2 and above	10	0
Topography		
Canyon bottoms	7	
Ridgetops	10	
Flats	1	
Slopes	4	
Slope		
0-5%		0.99
5-20%		0.66
>20%		0.33

Kit Fox Permeability and Suitability

Variable	**Permeability based on Permeability**	**Permeability based on Suitability**	**Suitability**
Factor Weights (100%)			
Vegetation	40%	40%	50%
Road Density	5%	5%	-
Terrain Ruggedness	50%	50%	25%
Vegetation Density	5%	5%	25%

Vegetation			
Alkali Desert Scrub	1	1	0.9
Annual Grassland (Avena)	4	5	0.5
Annual Grassland (Brome)	1	1	0.9
Barren	1	8	0.2
Blue Oak-Foothill Pine	10	10	0
Blue Oak Woodland	10	10	0
Chamise-Redshank Chaparral	10	10	0
Closed-Cone Pine-Cypress	10	10	0
Coastal Oak Woodland	8	8	0.2
Coastal Scrub	10	10	0
Deciduous orchard	3	9	0.1
Desert Riparian	9	10	0
Desert Scrub	1	1	0.9
Desert Wash	1	1	0.9
Dryland Grain Crops	1	9	0.1
Eucalyptus	10	10	0
Evergreen orchard	3	9	0.1
Freshwater Emergent Wetland	10	10	0
Irrigated Grain Crops	1	10	0
Irrigated Hayfield	2	10	0
Irrigated Row and Field Crops	1	10	0
Juniper	3	4	0.60
Lacustrine	10	10	0
Mixed Chaparral	10	10	0
Montane Chaparral	10	10	0
Montane Hardwood	10	10	0
Montane Hardwood-Conifer	10	10	0
Orchard-Vineyard	4	10	0
Pasture (Irrigated)	7	7	0.3
Perennial Grassland	1	5	0.5
Pinyon-Juniper	10	10	0
Rice	10	10	0
Sagebrush	10	10	0
Sierran Mixed Conifer	10	10	0
Urban	1	9	0.1
Valley Foothill Riparian	10	10	0
Valley Oak Woodland	8	8	0.2
Vineyard	4	10	0
Wet Meadow	10	10	0
Road Density			
0 – 0.5 km/km^2	1	1	
0.5 – 1 km/km^2	1	1	
1 – 2 km/km^2	1	1	
2 – 4 km/km^2	3	3	

4 – 6 km/km^2	3	3	
6 – 8 km/km^2	5	5	
8 – 10 km/km^2	8	8	
10 km/km^2 and above	10	10	
Terrain Ruggedness			
5	10	10	0.05
50	10	10	0.50
85	3	3	0.85
100	1	1	1.00
Vegetation Density			
0-9	10	10	0.00-0.09
10-19	9	9	0.10-0.19
20-29	8	8	0.20-0.29
30-39	7	7	0.30-0.39
40-49	6	6	0.40-0.49
50-59	5	5	0.50-0.59
60-69	4	4	0.60-0.69
70-79	3	3	0.70-0.79
80-89	2	2	0.80-0.89
90-99	1	1	0.90-0.99

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 *CARRIZO ENERGY SOLAR FARM PROJECT*

Docket No. 07-AFC-8

PROOF OF SERVICE
(Revised 2/18/2009)

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DECLARATION OF SERVICE

I, Hilarie Anderson, declare that on April 2, 2009, I served and filed copies of the attached Revised Draft Summary Report of Task 1 Modeling Results – Baseline Conditions. 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/carrizo/index.html]**. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

For service to all other parties:

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

_x__by personal delivery or by depositing in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above 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. 07-AFC-8
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