Shawna Purvines <shawna.purvines@edcgov.us>

Comments on the Draft EIR for General Plan Biological Resource Policy Update and Oak Resource Management Plan

1 message

Alice Cantelow <alicecantelow@gmail.com> Mon, Aug 15, 2016 at 3:47 PM
To: shawna.purvines@edcgov.us

Dear Ms. Purvines;

Attached are my comments and suggestions regarding the DEIR for the General Plan update and Oak Resource Management Plan. I urge you to recommend selection of Alternative 2, rather than the proposed project. Thank you for your consideration.

Alice L. Cantelow
4902 Dowell Lane
Placerville, CA, 95667
alicecantelow@gmail.com

ALC Comments to DEIR.pdf
77K

El Dorado County Community Development Agency,
Long Range Planning
Attn: Shawna L. Purvines
2850 Fairlane Court, Bldg C
Placerville, CA 95667
shawna.purvines@edcgov.us

August 15, 2016

Comments Regarding the General Plan Biological Resources Policy Update, Oak Resource Management Plan and Draft Environmental Impact Report

Dear Ms. Purvines:

Please change the alternative you are proposing to select in the Draft Environmental Impact Report for the General Plan Biological Resources Policy Update and Oak Resource Management Plan! Alternative 2, which requires at least 30% of the oaks on a given site to be retained, would be vastly preferred. **Please, please, propose Alternative 2 instead!**

It may seem like mitigation fees are a win-win, but this is not what recent research shows. This relatively new practice of offsetting biodiversity destruction at one location with compensatory environmental gains elsewhere has been found by researchers to actually exacerbate environmental harm. It has also been found that political and economic motivations regularly outweigh or undermine environmental protections. In other words, its almost always a one way street- the environment- our environment- the one that supports our clean air, clean water, and joy of living- takes a back seat to monetary considerations, because people think that environmental destruction is fine since they are paying a fee- that they've somehow done the "right thing". (Ives, C.D. and S.A. Bekessy, 2015, “The Ethics of Offsetting Nature”: Frontiers in Ecology and the Environment, [scientific journal of the Ecological Society of America], V.13, No. 10; pp. 568-573)

Moreover, the argument that 30% preservation of oaks on a site would not lead to “cohesive habitat blocks” (page 10-20 of the DEIR) and is therefore no different than complete removal is not supported by science. In reality, islands of native habitat can be absolutely crucial in connecting fragmented habitats together. (Bringing Nature Home: How You Can Sustain Wildlife With Native Plants, by Dr. Doug Tallamy, 2009) Tallamy, professor and chair of the Department of Entomology and Wildlife Ecology, University of Delaware, is considered a renowned expert in the science of plant-insect interactions (www.nwf.org)

This is not a mistake that can be rectified a few years down the road. Do you know how long it takes oaks to grow? Do you know how long it will take to replace these magnificent mature trees? Centuries! Not decades, centuries. And do you know that blue oaks in particular, though widespread as adults, are facing regeneration failure throughout the state? (www.ucanr.edu)

It only takes 15 minutes to cut a tree down- a tree that was supporting as many as 500 species of butterflies and moths (National Wildlife Federation- www.nwf.org) and over 300 species of vertebrates (www.ucanr.edu) Don’t let these ancients be treated as simple commodities, thinking that fees to be used in more remote areas of the county, where oaks are not facing development pressure anyway, would somehow help.

The General Plan Update project, as proposed, is a very short sighted approach. Both people living here and tourists coming to visit care about how the Highway 50 corridor looks. They like the fact that El Dorado County is rural. They like seeing wildlife, local native plants, and knowing that both are thriving. These are intangible, but have very real value. Even economic value. Don't let oak woodlands be decimated by providing that every oak on a property can be removed!

But don't just take the value and worth of oaks from me. Consider the following comments from **UC Agricultural and Natural Resources Pub. 21601e, dated 2009**:

> "For many residents and nonresidents alike, golden-brown hills dotted with gnarled oak trees epitomize the California landscape, and native oaks symbolize values we hold dear- strength, beauty, adaptability, and longevity." There is a "deep and endearing value of oaks"....
>
> "The value of oaks goes well beyond their stature and beauty and how people view them. Oaks and oak woodlands are home to a rich and diverse assortment of wildlife....and the food and shelter provided [by oaks] are essential to their survival. Oaks are also critical in protecting watersheds and ensuring the quality of water resources...Oak trees anchor the soil, preventing erosion and sedimentation."
>
> "But not all is well with California's oaks and oak woodlands. In addition to adverse impacts from firewood harvesting, agricultural conversions, intensive grazing, and residential and commercial development, there has been concern for a number of years that several oak species are not regenerating well in portions of the state. These species grow primarily in the foothills of the Sierra, Coastal, and Transverse mountains."- in other words, in El Dorado County.

Please don't sell the county's rural soul and environmental health down the river. Please. Recommend that the Board of Supervisors select Alternative 2 instead, which still gives more than enough latitude for a landowner to develop his/her property. You are responsible for the future of the county. Please do the right thing and select Alternative 2.

Thank you for considering my comments and suggestions.

Alice L. Cantelow
El Dorado County Resident
4902 Dowell Lane
Placerville, CA 95667

Shawna Purvines <shawna.purvines@edcgov.us>

RE: DEIR for General Plan Updates

Brennan, Whitney@Tahoe <Whitney.Brennan@tahoe.ca.gov> Fri, Jul 8, 2016 at 3:56 PM
To: Shawna Purvines <shawna.purvines@edcgov.us>

Thank you!

Whitney Brennan, PhD

Wildlife Biologist, California Tahoe Conservancy

Whitney.Brennan@tahoe.ca.gov

(530) 543-6054

From: Shawna Purvines [mailto:shawna.purvines@edcgov.us]
Sent: Friday, July 08, 2016 3:13 PM
To: Brennan, Whitney@Tahoe <Whitney.Brennan@Tahoe.ca.gov>
Subject: Re: DEIR for General Plan Updates

Hi Whitney,

Just to be sure I understand what you are asking; if you currently have two lots and want to move a lot line changing the size or shape of the two lots, a Boundary Line Amendment application would be filed with the County and approved under a ministerial review.

However, if your intent is to split an existing single parcel into two parcels you would need to file with the County a parcel map application which would require a discretionary review. If you would like to give me a call to discuss further my direct line is 530-621-5362.

For reference, the General Plan defines discretionary approval as follows:

Discretionary Decision As used in CEQA, an action taken by a governmental agency that calls for the exercise of judgement in deciding whether to approve and/or how to carry out a project. Includes such activities as the subdivision of property, the granting of general plan amendments or zone changes, the approval of specific plans, the approval of Williamson Act contracts, the granting of variances, special use permits, and others.

Discretionary Project A project which requires the exercise of judgment or deliberation when the public agency or body decides to approve or disapprove a particular activity, as distinguished from situations where the public agency or body merely has to determine whether there has been conformity with applicable statutes, ordinances, or regulations.

Hope this helps

Sincerely

Shawna Purvines

On Fri, Jul 8, 2016 at 2:49 PM, Brennan, Whitney@Tahoe <Whitney.Brennan@tahoe.ca.gov> wrote:

> Hi-
>
> What is included under development projects that require discretionary approval? Does this include lot line adjustments (e.g. if we want to sell of only part of a lot)? Thanks!
>
> *Whitney Brennan, PhD*
>
> *Wildlife Biologist, California Tahoe Conservancy*
>
> *Whitney.Brennan@tahoe.ca.gov*
>
> *(530) 543-6054*
>
> Every Californian should conserve water. Find out how at:
>
> Save Our Water
>
> SaveOurWater.com · Drought.CA.gov

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Shawna L. Purvines

Principal Planner

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Alternative 2 to the General Plan update on Oak Woodlands

Debra Ayres <drayres@ucdavis.edu> Fri, Aug 12, 2016 at 11:05 AM
To: shawna.purvines@edcgov.us

El Dorado County Community Development Agency, Long Range Planning

Alternative 2 to the General Plan update on Oak Woodlands

Attn: Shawna Purvines

2850 Fairline Court, Building C

Placerville, CA 95667

August 12, 2016

Dear Ms. Purvines,

One of the greatest threats to the biological richness supported by our native plant communities is a severing of connections among those plant community types. Those connections allow our native plants and animals to migrate to their preferred habitats. It is for this reason that I advocate Alternative 2 to the General Plan update as maintaining 30% of the oaks on all properties will keep those vital connections alive and functioning.

Best regards,

Debra Ayres, PhD, Vice President, El Dorado Chapter of the California Native Plant Society.

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Debra Ayres, PhD
Project Scientist, ret.
e-mail: drayres@ucdavis.edu

Shawna Purvines <shawna.purvines@edcgov.us>

Public comment on Bio Resources DEIR, 12-1203

Ellen Van Dyke <vandyke.5@sbcglobal.net> Sun, Aug 14, 2016 at 7:26 AM
To: Brian Veerkamp <bosthree@edcgov.us>, Ron Mikulaco <bosone@edcgov.us>, Shiva Frentzen <bostwo@edcgov.us>, Sue Novasel <bosfive@edcgov.us>, Michael Ranalli <bosfour@edcgov.us>, Jim Mitrisin <edc.cob@edcgov.us>
Cc: Char Tim <charlene.tim@edcgov.us>, Brian Shinault <brian.shinault@edcgov.us>, Gary Miller <gary.miller@edcgov.us>, Jeff Hansen <jeff.hansen@edcgov.us>, James Williams <james.williams@edcgov.us>, Rich Stewart <rich.stewart@edcgov.us>, Shawna Purvines <shawna.purvines@edcgov.us>

Please find two documents attached for public comment on the DEIR for the Biological Policy Update, comment period closing tomorrow, 8/15/16.

Thank you – Ellen

2 attachments

DEIR comments_Van Dyke_12-1203_Bio Res Pol update_8.15.16 a..pdf
588K

Public comment_BOS 6.22.15_bio policy update .pdf
694K

RE: Biological Resources Policy Update DEIR, file no. 12-1203, public comment period ending 8/15/16

Dear Supervisors:

Please consider the following comments on the Draft EIR and include them in the record for the above project:

1. **Retention**: Keeping Oak woodland retention requirements was a primary concern expressed by the public in the Notice of Preparation (NOP) for this Draft EIR (DEIR), yet retention has been one of the most unstable aspects of the project description. In the scoping hearings retention was dismissed, with staff falsely claiming 100% removal has always been allowed (2/23/15); then existing retention standards were briefly acknowledged in a staff slide presentation (3/30/15), followed by it being added as an alternative to be analyzed in the DEIR (6/22/15); then the alternative was deleted via consent calendar (7/14/15), confirmed in the NOP (7/17/15) with no change noted in the revised NOP (11/23/15), and finally it just randomly reappeared in the DEIR (7/29/16 release date) with no basis for the retention values that were proposed. This is NOT a stable project description, nor is it consistent with the intent of CEQA to further public understanding and discourse prior to making policy decisions.

   Regarding retention standards:

   a. The DEIR concludes that minimum retention standards are 'infeasible' without providing any evidence to support this claim (DEIR pg 6-65; pdf pg 139/270). This is contrary to the fact that under existing Option A retention standards, oak woodland conversion in the time frame between 2002 and 2015 has been minimal per the DEIR reported FRAP data (DEIR pg 6-60; pdf p134/270). Please reconcile and provide substantiating info, or revise this conclusion.
   b. General Plan policy 7.4.5.2 allowed for exceptions to retention requirements if reasonable use of the property would otherwise be denied. Please provide substantiating evidence as to why it would be infeasible to continue this policy as mitigation for any detrimental impacts that might be considered 'a taking' under Option A retention standards.
   c. It is not clear why an alternative requiring 30% retention was analyzed rather than the variable standards that exist under Option A. Where did this percentage come from?
   d. The General Plan goal of maintaining higher intensity uses inside the Community Regions has not been shown to be incompatible with a minimum retention standard, as is being falsely asserted in the DEIR (pg 5-16; p64/270). The 30% open space required in proposed developments has been utilized to maintain existing oak canopy and habitat connectivity in the past such as in the approved Wilson Estates development (11/4/14), and various Serrano maps.
   e. The DEIR says limiting agricultural exemptions would help reduce their negative impacts, but incorrectly asserts that would be a conflict with General Plan policies. Applying exemptions only to the area above and beyond the 30% retention requirement would retain the commitment to agricultural enhancement while protecting our other resources. There is no conflict in that regard. But to show preference to one element of the General Plan (Agricultural) over another (Open Space & Conservation) is in itself a conflict with regard to CEQA. Please substantiate how limiting exceptions would cause conflict.
   f. DEIR Visual Resources section '9.4 Mitigations Measures' falsely claims there are no feasible mitigations for the significant impact this project will have on the visual character or quality of the area (DEIR p9-18; pdf p212/270). That is contrary to the analysis under both Alternatives 1 and 2, which state that mitigation in the form of oak woodland retention would result in reduced impacts to visual resources (DEIR pgs 10-19 and 10-22). DEIR claims that significant impacts are comparable to the 2004 General Plan analysis are incorrect since many of those policies are being changed or deleted under this update.

2. **Cattle grazing** is known to prohibit regeneration of oak woodland, as confirmed in the Dudek memo (attachment 14B, p 13/236). This conflicts with DEIR assertions that grazing within conservation easements does not contribute to the significant impact of agricultural exemptions. The DIER also asserts mitigations to be infeasible (DEIR p 6-60; pdf p134/270) and provides no supporting evidence. Possible mitigation options:
   a. protect saplings from grazing activities.
   b. disallow cattle grazing as a use in dedicated conservation easements.

c. require protection of woodland area per established retention standards if grazing is to be a use on land designated as conservation easement or as project mitigation.

3. **Project Description**: Per the project description, this update is "*clarifying and refining the intent and scope*" of the General Plan's biological policies (DEIR p3-2;pdf pg26/270). This downplays the extent of the project, and violates CEQA's intent to inform the public and its decision makers. The policy revisions are drastic changes rather than mere clarifications, and again, they were not reviewed against the increased development potential of the TGPA/ZOU. Some examples:

   a. preservation of habitat is being revised to voluntary rather than required
   b. area of development potential is greatly increased
   c. exemptions are broadened without mitigations to offset them
   d. policies are moved from the General Plan into an ordinance that is more easily revised with minimal public exposure or awareness.

4. **The 'No Project Alternative'** is erroneously said to result in similar levels of development as the project, and result in similar habitat conversion as that described in the 2004 General Plan EIR (DEIR 10-8; pdf p220/270). Neither is true, and in fact evidence in the record shows otherwise:
   a. more exemptions are being allowed under the project, so more area can be developed (DEIR Table 10-1 page 10-10; pdf p222/270)
   b. tree/woodland retention is to be made voluntary, also allowing greater area to be developed (DEIR Table 10-1 page 10-10; pdf p222/270)
   c. the policy 7.3.3.4 revision to decrease riparian setbacks allows an increased area for development
   d. decreased open space requirements in the 2015 Targeted General Plan Amendment (TGPA) update allow for greater area of development
   e. the DEIR uses a lower and incorrect growth rate for the impact analysis (see item 5 below).
   f. The efficacy of the existing General Plan policies is due to their lack of implementation, NOT the content of the policies themselves (DEIR Table 10-1 pg 10-12; pdf p224/270), i.e. extensive work was completed on the soon-to-be-discarded INRMP without completing the final implementation. Analysis of the No Project Alternative has not taken this into account.

The County could reduce impacts of development by implementing the *existing* Gen Plan policies, via the 'No Project Alternative'. The DEIR falsely concludes that option to be 'infeasible' (DEIR pg 10-19; pdf 231/270) claiming it does not meet the project objectives. But per the project description, the existing policies are the basis of the project, and are merely being refined and clarified. From the DEIR Project Description page 3-2:

> On September 24, 2012, the BOS directed County staff to retain consultants to assist the County in the process of considering amendments to General Plan Policies 7.4.2.8, 7.4.2.9, 7.4.4.4, 7.4.4.5, 7.4.5.1, and 7.4.5.2 and their related Implementation Measures, and to prepare an Environmental Impact Report (EIR). As stated in the staff report to the BOS, the effort was undertaken with the goals of "clarify[ing] and refine[ing] the intent and scope of all of those policies, ensur[ing] the consistency of all the related biological policies, consider[ing] changes in state law, and finally harmoniz[ing] the General Plan Policies."

The bifurcation of this project's EIR from the TGPA's EIR is already the subject of current litigation. The analysis of increased development potential under the TGPA/ZOU *depended* on the biological resource policies of the 2004 Gen Plan. These changes proposed are not mere clarifications, and will validate that lawsuit.

5. **Growth issues**:

    a. The DEIR falsely claims "*this EIR relies on the same growth and development projections used for the TGPA-ZOU*" (DEIR pg 6-44; pdf p118/270). This DEIR actually uses .9 percent (DEIR pg 5-4; pdf p53/270) while the TGPA used 1.03 percent (TGPA DEIR p 3.10-17; pdf p337/1212). The lower growth projection of .9 would reflect lesser impacts throughout the DEIR, presenting an inaccurate and deflated analysis of the impacts.

    b. A project indirectly induces growth by reducing or removing barriers to growth. This project absolutely will induce growth, contrary to the conclusion of DEIR Section 11.4, Growth Inducement (DEIR pg 11-4; pdf p241/270). The proposed Dixon Ranch project on Green Valley Rd is just one of many proposed General Plan amendment development projects being phased to allow additional removal of oak canopy in order to increase density/population once these policies are approved.

    From the Dixon Ranch Development Agreement (DA, pdf pg 3/17, file no. 14-1617, attachment 6C):

    *"..**<u>the second phase (which includes 194 new residential units ("Phase 2")) cannot proceed until such time as the County has adopted policies</u>**, as provided in the County's General Plan, allowing for the utilization of offsite mitigation or the payment of impact fees, or otherwise amends its oak tree conservation policies <u>to allow for offsite mitigation techniques and</u> **<u>removal of oak tree canopy beyond 10%</u>**,.." [emphasis added]*

    The DEIR must be revised to address growth inducement as a significant impact.

6. **Bifurcation from the TGPA/ZOU**:

    a. The Zoning Ordinance Update in Dec. 2015, new ordinance section 130.30.030G, established setbacks that were a reduction from existing Gen Plan policy 7.3.3.4 (DEIR pg 6-42; pdf p116/270) without evaluating the impact of that change. This was pointed out in the NOP comments (Van Dyke, 6/22/15 item 4.a). This project's DEIR now assumes the reduced setback to be in place and provides no actual impact analysis. <u>This is an issue of bifurcation and piece mealing of the CEQA process</u>. These policies are vulnerable to litigation if the reduced setbacks are never analyzed, particularly since the ordinance now applies to ministerial projects that will not receive any further discretionary review.

    b. The 2004 General Plan anticipated development intensification throughout the County of sufficient level to degrade community character. Policies 7.4.4.4, 7.4.4.5, 7.4.5.2, 7.4.2.8, and CO-P were a few of the policies added to mitigate those impacts. The 2015 amendments under the TGPA further added uses intensifying the impacts of the 2004 Gen Plan (DEIR pg 5-13, pdf pg 61/270), *but the TGPA/ZOU's EIR impact analysis assumed those protective biological resource policies would remain in place and did not analyze the changes proposed here*.

    This project reduces biological protections, and erroneously claims under impact LU-2 that 'it's ok' because the findings were previously, and still remain, 'significant and unavoidable'. This is NOT permissible under CEQA, and a) validates the litigation on the TGPA project because these policies were assumed to be intact, and b) makes this project vulnerable to litigation due to bifurcation.

7. **Mapping**: Existing policy 7.4.2.8 required mapping of IBC corridors to be updated every three years in order to see where development may have compromised them. This has not been done, yet rather than update the mapping, the requirement is being deleted. This was a significant mitigation requirement of the 2004 General Plan, yet no analysis of the impact of neglecting the requirement, or deleting it, is apparent. Please direct me to where this has been discussed in the DEIR.

8. **NOP comments**: A number of questions raised in my NOP comments (Van Dyke, 6/22/15) were not addressed in the DEIR and are still relevant. That letter is attached here for reference and ease of response.

In reviewing the DEIR, it appears this update would be unnecessary if the 2004 General Plan policies were actually implemented as required. The No Project Alternative is most definitely 'feasible', and the best choice for resource protection *and* to keep development moving rather than tie it up in litigation related to the General Plan.

I understand the Center for Sierra Nevada Conservation (CSNC) has another alternative to recommend for consideration. I would urge you to include it in a recirculation of the Draft EIR, at which time some of the bifurcation issues relative to the TGPA/ZOU can also be addressed.

Thank you for the opportunity to comment.

Ellen Van Dyke, E. Green Springs Rd, Rescue

cc:
shawna.purvines@edcgov.us
Planning Commissioners Stewart, Miller, Hansen, Williams, Shinault

<u>Public Comment for BOS meeting 6/22/15, File no 12-1203- draft Biological Policies</u>

Dear Supervisors:

The biological policies being drafted are intended to be the basis of an EIR. Do not waste time and resources analyzing policies the public does not support. *I urge you to reject any elimination of the Option A oak tree retention standards and do not allow 100% tree removal on a project site.* If a project requires such clear cutting of oaks, it should probably be proposed for a different site.

Additionally,

1. At the 5/18 meeting, in response to the question "*what other jurisdictions endorse 100% removal?*", Dudek consultant Scott Eckardt said that no other counties had retention requirements. In reality,

    A. <u>No</u> jurisdiction actually condones 100% removal.

    - All jurisdictions prefer preservation and discourage complete annihilation. Some jurisdictions have voluntary retention with strict mitigation(Folsom, Sac County), others have not yet adopted protective ordinances and depend on CEQA review for retention (Tuolumne), others have retention guidelines and depend on CEQA review for projects that exceed the standards (Placer).

    B. 100% removal was never the intention of the 2004 General Plan policies.

    - **Policy 7.4.5.2** (Existing): "*It shall be the policy of the County to preserve native oaks wherever feasible, through the review of all proposed development activities where such trees are present on either public or private property, while at the same time recognizing individual rights to develop private property in a reasonable manner. To ensure that oak tree loss is reduced to reasonable acceptable levels, the County shall develop and implement an Oak Tree Preservation Ordinance*. .."

    Where avoidance is not possible and mitigation is necessary, mitigating policies should be developed. Option B was a mitigating policy to ensure reasonable use of the property - not to allow 100% canopy removal when an incompatible project is proposed.

    C. In the 2005 court ruling that lifted the writ of mandate, the Judge noted that the County had eliminated the replacement option in lieu of retention. From pg 5 of the ruling:

    "The new, revised canopy protection measure keeps the retention percentages that were adopted in 1996, eliminates replacement as an option in lieu of retention, and requires a replacement of any canopy not required to be retained under the policy."

    Retention standards were to be met, and tree removal was to be mitigated.

2. Mitigation fees were collected through 2012. What is the County's record for the funds collected, and easements recorded to date? How is the monitoring being done? If the County did not have the resources for monitoring planting mitigations in the past, what is going to be different going forward?

3. The proposed Heritage Tree designation of 36" appears to have been randomly selected; why not 18", or 24"?

   A. Where are the explanations of what those inches mean in terms of years of growth? How old is a 20" dbh (diameter at breast height) Blue Oak?
   B. Are Supervisors aware that the El Dorado Hills CSD currently has tree protection standards defining Heritage Oaks as 20" dbh, rather than 36"?
   C. What have other counties designated as 'heritage' worthy diameters? Please confirm the standard is 24" in both Placer and Tuolumne counties, and 19" in neighboring Folsom.
   D. Trees are quite photogenic. Has staff provided pictures to help guide the Supervisors' decision?

4. As noted in the TGPA/ZOU public comments, separating the biological policies out of that project and deferring them to this project (a separate EIR) is confusing and leaves a lot of room for error.

   A. Because of this bifurcating of the CEQA analysis, policy changes are falling through the cracks. For example, policy 7.3.3.4 revisions are not indicated as 'changes' in the TGPA, but the 50'/100' setbacks to streams are indeed reduced to 25'/50' under the ZOU. Will that change be considered as already "done" when this EIR moves forward? It appears that since this change was deferred from the TGPA, but it is not delineated as a change here, the impact analysis will never be done.

      Similar jurisdictions such as Placer County have 50'/100' riparian setbacks. Why are we reducing ours and when does the change get analyzed?

   B. When the biological policies were separated out of the TGPA/ZOU, were the relevant public comments forwarded to this project file, and/or were the commenters notified that their comments would need to be resubmitted here?

   C. Will these draft biological policies be analyzed relative to the 2004 General Plan, or relative to the as-yet-to-be-completed TGPA/ZOU with its increased development potential?

<u>Comments on the 6/22/15 Dudek memo</u>:
This 236 page document just came available for public review Thursday, and the BOS meeting is Monday morning. There simply is not adequate time to review it and get input back to the Supervisors in time for them to read it before the meeting. A few comments follow, but I am requesting a continuance to allow the working public (myself included) adequate time to read and reply.

5. The page 10 explanation of why they do not recommend an update of the IBC Corridors is an exercise in circular logic. On the contrary, this is the perfect time. The existing mapping is over 10 years old. Policy 7.4.2.8 requires mapping of Habitat inventory to be updated every three years. The County's progress in habitat conservation would help guide the upcoming policy decisions.

6. Pages 9-10 give an unrealistic view of minimal management and monitoring the conservation easements might require. The 'self-monitoring' suggested should be out of the question. Previous disregard of real costs is what got EDC into trouble with the Option B in-lieu fees before, and downplaying the monitoring requirements will not result in an accurate estimate of necessary fees.

7. Page 13 discusses cattle grazing in conservation easements, and portrays General Plan Objective 7.4.4 incorrectly. Objective 7.4.4 strives to preserve oak woodland to improve grazing areas; it does NOT say grazing is good for oak woodland. Research clearly indicates grazing inhibits regeneration of oak seedlings. Any policies allowing conservation easements to be utilized as grazing land should include the appropriate protections for regeneration of seedlings, and then the two uses may be compatible. This would affect the monitoring & management costs and associated in-lieu fee.

8. Page 14 discusses the issue of allowing 100% oak woodland removal from a project site, and says "the Board gave direction" to proceed with it. FYI: This is *NOT* what the general public wants.

   Supervisors were also told that the retention standards in Policy 7.4.4.4 do not apply if an in-lieu fee option is used. This is a liberal interpretation of Policy 7.4.4.4, that was not similarly interpreted by the Judge when lifting the Writ of Mandate.

   > **Policy 7.4.4.4** [excerpt]**:** "..*the County shall require one of two mitigation options: (1) the project applicant shall adhere to the tree canopy retention and* [on-site] *replacement standards described below*; *or (2) the project applicant shall contribute to the County's Integrated Natural Resources Management Plan (INRMP) conservation fund described in Policy 7.4.2.8*."

   and from the Judge's interpretation in the 2005 Return to Writ document: "*The new revised canopy protection measure keeps the retention percentages .. eliminates replacement in lieu of retention* .."

CASE NUMBER: 96CS01290 DEPARTMENT: 11
CASE TITLE: EL DORADO COUNTY TAXPAYERS, ET AL. VS. EL DORADO COUNTY, ET AL.
PROCEEDINGS: MOTION FOR REVIEW OF COUNTY'S RETURN TO WRIT OF MANDATE-RULING

process. Thus, issues concerning changes made in former versions of the General Plan are no longer relevant.

Moreover, the County has gone well beyond the direction of the 1999 writ. It has provided a new analysis of the impacts of replacement versus retention of oak woodlands, and it has also eliminated the "replacement" option from the policy as approved. The new, revised canopy protection measure keeps the retention percentages that were adopted in 1996, eliminates replacement as an option in lieu of retention, and requires a replacement of any canopy not required to be retained under the policy. In addition, the current DEIR proposed an alternative to the retention requirements, "Option B", which allows the County to require a project applicant to provide funding for woodland preservation in lieu of on-site canopy retention. The preservation would be at a 2:1 ratio and would allow the County to pool funds and apply them towards acquisition and restoration projects that would preserve larger contiguous blocks of habitat. The County adopted other new mitigation measures regarding oak woodland habitat. (See Mitigation Measures 5.12-1(e) and 5.12-1(g).)

9. Pages 14-15 discuss Heritage Trees being defined as 36" dbh, concluding that "*Lowering the 36-inch threshold for the Heritage Tree definition in EDC would increase the number of trees required to mitigate at a 3:1 ratio potentially resulting in greater tree replanting or in-lieu fee mitigation payments*." NOT stated is the fact that it could also result in fewer Heritage Trees being removed. No consideration is given to changing this definition, showing a severe disregard of our natural resources and an embarrassingly blatant gift to the development community.

10. Page 15 has a statement that "*Acorn planting is an accepted and often preferable practice*", but I was unable to find a single jurisdiction that allows this as mitigation planting. Are there any?

11. In the May hearing, both County staff and Dudek's representative stated that Community Regions and Rural Centers were not to be excluded from the conservation areas. But page 19 of the 'Revised ORMP' (pdf page 190/236) states that Community Regions are specifically excluded from Priority Conservation Areas. This kind of misrepresentation makes me mistrust the 220 pages of the document I will not have time to read and comment on today.

> **4.0 Priority Conservation Areas**
>
> ***4.1 Identification of Priority Conservation Areas***
>
> Figure 2 identifies the areas in which acquisition of land or conservation easements from willing sellers shall be prioritized using the Oak Woodland Conservation Fund generated by the payment of the in-lieu fees described above. These areas were identified using the FRAP classification of oak woodland habitat in the county. After those areas were mapped, the areas were narrowed down to large expanses consisting of 500 acres or more. Those large expanses were further narrowed to lands where oak woodland habitat would not likely undergo substantial fragmentation and oak woodland conservation would be consistent with the 2004 General Plan land use designations. Areas specifically excluded were lands within Community Regions and Rural Centers and lands designated Low Density Residential. These resulting areas are classified as Priority Conservation Areas (PCAs).

EIR's are too expensive to be careless in their initiation. We should be taking the time now to get the policy as close to 'right' as possible. Please continue this item and do not shortchange this phase of the project.

Sincerely,
Ellen Van Dyke, Rescue

****

A few minor 'back up' items for reference follow

City of Folsom ordinances, section 12.16 excerpt regarding Heritage tree designation:

"Heritage tree" means a native oak tree over 19 inches in diameter at breast height or a multitrunked native oak tree having an aggregate diameter of 38 inches or more at breast height.

From the EDH-CSD Oak Tree Preservation policy, defining Heritage tree:

(hh) **Heritage Tree:** A tree, as defined above, twenty (20) inches or more in diameter measured four and one half feet above the ground, or a multi-trunk tree having an aggregate diameter of thirty (30) inches or more measured four and one-half feet above the ground.

From Placer County Tree Preservation Ordinance:

12.20.040 Permit procedure.

A. When Required. No person shall cut down, move, remove, kill, or materially damage any live tree six inches dbh or over, or attach any appurtenance to a tree, without first having obtained a tree cutting permit from the permit-issuing authority, unless such tree is located on lands devoted to the growing and harvesting of timber for commercial purposes for which permits have been granted permitting timber harvesting. Such permit shall be unnecessary for the removal of trees proposed to be removed as approved in connection with the approval by the agency of a tentative map under the subdivision ordinance, except where such subdivision involves a land use conversion, or for the removal of trees as permitted under a permit issued pursuant to the grading ordinance, provided, however, that the standards contained in this article shall also be applicable to the approval of a tentative and final subdivision map and to the issuance of a grading permit.

Placer County, ordinance 12.16 excerpt regarding riparian setbacks:

"Riparian zone" means any area within fifty (50) feet from the centerline of a seasonal creek or stream, any area one hundred (100) feet from the centerline of a year round creek, stream, or river, and any area within one hundred (100) feet from the shoreline of a pond, lake or reservoir. At a minimum all streams, creeks, ponds, lakes, and reservoirs as shown on 7.5 minute USGS maps are included in this definition. (A riparian zone established in specific community or general plan may supersede this definition.) (Note: All trees regardless of size within riparian areas within the tree preservation zones and as a part of any discretionary project county-wide are subject to this article.)

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on bio-policies

1 message

Heidi Napier <heidiandjeff@att.net> Sun, Aug 14, 2016 at 9:45 PM
To: shawna.purvines@edcgov.us

Shawna:

Attached are my comments about the bio policies.

Heidi Napier

3176 El Tejon Rd

Cameron Park 95682

Bio policy DEIR.docx
14K

Bio policy DEIR

Policy 7.1.2.5 How are you going to prevent erosion of roadside ditches if you spray to kill weeds. The weeds help prevent erosion. Providing good drainage beside a road means there will be water that will carry soil away with it.

Policy 7.3.1.1 and Policy 7.3.2.1 How are you going to prevent erosion, silting and flooding? The only way to do this is to stop all rain from falling. It is normal for stream and river banks and beds to erode. It is normal for soil to muddy the waters of streams and lakes when it rains.

OBJECTIVE 7.4.2: IDENTIFY AND PROTECT RESOURCES

Identification and protection, where feasible, of critical fish and wildlife habitat including deer winter, summer, and fawning ranges; deer migration routes; stream and river riparian habitat; lake shore habitat; fish spawning areas; wetlands; wildlife corridors; and diverse wildlife habitat.

The local deer don't need any protection. There are too many of them, and they adapt very well to human developments, as evidenced by their occupation of neighborhoods in Cameron Park and El Dorado Hills, probably the two most densly populated parts of El Dorado County.

Page 146, paragraph B.   Wildlife "undercrossings" are a stupid waste of money. How do the deer know that they must travel east or west on Hwy 50 to get to the undercrossng? Has anyone actually counted the number of deer using the undercrossing? It looks to me like deer continue to be slaughtered by cars on many of our roads, and the 2 lane roads are the worst because they are easier and less scary to cross than a freeway.

Comments about the Oak resources ordinance.

How can paying a mitigation fee make up for killing a 200 + year old tree? What happens to these mitigation fees?

Our native oaks grow very slowly. A 20 year old Blue Oak (Quercus douglasii) is 12-15 feet tall and about 4-5 inches diameter at 4 feet. A 15 year old Valley Oak (Quercus lobata) is a little larger. This growth rate would be under ideal conditions. The replanting project along Silva Valley Rd in EDH doesn't look very successful, and whoever planted the trees didn't give them much help to avoid being eaten. Was this project an effort by a developer to mitigate destroying older trees?

There are more ways to kill an oak tree than just cutting it down. Have you noticed the old Valley Oak on Merrychase near the Arco station in Cameron Park at the Cambridge exit from Hwy 50? It is dying because half of the root zone is paved over by Merrychase and the other half is paved over by the Arco station. Did Arco pay a mitigation fee to kill this tree? How much? Look at the residential development now being graded on Malcom Dixon Rd in EDH. The grading is piling many feet of soil over the root zone of some of the old Blue Oaks on the property, and this will kill them slowly. There are many examples of dead and dying oaks in CP and EDH that have been damaged by trenching, paving and/or overwatering.

Our native oaks can be slowly killed by:

1. Paving over the root zone
2. Trenching through the root zone
3. Changing the grade over the root zone.
4. Planting grass or other plants that need lots of water over the root zone; this causes Phytophthora root rot.

Do developers pay a mitigation fee for the above activities, or do they only pay if they cut down a tree?

If you would like to learn more about native oaks, I would be happy to teach you. I have been teaching a public class for Master Gardeners for 7 years, and I had the help of an oak arborist putting the class together. The class takes about 2 hours, and I cover identification of the oaks found in El Dorado County, their care, how to landscape around them and diseases.

There is also an excellent book, Oaks in the Urban Landscape, Costello, Hagan and Jones. UC ANR publication 3518

Shawna Purvines <shawna.purvines@edcgov.us>

General Plan Biological Resources Policy

1 message

Jeannette Maynard <jeannette.maynard@yahoo.com> Mon, Aug 15, 2016 at 4:37 PM
Reply-To: Jeannette Maynard <jeannette.maynard@yahoo.com>
To: "shawna.purvines@edcgov.us" <shawna.purvines@edcgov.us>, Shiva Frentzen <bostwo@edcgov.us>, Supervisor Mikulaco <bosone@edcgov.us>, Supervisor Novasel <bosfive@edcgov.us>, Supervisor Veerkamp <bosthree@edcgov.us>, The BOSFOUR <bosfour@edcgov.us>, EDC COB <edc.cob@edcgov.us>

Dear Shawna Purvines and Board of Supervisors,

The proposed changes to the General Plan Biological Resources Policies threaten the biological diversity and natural beauty of El Dorado County. The changes, as proposed, will also add to the dense development of the Hwy 50 corridor -- increasing traffic on an already congested freeway.

For these reasons, I am vehemently opposed to the proposed changes.

I urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative. This plan will help to protect our oak woodlands, our wildlife corridors, and the natural beauty which makes El Dorado County so unique.

I thank you, in advance, for doing everything you can to protect the beauty and biological diversity of our county.

The Center for Sierra Nevada Conservation's plan is the way to go! Please study if carefully. Please adopt it!

Respectfully,

Jeannette Maynard
Shingle Springs resident

Oaks California Oaks

Preserving and perpetuating California's oak woodlands and wildlife habitats

July 22, 2016

16 JUL 27 AM 11: 37
RECEIVED
PLANNING DEPARTMENT

Community Development Agency
Long Range Planning Division
2850 Fairlane Court
Placerville, CA 95667
shawna.purvines@edcgov.us

Re: Biological Policy Update Project

Shawna Purvines, Principal Planner:

California Oaks appreciates the opportunity to comment on the Biological Policy Update Project. While acknowledging California Oaks previous greenhouse gas (GHG) concerns, the DEIR has provided no meaningful or cogent responses to the issues raised. Specifically: (1) the failure to feasibly and proportionally mitigate the direct loss of sequestered carbon; (2) the failure to analyze or feasibly and proportionally mitigate the foreseeable indirect carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and black carbon emission effects due to removed biomass decomposition or combustion. These DEIR omissions represent a failure to proceed in the manner prescribed by the California Environmental Quality Act (CEQA). The project is also inconsistent with other aspects of California's GHG reduction policy.

Necessity

The stated CEQA purpose of Senate Bill 97 (2007) is "the feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions." The CEQA Appendix G checklist encourages that forest land conversion GHG biogenic emissions be considered. The direct effect biogenic emissions are due to the one-time loss of sequestered carbon. The indirect effect biogenic emissions are the result of biomass utilization or disposal of the carbon stored in the dead vegetation. CEQA recognizes the secondary GHG biogenic emissions in the indirect effects language of Guidelines § 15358(2), "... are later in time or farther removed in distance, but are still reasonably foreseeable."

DEIR: "Buildout of the General Plan could result in the loss of 6,442 acres of forest land by 2035 resulting in a significant and unavoidable impact." (at 7-9).

Comment 1: Please answer the following forest land conversion question:

1. Due to biomass decomposition or combustion, how many metric tonnes of CO_2, CH_4, N_2O and black carbon biogenic emissions are projected with buildout impacts to 6,442 acres by 2035?

DEIR: "The effect each GHG has on climate change is measured as a combination of the mass of its emissions and the potential of a gas or aerosol to trap heat in the atmosphere, known as it "global warming potential" (GWP). GWP varies between GHGs; for example, the GWP of CH_4 is 21, and the GWP of N_2O is 310" (at 8-2).

428 13th Street Suite 10A / Oakland, CA 94612 / ph 510/763-0282 / fax 510/208-4435 / www.californiaoaks.org

Comment 2: The DEIR is quoting outdated GWP standards. The California Air Resources Board (CARB) current GWP standards list methane as having 25 times, nitrous oxide 298 times and black carbon 900 times more climate warming potential than CO_2 over a 100-year time horizon.[1]

DEIR: "The El Dorado County Air Quality Management District was part of the committee of air districts in the Sacramento region involved in the development of GHG thresholds of 1,100 metric tons CO_2e per year for the construction phase of projects or the operational phase of land use development projects ..." (at 8-12).

Comment 3: The El Dorado County air district and SMAQMD project GHG thresholds are knock offs of the 2010 Bay Area Air Quality Management District (BAAQMD) standards. They mimic the same forest conversion biogenic emissions accounting deficiencies as the BAAQMD project threshold. The following quote from the current Ciminelli vineyard conversion DEIR in Napa County (CAL FIRE lead agency) correctly recognizes that the BAAQMD project threshold excludes GHG biogenic emissions quantification:

"Although the [BAAQMD] Guidelines provide clear guidance on how to analyze GHG emissions from biogenic sources, which result from natural biological processes such as the decomposition or combustion of vegetative matter (wood, paper, vegetable oils, animal fat, yard waste, etc.), the Guidelines do not require the quantification of biogenic GHG emissions as part of the quantification of project-related GHG emissions and does not provide a GHG emission threshold for these sources for either operation and construction activities. The Guidelines require that only exhaust from construction equipment be included in the climate change analysis, similar to the analysis for criteria pollutants" (Ciminelli DEIR at 4.7-7).

The El Dorado County air district project threshold excludes forest land conversion biogenic emissions quantification, which is inconsistent with CEQA requirements. This omission is understandable given that forest land oversight is the purview of the State of California not the air districts. The state has chosen not to establish a forest land conversion threshold of significance.

A greenhouse gas project threshold of significance that excludes the entire category of forestry sector emissions cannot be claimed to unequivocally reduce all GHG impacts to less than significant. Since the El Dorado air district project threshold fails to account for forest land conversion biogenic emissions, these GHG emissions must be analyzed and mitigated independent of the air district project threshold of significance standard.

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[1] "Black carbon (BC, also referred to as black soot, black carbon aerosols, black carbon particles) refers to a solid particle emitted during incomplete combustion. All particle emissions from a combustion source are broadly referred to as particulate matter (PM) and usually delineated by sizes less than 10 micrometers (PM10) or less than 2.5 micrometers (PM2.5). Black carbon is the solid fraction of PM2.5 that strongly absorbs light and converts that energy to heat. When emitted into the atmosphere and deposited on ice or snow, black carbon causes global temperature change, melting of snow and ice, and changes in precipitation patterns. Roughly half of atmospheric BC comes from fossil fuel combustion, and the other half from biomass and biofuel burning. While BC is short-lived in the atmosphere (1-4 weeks), it is linked to strong regional climate effects and a large share (~30%) of recently observed warming in the Arctic."
http://www.unep.org/transport/gfei/autotool/understandingtheproblem/Black%20Carbon.pdf

DEIR: "A development that converts natural vegetation to a developed site results in potential release of sequestered carbon to the atmosphere as CO_2, which would not have been released had there been no change in land cover ... To evaluate the effect of oak woodland conversion on the Countywide GHG emissions inventory, this analysis uses available carbon sequestration data for oak woodlands to determine the loss of sequestration associated with the oak woodland impacts that would occur under the 2025 and 2035 General Plan buildout scenarios ... The analysis of the loss of carbon sequestration uses sequestered carbon content data derived from the Carbon Online Estimator (COLE) (Van Deusen and Heath 2016)" (at 8-16).

Comment 4: Stored carbon in dead biomass not only releases CO_2 into the atmosphere but also CH_4, N_2O and black carbon. Programmatic models like COLE are designed to measure the biomass carbon stocks for a given area. The end user takes the model's site-specific biomass information and translates it into GHG emissions. These models don't know what regulations, rules or laws they are being applied under. The end user has to adjust for those regulatory nuances. In California we have the uniqueness of CEQA, which recognizes GHG indirect biogenic emissions, which are delineated in Guidelines § 15358(2). COLE is a federal product from the USDA Forest Service. USDA neither knows nor cares about CEQA legal nuances so COLE doesn't address indirect biogenic emissions. Thus, the Cole programmatic model being used doesn't know how the biomass will be utilized or disposed.

1. Please explain how the DEIR can claim to make a "good faith effort" to measure forest conversion GHG biogenic emissions due to potentially removing 140,000 acres of oak woodland biomass when the programmatic model being used doesn't know how the biomass will be utilized or disposed?

DEIR: "These calculations assume a one-time loss of sequestered carbon resulting from conversion of existing oak woodlands to developed uses. This analysis also assumes that sequestered carbon from removed vegetation will be returned to the atmosphere; that is, the wood from the removed oak woodlands would not be re-used in another form that would retain carbon (e.g., furniture). This analysis of sequestered carbon impacts does not account for CO_2 emissions estimates associated with vegetation clearing or removal activities, or the transport and disposal of vegetative biomass. GHG emissions generated during project-specific construction activities, including clearing, tree removal and disposal, and grading, would be evaluated at the project level.

The ORMP requires mitigation in the form of conserving off-site oak woodlands and replanting (up to a maximum of 50% of the required mitigation). As outlined in the ORMP, mitigation ratios for oak woodland impacts may be 1:1, 1.5:1, or 2:1, depending on the extent of on-site impacts. The following summarizes potential mitigation scenarios under the 2035 General Plan buildout scenario:" (at 8-18).

Comment 5: The off-site conservation of existing forest coupled with the proposed replanting standards are inconsistent with scientific fact and 2008 AB 32 Scoping Plan forest sector policy targets. The already existing "conserved" trees aren't suddenly going to begin growing faster and sequester more carbon to reduce soil/vegetation GHG biogenic emission impacts in a timely manner. The appropriate means to feasibly and proportionally mitigate forest conversion biogenic emissions is by planting/maintaining the requisite number of replacement trees in El Dorado County to reduce emissions 80 percent by 2050.

1. Please explain how the DEIR biogenic emissions mitigation measures will provide consistency with Executive Orders S-3-05 to reduce GHG emissions 80 percent by 2050.[2] See *Cleveland National Forest Foundation, et al. v. San Diego Association of Governments, et al.* ___ Cal.App.4th ___, 2014 and the 2015 California Supreme Court citation in *Center for Biological Diversity v. Department of Fish and Wildlife* (Exhibit A). Here the Supreme Court is giving CEQA practitioners a heads-up regarding an issue in its upcoming *Cleveland National Forest Foundation v. SANDAG* decision. The Court indicates it will confirm that the climate change executive order timeline thresholds established by Governors Schwarzenegger and Brown should be fully considered in CEQA documents. Pending Senate Bill 32 (Pavley) codifies Governor Brown's Executive Order B-30-15 establishing a midterm target to reduce GHG emissions by 2030, to 40 percent below 1990 levels.

2. Please explain and demonstrate mathematically how the proposed off-site conservation/replanting standards are consistent with the 2008 AB 32 Scoping Plan goals of "no net loss" for forest land carbon sequestration and "stretch targets" of increasing forest land CO_2 storage by 2 million metric tonnes by 2020 and 5 MMT by 2050.

3. Please explain and demonstrate mathematically how the off-site conservation of existing forest land feasibly and proportionally mitigates direct or indirect forest conversion biogenic emissions in a manner consistent with the state's 2020, 2030 and 2050 timeline thresholds.

4. Please explain how the DEIR GHG mitigation measures will provide consistency with the 2016 CARB Short-Lived Climate Pollutants Policy. The goal is by 2030 to cut yearly emissions of several pollutants from 2013 levels. CARB seeks to shrink black carbon pollution to 19 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) from 39 $MMTCO_2e$ (50% reduction) by 2030 and methane to 71 $MMTCO_2e$ from 118 $MMTCO_2e$ (40% reduction). Pending Senate Bill 1383 (Lara) codifies these GHG reduction standards.

5. The DEIR appears to be piecemealing the project's near- and long-term GHG biogenic emissions by not fully estimating the countywide forest conversion biogenic emission impacts but instead delaying comprehensive GHG emission calculations to future "project-specific" analysis. Please explain why the piecemealing perception is incorrect and how the DEIR approach provides consistency with the state's 2020, 2030 and 2050 timeline thresholds.

DEIR: "In addition to the estimated oak woodland impacts from buildout of the General Plan with residential, commercial, retail, and industrial uses, there is a potential for an additional 138,704 acres of woodland that could be lost without mitigation under the exemptions in the ORMP. This could contribute an additional 1,070,210 MT CO_2e annually from release of sequestered carbon to the atmosphere. However, 132,281 acres of oak woodlands would be impacted without mitigation as a result of expanded agricultural production activities ..." (at 8-19).

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[2] Both forests and GHGs are analyzed over a 100-year planning horizon. However, California has climate change planning timelines that only extend out to the year 2050. So while for CEQA discussion and consistency purposes 80 percent of emissions must be reduced by 2050, in fact 80 percent of a project's forest conversion biogenic emissions are actually mitigated over a 100-year period. This allows enough time for feasible and proportional forest conversion biogenic emissions mitigation to occur.

Comment 6: Forest GHG emissions are measured over a 100-year planning horizon; not on an annual basis. The "additional 1,070,210 MT CO_2e annually" translates into 107,021,000 MMT CO_2e over 100 years. That's not counting the CO_2, CH_4, N_2O and black carbon emissions due to removed biomass decomposition and combustion over time.

Apparently El Dorado County has a reading comprehension problem. If the county is going to claim forest land conversion GHG biogenic emission exemptions it will need to provide statutory law citations to justify each exemption category. The Natural Resources Agency has already said no twice to agriculture regarding a forest land conversion CEQA GHG exemption. El Dorado County needs to take no for an answer:

Natural Resources Agency (2009)

"Moreover, the text of the questions themselves demonstrate that the concern is *any* conversion of forests, not just conversions to other agricultural operations."

"Second, analysis of impacts to forestry resources is already required. For example, the Legislature has declared that "forest resources and timberlands of the state are among the most valuable of the natural resources of the state" and that such resources "furnish high-quality timber, recreational opportunities, and aesthetic enjoyment while providing watershed protection and maintaining fisheries and wildlife." (Public Resources Code, § 4512(a)-(b).) Because CEQA defines "environment" to include "land, air, water, minerals, flora, fauna, noise, and objects of historic or aesthetic significance" (Public Resources Code, section 21060.5), and because forest resources have been declared to be "the most valuable of the natural resources of the state," projects affecting such resources would have to be analyzed, whether or not specific questions relating to forestry resources were included in Appendix G. *(Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th 1099, 1109 ("in preparing an EIR, the agency must consider and resolve every fair argument that can be made about the possible significant environmental effects of a project, irrespective of whether an established threshold of significance has been met with respect to any given effect").) In effect, by suggesting that the Appendix G questions be limited to conversions to "non-agricultural uses," the comment asks the Natural Resources Agency to adopt changes that are inconsistent with CEQA, which it cannot do" (Responses to Farm Bureau and Wine Institute).

Please answer the following forest land conversion questions:

1. Due to biomass decomposition or combustion, how many metric tonnes of CO_2, CH_4, N_2O and black carbon biogenic emissions are projected with impacts to 138,704 acres?

2. Due to biomass decomposition or combustion, how many metric tonnes of CO_2, CH_4, N_2O and black carbon biogenic emissions are projected due to forest land conversion impacts by 2025?

3. Due to biomass decomposition or combustion, how many metric tonnes of CO_2, CH_4, N_2O and black carbon biogenic emissions are projected due to forest land conversion impacts by 2035?

4. Due to biomass decomposition or combustion, how many metric tonnes of CO_2, CH_4, N_2O and black carbon biogenic emissions are projected due to forest land conversion impacts by 2050?

EIR: "The proposed project would result in a significant and unavoidable impact related to GHG emissions. There is no feasible mitigation that would substantially reduce or avoid this impact. The proposed project would result in no impacts related to conflicts with plans, policies, and regulations related to GHG emissions and climate change, and, therefore, no mitigation is required for this impact" (at 8-22).

Comment 7: In fact there is feasible and proportional project mitigation available by planting/maintaining the requisite number of replacement trees in El Dorado County to reduce forest conversion GHG biogenic emissions 80 percent by 2050. The question becomes whether El Dorado County would have land available for planting oaks after developing 140,000 acres of oak woodland. The assertion that the DEIR is not in conflict with state climate change policy and law is specious.

Summary

The DEIR chose to apply the El Dorado air district project threshold and COLE model for its forest land conversion GHG emissions analysis. However, as the Ciminelli DEIR factually observes biogenic emissions exist but the El Dorado air district project threshold excludes direct and indirect biogenic emissions quantification. The COLE model doesn't account for indirect GHG biogenic emissions and the end user apparently wasn't cognizant of CEQA regulatory requirements. The DEIR doesn't account for the GHG biogenic emissions associated with biomass decomposition and combustion, which result in CO_2 emissions in combination with the much more potent CH_4, N_2O and black carbon emissions. At a time when the state is acting aggressively to significantly reduce methane and black carbon emissions, the DEIR is oblivious to the importance of immediately addressing these powerful GHG emissions. The project greenhouse gas impacts remain significant and appropriate mitigation/alternatives to reduce these impacts have not been adequately considered.

Greenhouse gas emissions, especially forest conversion emissions, stand out from all other CEQA effects. This is because only GHG emission impacts have been *decreed* a serious threat to the well-being of all Californians and the state itself. Further, forests are the only state GHG sector that sequesters carbon. The constant among court decisions regarding GHG analysis is that project emissions must be accurately and fully rendered in a CEQA document. This DEIR appears designed to obfuscate and minimize project forest land conversion GHG biogenic emissions, rather than a bona fide attempt to comply with CEQA's focus of ascertaining *"the feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions."*

Substantial evidence has been presented that project biogenic GHG emissions due to forest land conversion will result in potentially significant environmental effects that have not been sufficiently analyzed or feasibly mitigated. The project has not made "a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project" (CEQA Guidelines § 15064.4(a)). Therefore the DEIR is deficient as an informational document, in that it fails to apprise decision-makers/public of the full range and intensity of the adverse GHG emission effects on the environment that may reasonably be expected if the project is approved.

Sincerely,

Janet Cobb

Janet Cobb, Executive Officer
California Wildlife Foundation/California Oaks

Exhibit A

California Supreme Court - *Center for Biological Diversity v. Department of Fish and Wildlife* (2015)
A qualification regarding the passage of time is in order here. Plaintiffs do not claim it was improper for this EIR, issued in 2010, to look forward only to 2020 for a guidepost on reductions in greenhouse gas emissions, and we therefore do not consider the question whether CEQA required the EIR to address the state`s goals beyond 2020. Nevertheless, over time consistency with year 2020 goals will become a less definitive guide, especially for long term projects that will not begin operations for several years. An EIR taking a goal consistency approach to CEQA significance may in the near future need to consider the project`s effects on meeting longer term emissions reduction targets.[6]

[6] Executive Order No. S-3-05, signed by Governor Schwarzenegger on June 1, 2005, set reduction targets of 1990 levels by 2020 and 80 percent below 1990 levels by 2050. A.B. 32 codified the 2020 goal but did not indicate any intent to abandon the 2050 goal; indeed, the Legislature cited the executive order and indicated its intent that the climate policy efforts the order initiated continue. (Health & Saf. Code, § 38501, subd. (i).) More recently, in an update to the Scoping Plan, the Air Board noted the need for steep post-2020 reductions and proposed the state adopt a strong mid-term target for the year 2030, in the range of 35-50 percent below 1990 levels. (Air Resources Board, First Update to the Climate Change Scoping Plan: Building on the Framework (May 2014), p. 34.) Executive Order No. B-30-15, signed by Governor Brown on April 29, 2015, endorsed the effort to set an interim target of emission reductions for 2030. Pending legislation would codify this additional goal, directing the Air Board to establish a 2030 limit equivalent to 40 percent below 1990 levels. (Sen. Bill No. 32 (2015-2016 Reg. Sess.)

Shawna Purvines <shawna.purvines@edcgov.us>

Comments regarding the Draft EIR for ORMP and General Plan Policy updates

1 message

Lester Lubetkin <lesterlubetkin@gmail.com> Thu, Aug 11, 2016 at 9:18 AM
To: shawna.purvines@edcgov.us

Attached are my comments to the DEIR, ORMP and General Plan Biological Resources Policy Update. Thank you for considering my comments.

Lester Lubetkin
4902 Dowell Lane
Placerville, CA 95667
lesterlubetkin@gmail.com

LL GPBRPU and ORMP DEIR Ltr.pdf
93K

Lester Lubetkin
4902 Dowell Lne
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El Dorado County Community Development Agency, Long Range Planning
Attn: Shawna L. Purvines
2850 Fairlane Court, Bldg C
Placerville, CA 95667
shawna.purvines@edcgov.us

August 11, 2016

Re: Comments Regarding the Draft Environmental Impact Report for the General Plan Biological Resources Policy Update and Oak Resources Management Plan

Dear Ms. Purvines:

After reviewing the Draft Environmental Impact Report (DEIR) for the General Plan Biological Resources Policy Update (GPBRPU) and Oak Resources Management Plan (ORMP), I would like to offer the following comments. I feel that oak trees and oak woodlands are critical resources for the biological as well as socioeconomic health of our County and feel that the General Plan and Oak Resource Management Plan should ensure that functioning oak woodlands continue throughout those portions of El Dorado County where they now occur, not just on the County margins, leaving a gap along the Highway 50 corridor.

A. Protection of a Minimum Amount of Oaks and Oak Woodlands - Alternative 2

Several of the letters commenting on the Notice of Preparation (such as the El Dorado Chapter of the California Native Plant Society letter submitted on 8/17/2015) noted the importance of providing for protection of oaks and oak woodlands in the areas most likely to be developed (particularly along the Highway 50 corridor). As currently presented in the General Plan policy updates and Oak Resources Management Plan, simply allowing developers to acquire lands or conservation easements in Priority Conservation Areas (located outside of the area of most likely development as shown in Figure 2, page 28 of the proposed Oak Resource Management Plan, Appendix C of the DEIR) or to pay into an In Lieu fund, does not adequately address the need to protect oaks and oak woodlands in the Highway 50 corridor, where the oak woodlands are in greatest danger of being impacted by future development. In response to the public comments, the DEIR considered an alternative (Alternative 2) which specifies that future development on sites that contain oak woodlands must achieve a minimum oak woodland retention of 30%. I feel very strongly that this alternative provides essential protection and future viability of this important ecological habitat type.

I take exception to the portion of the analysis of effects of Alternative 2 in the DEIR regarding Habitat Loss and Fragmentation (pages 10-20 and 10-21). The analysis identified the potential for increased land disturbance and greater amounts of habitat loss and fragmentation due to (1) retaining small patches of oaks and oak woodlands that "would not function as a cohesive habitat block, and (2) to the extent that meeting the minimum retention standard would reduce development intensities on individual parcels, it would be expected that a greater total number of parcels would be developed to accommodate the projected growth within the County. This could result in greater amounts of habitat loss and fragmentation (across all habitat types, not just oak woodlands) County-wide." The DEIR goes on to state "Therefore Alternative 2 would result in similar impacts related to habitat loss and fragmentation as the proposed project." (page 10-21of the DEIR)

As described in the DEIR, Chapter 6 - Biological Resources, oaks and oak woodlands provide all or some of the biological and ecological needs of a great variety of plants and animals. The size of blocks needed for different plants and animals varies significantly, and it cannot be assumed that one size fits all. While there is a critical need for large blocks of intact oak woodland for certain animals, smaller blocks can meet many wildlife needs. In addition, for certain insects and avian species, such as those listed in Chapter 6 of the DEIR, oak and oak woodland patches in close proximity (forming a network) can still meet their needs. I feel that describing the impacts from implementing Alternative 2 in relation to habitat loss and fragmentation as similar to the proposed project is incorrect and inconsistent with the data presented in Chapter 6 of the DEIR dealing with Biological Resources. I feel that the data in Chapter 6 shows that the impacts resulting from retaining a minimum of 30% of the oak woodlands within future development sites would be less for many wildlife species that do not depend on large tracts of intact oak woodland habitat.

As described in more detail below, Alternative 2 could be improved if the ORMP and GPBRPU encouraged and incentivized acquisition and protection of oak woodlands in close proximity to existing protected oak woodlands in the vicinity of the Highway 50 corridor, in conjunction with the retention of a minimum of 30% of the oak woodlands within future project.

B. Encouraging and Incentivizing Retention of Oaks and Oak Woodlands in the Areas Where Development is Expected

At present, the ORMP allows for the purchase of lands or conservation easements or implementation of deed restrictions on lands contiguous with adjacent protected lands (page 26 of the

Draft ORMP), but does not focus on looking for opportunities within the areas most likely to be developed. The ORMP also allows for the payment of in-lieu fees for the purchase of lands to be held for the conservation of oaks and oak woodlands. The proposed in-lieu fee program (designed solely on the cost to acquire lands in the Priority Conservation Areas [PACs]) does not reconcile with the higher cost of lands within the Highway 50 corridor and so favors shifting acquisition of protected oak woodlands to the margins of the County. At present, the ORMP does not provide for any incentives to encourage maintaining oak woodlands in the areas most susceptible to development. The ORMP does recognize Important Biological Corridors (IBC) (many of which are found within the corridor most susceptible to future development) and allows for the purchase of these lands or conservation easements, but does not incentivize that potential. Further, the ORMP fails to identify when purchase of lands or conservation easements must occur in proximity to proposed developments due to the location of project related impacts.

There is an opportunity to establish mechanisms to encourage protection of at least a minimum of oak woodlands within the Highway 50 corridor, through incentives, such as allowing for a reduction in the acreage requirement for acquisition of oak woodlands within the Highway 50 corridor, encouraging purchases within IBCs, not just PCAs, adjusting the fees paid for the In Lieu Fund program to account for higher land costs within the Highway 50 corridor (so that oak woodlands within the areas most susceptible to future development can be protected), setting direction or incentives to encourage acquisition of oak woodlands in proximity to previously protected oak woodlands with the Highway 50 corridor (thus allowing for smaller individual parcels forming an ecologically viable network) and setting direction or a requirement to conserve oak woodlands in proximity to proposed developments. By incentivizing the acquisition of oak woodlands adjacent to previously acquired lands, the County could increase the area of retained oak woodland with the Highway 50 corridor, thus reducing fragmentation.

In summary, I feel that through providing direction and incentives, we could .encourage establishing smaller individual parcels of protected oak woodlands that are in close proximity to each other within the Highway 50 corridor, thus creating a network that can function ecologically for many of the plant and wildlife species that are dependent on oak woodlands, while acquiring and maintaining larger blocks of intact oak woodlands in the areas further out from the developing corridor.

C. Future Modifications of Priority Conservation Area Determination

The ORMP and GPBRPU establish Priority Conservation Areas (PCA), utilizing various existing available information and data sets. However, the ORMP does not establish a mechanism for assessing the accuracy of the mapping, assessment of the effectiveness of individual PCAs and the functioning of the PCA network. There may be a need in the future to modify the lands identified as PCAs. This may affect the list of willing sellers of lands classified as PCA. The ORMP should include a means and time schedule for assessing the network of PCAs identified and make modifications as appropriate.

D. Future Compliance of Deed Restrictions in Protecting Oaks and Oak Woodlands

The ORMP allows for proponents to put deed restrictions into place in certain situations, in lieu of conservation easements or transferring ownership of lands to the County. The analysis of effects of implementing the proposed project is based on meeting the terms of these deed restrictions into the future. However, there is no specific monitoring requirement or other means of assuring compliance with the deed restriction over time. There is also no contribution to an endowment to complete future compliance inspections or measures to resolve non-complaince. There should be a mechanism to provide for monitoring by the County or a Qualified Professional in order to assure that the deed restriction is being complied with and that the protection of oak woodlands is in effect.

E. Maintaining a Fund for the Management and Monitoring of the Lands and Conservation Easements to be Acquired as well as for the Management of the Oak Resource Management Program

I applaud the recognition of the need to collect sufficient funds to create an endowment for the ongoing management, monitoring, restoration and protection of any lands or conservation easements acquired under the Oak Resource Management Plan. It is important that the cost of these efforts be assessed on a regular basis and any collections for this endowment be modified in the future to assure that sufficient funds are available. As suggested in the ORMP and GPBRPU, the use of land conservancies or land trusts, or other entities (such as the County Resource Conservation Districts) is a great way to have entities complete this needed work that have the ability to seek other funding sources, such as grants, donations, etc. The collection of funds should also include the future costs associated with managing the program as a whole, including the monitoring of the effectiveness of oak woodland networks, determining whether the PCAs and IBCs are meeting the intent and whether the initial mapping and identification of PCAs and IBCs was accurate and sufficient.

Conclusion

In conclusion, I strongly urge El Dorado County to maintain a viable network of oaks and oak woodlands throughout the County, including the areas most likely to be developed. I feel that this can best be accomplished through adoption of Alternative 2 (retention of 30% of the oak woodland within sites of future development), incentivizing the conservation of oak woodlands within the areas most likely to be developed (in the vicinity of Highway 50) and providing for the collection of the information needed to assess the effectiveness and success of the lands to be conserved. I appreciate the opportunity to comment on the DEIR for the General Plan Biological Resource Policy Update and Oak Resource Management Plan. Please include me on future notifications as the process moves forward. Thank you very much.

Sincerely,

LESTER LUBETKIN
El Dorado County Resident

Shawna Purvines <shawna.purvines@edcgov.us>

Retention of oak woodlands

Margretta Dahms <riders3@sbcglobal.net>
Reply-To: Margretta Dahms <riders3@sbcglobal.net>
To: "shawna.purvines@edcgov.us" <shawna.purvines@edcgov.us>
Sun, Aug 14, 2016 at 8:46 AM

Dear Ms. Purvines:

This email is to express my support for General Plan, Alternative 2. This alternative requires the retention of 30% of oak woodlands on or near developments, on site.

Oak woodlands are important to preserve the habitat and the natural environment along the Highway 50 corridor and other areas of our county.

Thank you,
Margretta Dahms
Greenwood, California

Shawna Purvines <shawna.purvines@edcgov.us>

ED_ORMP_DEIR_comments_LL_8_15_2016

1 message

Egbert, Mark - NRCS-CD, Placerville, CA <Mark.Egbert@ca.usda.gov> Mon, Aug 15, 2016 at 4:29 PM
To: "shawna.purvines@edcgov.us" <shawna.purvines@edcgov.us>

Hello Shawna,

Attached are comments being presented by the El Dorado County Resource Conservation District regarding the General Plan Biological Resources Policy update and Oak Resources Management Plan.

Thank you.

Mark A. Egbert, CPESC# 6350
District Manager
El Dorado County & Georgetown Divide Resource Conservation Districts
100 Forni Road, Suite A
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www.georgetowndividercd.org

-----Original Message-----
From: scans@ca.usda.gov [mailto:scans@ca.usda.gov]
Sent: Monday, August 15, 2016 12:47 PM
To: Egbert, Mark - NRCS-CD, Placerville, CA <Mark.Egbert@ca.usda.gov>
Subject:

This E-mail was sent from "RICOHMPC5000N200" (Aficio MP C5000).

Scan Date: 08.15.2016 15:46:35 (-0400)
Queries to: scans@ca.usda.gov

20160815154636148.pdf
943K

El Dorado County Resource Conservation District
100 Forni Road, Suite A • Placerville, CA 95667 • Phone (530) 295-5630, Fax (530) 295-5635

Shawna Purvines
Senior Planner
2850 Fair Lane Court, Blg. C
Placerville, CA 95667

RE: El Dorado County Resource Conservation District comments on Draft EIR for the Biological Resource Policy and Oak Resource Management Plan.

1.) There are several elements within the Oak Resource Management Plan (ORMP) in which the Resource Conservation District could assist the County in determining whether the proposals or actions comply with the ORMP, including:

- The ORMP identifies that developers or others can replace oak woodlands to be impacted by obtaining fee title or conservation easements on lands within Priority Conservation Areas (defined and mapped) or in other areas that meet specific criteria spelled out in the ORMP (page A-30). A report from a Qualified Professional is required. There is a role for the RCD to assist in the evaluation of whether the lands proposed by the proponent are appropriate, whether they meet the criteria, and whether they are comparable to the oak trees or oak woodlands proposed to be cleared or impacted.

- The ORMP calls for monitoring reports for assessment of completion and success of replanting of oaks. These reports are to be completed by a Qualified Professional. The RCD could serve as a Qualified Professional or could assist the County in evaluating the reports and in site visits to determine whether the reports accurately reflect conditions on the ground.

- The ORMP established Priority Conservation Areas (PCAs), utilizing various data sets. There may be a need in the future to evaluate the accuracy of this mapping and make adjustments. This may affect the list of willing sellers of lands classified as PCA. The RCD could assist in the evaluation and assessment of whether lands meet the criteria to be considered PCA.

- The ORMP also calls for an Oak Woodland Conservation Program with several elements including the management, maintenance, monitoring and restoration of these areas. The RCD could assist in several of these tasks.

- The ORMP calls for an education and outreach effort to assist in establishing a list of willing sellers of lands or conservation easements within PCAs, and to provide for voluntary conservation of oak woodlands within working landscapes. The RCD could assist in these education and outreach responsibilities.

- The RCD is in an ideal position to seek grants to help the County in the ongoing implementation of the ORMP, including management, protection and enhancement of oak woodlands within conservation easements or fee title held by the County or land conservancy.

- The ORMP allows developers and other project proponents to pay in-lieu fees, with those funds going into an Oak Woodland Conservation Fund. These funds can be used to acquire PCA lands or other appropriate lands. The RCD could play a role in assessing lands that meet the objectives of the ORMP and recommending lands or conservation easements to be acquired by the County.

2.) The ORMP allows for proponents to put deed restrictions into place in certain situations, in lieu of conservation easements or transferring ownership of lands to the County. However, there is no specific monitoring requirement or other means of assuring compliance with the deed restriction over time. There is also no contribution to an endowment to complete future compliance inspections or measures to resolve non-compliance. There should be a mechanism to provide for monitoring by the County or a Qualified Professional.

3.) Biological Policy DEIR, Evaluation of Alternative 2, page 10-20 and 10-21, Fragmentation. The analysis identified the potential for increased land disturbance and greater amounts of habitat loss and fragmentation. However, the ORMP provides for acquisition of lands or conservation easements in close proximity to lands proposed for development. This could increase the area of retained oak woodland, thus reducing fragmentation. The ORMP should encourage and incentivize the acquisition of lands in close proximity to existing protected oak woodlands. At present, the ORMP allows for the purchase of lands or implementation of deed restrictions on lands contiguous with adjacent protected lands (page 26 of the Draft ORMP), but does not provide an incentive.

We appreciate the opportunity to provide comment. Please contact the RCD office if you have any questions.

Thank you,

Mark A. Egbert, CPESC# 6350
District Manager
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Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Biological Resources Policy Update and Oak Resources Management Plan

1 message

Mwgraf@aol.com <Mwgraf@aol.com> Mon, Aug 15, 2016 at 4:55 PM
To: shawna.purvines@edcgov.us

Attached please find comments of Center for Sierra Nevada Conservation, California Native Plant Society (El Dorado Chapter) and the Maidu Group of the Sierra Club on the Biological Resources Policy Update and Oak Resources Management Plan Draft EIR .
I am including two attachments, which will be sent by separate email due to their size.

Please let me know if you have any problem accessing these documents.

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Final Comment Letter.pdf
104K

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August 15, 2016

Via Email Delivery
Shawna L. Purvines
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2850 Fairlane Court
Placerville, CA 95667
shawna.purvines@edcgov.us

RE: Comments on Biological Resources Policy Update and Oak Resources Management Plan Draft EIR

Dear Ms. Purvines:

I am submitting these comments on behalf of the Center for Sierra Nevada Conservation, California Native Plant Society (El Dorado Chapter) and the Maidu Group of the Sierra Club on the Biological Resources Policy Update and Oak Resources Management Plan Draft EIR .

As discussed below, we have concerns that the changes to the Biological Resources section of the existing General Plan, particularly the elimination of the requirement that the County prepare an Integrated Natural Resources Management Plan ("INRMP"), has the potential for significant environmental impacts on rare and sensitive plants and wildlife and their habitats, including oak woodlands, in El Dorado County.

The proposed General Plan changes intend to "mitigate" for losses of oak woodland and dependent wildlife by purchasing development rights on rural lands far from where the actual threats to wildlife habitat and movement will occur, along the rapidly developing areas around the Highway 50 corridor. The DEIR does not consider this impact in meaningful detail, nor does it consider an alternative that would identify Priority Conservation Areas ("PCA") in the corridor region.

We would request that County consider and choose an alternative that follows up on the considerable analysis already completed as part of the INRMP process to identify lands for acquisition and/or conservation that will ensure adequate habitat for future wildlife refuge and movement. *See e.g.,* El Dorado County Integrated Natural Resources Management Plan - Phase I Final Wildlife Movement and Corridors Report December 7, 2010. (Attachment 1); El Dorado County Integrated Natural Resources Management Plan Phase I - Revised Draft - Overall Approach for Preparing INRMP (Phase II) February 7, 2011 (Attachment 2). In this way, the County may avoid the worst effects of habitat fragmentation, as intended by the existing General Plan. *See e.g.,* Policies 7.4.1.6, 7.4.2.8. *See also* Pub. Resources Code § 21002 ("The Legislature finds and declares that it is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would *substantially lessen the significant environmental effects* of such projects....") (emphasis added.)

Components of this Alternative would include:

- analyzing "corridors" where wildlife might cross highways if able to do so.

- providing mechanisms to raise adequate mitigation funds to preserve this type of valuable habitat.

- linking public lands to form refuges for wild animals.

Our more specific comments are discussed below.

1. Impacts to Important Habitat and Migratory Corridors Due to the County's Abandonment of the INRMP.

The 2004 General Plan requires the County to complete the INRMP in order to identify "important habitat in the County" and "establish[] a program for effective habitat preservation and management." *See* General Plan Policy 7.4.2.8. Important habitat is to include 1) Habitats that support special status species; 2) Aquatic environments including streams, rivers, and lakes; 3) Wetland and riparian habitat; 4) Important habitat for migratory deer herds; and 5) Large expanses of native vegetation. *Id.* The County should update the important habitat inventory every three years "to identify the amount of important habitat protected, by habitat type, through County programs and the amount of important habitat removed because of new development during that period." *Id.*

In coordination with this strategy, the 2004 General Plan relies on the protection and full mitigation of important habitat loss as a means to limit the impacts of future development:

> All development projects involving discretionary review shall be designed to avoid disturbance or fragmentation of important habitats to the extent reasonably feasible. Where avoidance is not possible, the *development shall be required to fully mitigate the effects of important habitat loss and fragmentation. Mitigation shall be defined in the Integrated Natural Resources Management Plan* (INRMP) (see Policy 7.4.2.8 and Implementation Measure CO-M).

See General Plan Policy 7.4.1.6 (emphasis added.)

The INRMP was considered at the time of the General Plan's enactment to be a critical element of avoiding future habitat fragmentation and worst impacts of General Plan buildout development. The INRMP approach called for the establishment of a "Habitat Protection Strategy," described as "a strategy for protecting important habitats based on coordinated land acquisitions [] and management of acquired land" in order to "to conserve and restore contiguous blocks of important habitat to offset the effects of increased habitat loss and fragmentation elsewhere in the county."

In contrast to the County's heavy reliance on the future formulation of the INRMP to identify and establish important habitat for wildlife refuge and movement, the proposed General Plan changes eliminates Policy 7.4.1.6 and substantially modifies Policy 7.4.2.8, replacing it with a series of mitigation measures that no longer requires the County to establish a coordinated strategy of protecting important habitat. Instead, the proposed changes 1) defers the assessment of mitigation measures for loss of important habitat to the project level stage; 2) limits the requirements for full mitigation to development within Important Biological Corridors; and 3) limits mitigation for loss of oak woodlands to areas identified in PCAs.

We believe there are a number of problems with this approach, which constitutes a weakening of the existing General Plan standards for protecting important habitat in the County.

First, the entire purpose of the INRMP was establish a coordinated strategy for protecting important habitat for wildlife refuge and movement. The deferral of this process to the project specific stage, as described in proposed new General Plan policy 7.4.2.8, in no way ensures that such important habitat will be protected. Instead, the project specific direction simply provides a series of criteria that will allow the elimination of habitat based on preservation of habitat elsewhere, without any coherent strategy for how such replacement habitat will be able to provide the same critical functions for wildlife refuge and movement. *See e.g., Gray v. County of Madera* (2008) 167 Cal. App. 4th 1099, 1118 ("[W]e conclude that here the County has not committed itself to a specific performance standard. Instead, the County has committed itself to a specific mitigation goal.")

Second, the County's reliance on the IBC as a substitute for important wildlife habitat is also not adequate, as the IBC has never been analyzed in any CEQA review document as a mechanism for avoiding significant impacts due to habitat fragmentation. This point can be seen from a comparison of Figure 2 in the proposed Oak Woodland Resources Plan (p. 23) to the identification in the 2010 Phase I Final Wildlife Movement and Corridors Report (Attachment 1) of important corridor areas (see Figure ES-1, p. ES-4). *See also* Discussion in Attachments 1 & 2 regarding selection of size and location of these important habitat areas. Here, the IBC overlay 1) misses several critical crossing areas, including in the 'Lower Foothills," which were found to be important in the INRMP studies; and 2) establishes 'corridors' that are in places extremely limited in size, thereby requiring entire wildlife movement to occur in spots across a single small parcel. *See e.g.,* Oak Woodland Resources Plan, Figure 2 (IBC designation for area just to the east of Shingle Springs.)

Even beyond the IBC's inadequate coverage, the proposed new Policy 7.4.2.9's requirement that the developer demonstrate 'no net loss of wildlife movement function" is too vague and general to ensure any ultimate protection of important wildlife habitat for refuge and movement. The new General Plan policies do not provide criteria for how such wildlife movement function will be ensured, nor does the DEIR provide any analysis on this topic, despite the considerable information development in Phase 1 & 2 processes of the INRMP. *See* Attachments 1 & 2. The DEIR's failure both to discuss and analyze these impacts as well as identify objective criteria for mitigation violates CEQA. *See e.g, Gray v. County of Madera, supra.*

Finally, for oak woodlands, the General Plan changes propose to do away with the important habitat requirements of existing Policy 7.4.2.8, replacing them with a complete reliance on the Priority Conservation Areas, which are uniformly identified in the Oak Resources Management Plan ("ORMP") and being located well away from the Highway 50 corridor area. *See e..g,* ORMP, Figure 2, p. 23. The County's reliance on PCAs to protect important oak woodland habitat for wildlife refuge and movement is disingenuous, given its past previous reliance on INRMP process to identify the important habitat needed to be protected in the future:

> Subsequent adoption and implementation of the INRMP, and incorporation of this plan into that document, will ensure connectivity between the PCAs. The INRMP will also address north-south connectivity across Highway 50 and the potential role of oak woodlands less than 40 acres in maintaining connectivity between larger expanses of oak woodlands.

See Oak Woodland Management Plan, April 2008. *See also id.* ("Oak woodland habitat connectivity will be evaluated with other Policy 7.4.2.8 considerations to identify a final set of corridors that best meet all objectives.")

The intent of the existing General Plan polices was to ensure that important oak woodland habitat would be identified and preserved, through a coordinated regulatory structure that ensured that the elimination of oak woodlands on parcels would require the preservation of "existing woodlands of equal or greater biological value as those lost." As discussed below, the new polices do not ensure this result.

2. Impacts to Oak Woodland Habitat

We are concerned that the proposed General Plan changes allow for new impacts to oak woodlands that have not been analyzed in the DEIR.

First, as was true of the prior Oak Woodland Management Plan ("OWMP"), the Oak Resources Management Plan ("ORMP") relies on the establishment of PCAs far away from the Highway 50 corridor as the basis for offsite mitigation. However, in contrast to the ORMP, the OWMP relied heavily on the INRMP to provide protection for important oak woodland habitat in the County that was not necessarily part of the PCAs. *See* OWMP ("Subsequent adoption and implementation of the INRMP, and incorporation of this plan into that document, will ensure connectivity between the PCAs.")

Here, as discussed above, the proposed General Plan changes eliminate the INRMP requirement to identify and preserve important habitat in the County. Instead, the proposed General Plan policies rely on vague requirements of 'no net loss' of wildlife 'movement,' which only is triggered when development occurs in IBCs, a limited subset of potentially important migratory and refuge habitat in the County that has never undergone CEQA analysis.

In the OWMP, the County asserted that parcels under 500 acres would have limited value for habitat preservation and thus PCAs would be required to be located in distant rural areas. However the DEIR here acknowledges that in cases of protecting important refuge and corridor habitat, parcels as small as five acres indeed can have value. *See* DEIR, p. 6-82 ("Policy requirements would ensure that preserved lands would be on a minimum contiguous block of 5 acres.") Thus, there is no basis for limiting PCAs for offsite mitigation to areas far from the Highway 50 corridor.

The ORMP's reliance on PCAs as off-site habitat mitigation also leads to the same problem the County encountered with respect to its OWMP, which is that the fee mitigation program established by the OWMP (Table 5, p. 19), will not be adequate to provide for full mitigation of oak woodland habitat of equal biological value. Instead, the DEIR should assess a mechanism whereby an In-Lieu fee program will be adequate to preserve important oak woodland habitat in areas of potential development, not just habitat in faraway rural areas that will likely never be developed in the foreseeable future. As discussed in *Center for Sierra Nevada Conservation v. County of El Dorado* (2012) 202 Cal.App.4th 1156, 1180-1181:

> In formulating the oak woodland management plan, the County's planner informed the Board that "it is necessary to recognize the concept of connectivity, in the form of corridors, to ensure that the oak woodlands that will be preserved in the future through the mitigation program will also be able to function as habitat. Therefore, oak woodland corridors have now been illustrated on the final map for your Board's consideration. ... [¶] ... Without corridors, fragmentation of habitat will result. Fragmentation results in the degradation of habitat and ecosystem values." The initial study for the oak woodland management plan acknowledges, 'In El Dorado County, Highway 50 presents a major barrier to north-south wildlife dispersal [citation]. The Oak Woodland Technical Advisory Committee that was formed in the County in 1996 'concluded that connectivity of woodlands from north to south was an important value to preserve and that it was at risk from future development.'
>
> In adopting the oak woodland management plan, the Board deferred the issue of '[c]onnectivity between the various habitat types, including oak woodlands' until 'other components of the [integrated plan] are developed, which will look at the whole ecosystem.' By excluding the Highway 50 corridor from Option B fund mitigation goals, the County allowed for a fee rate at the lower end of the range due to the lesser cost of rural land and easement acquisition. By specifying that Option B mitigation funds would not be spent on conservation in that corridor, the oak woodland management plan differs from the 2004 program EIR's emphasis on the importance of protecting connectivity of habitat across the Highway 50 corridor. These decisions on the adequacy of the Option B mitigation goals and fee structuring must be made with the benefit of an EIR.

Finally, we have concerns about the mitigation options allowed for eliminating oak woodlands, particularly the provision that allows for up to 50% of the mitigation requirement to be accomplished through onsite planting. *See* ORMP, p. 10. The ORMP and EIR should clarify how on-site planting would be measured in terms of replacing oak woodland habitat lost, *i.e.*, how it would be accomplished in a manner consistent with the ORMP's recognition that mitigation for lost oak woodland habitat must measured in terms of replacement habitat acreage and not simply in numbers or volume of trees.

3. Issues Related to Pine Hill Plants

We are concerned about two changes made to Policy 7.4.1.1.

First, there is a change in the code number for the county code related to the ecological preserves, *i.e*., a change from 17.71 to 130.71. However, the actual county code 130.71 states that the purpose of the fee program is "The purpose of this Chapter is to implement the Pine Hill Endemics rare plant fee payment in lieu of mitigation for Mitigation Areas 1 and 2." *See* County Code § 130.71.010, Further, the county code also states:

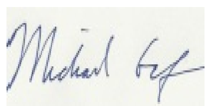
> 130.71.050 Off-site Mitigation or Fee Payment in Lieu of Ecological Preserve Mitigation in Mitigation Areas 1 and 2:
>
> Payment of a fee in lieu of Ecological Preserve Mitigation is encouraged in Mitigation Areas 1 and 2. Developments in Mitigation Areas 1 and 2 shall mitigate impacts by exercising one of the following two options:
>
> A. Pay the appropriate fee in lieu of Ecological Preserve Mitigation for the direct or indirect impacts caused by development on rare plants and rare plant habitat; or
>
> B. Participate in a Rare Plant Off-Site Mitigation Program, upon adoption of such program by the Board.

This fee program was found not to be a valid fee program and was set aside by the 3rd District Court of Appeal in *California Native Plant Society v. County of El Dorado* (2009) 170 Cal.App.4th 1026, 1030, due to a lack of adequate CEQA review. Here, the DEIR contains no analysis of the adequacy of the current fee program.

We ask that the county code be revised to reflect that the options above are not available and that projects must individually evaluate and mitigate impacts to these rare plants.

Second, the policy is changed by adding the words "where feasible" in reference to consistency with the Recovery Plan. The DEIR indicates that there is an underlying expectation that such consistency is bound by feasibility and that adding this phrase is not a substantive change. If that is the case, we would argue that there is no need to make such a change and making such a change is intended to diminish the need to be consistent with the recovery plan. Consistency with the recovery plan is at issue generally because it is a document created by the US Fish and Wildlife Service to guide the recovery of the federally listed species. Contained in the document are actions that the experts in this agency determined were Priority 1 actions that "must be taken to prevent extinction or to prevent a species from declining irreversibly in the foreseeable future." (Recovery Plan, p. II-37). The acquisition of specific properties was identified in the recovery plan as Priority 1 actions. More specifically, we are aware of the County's interest in developing a road across a property in the ecological preserve and that was recommended in the recovery plan as Priority 1 action. Development of this property for a road would not be consistent with the recovery plan. The County also owns a 20-acre property that has not been designated by the County as an ecological preserve, but the acquisition of this property has been identified in the Recovery Plan as a Priority 1 action. In the near future, the County may propose to use the 20-acre property as mitigation for the proposal to construct through the ecological preserve. This would be a net loss of habitat determined by the Recovery Plan to be necessary to "prevent the extinction" of the Pine Hill plants. Actions that the County contemplates today are likely to undermine the Recovery Plan and the ability to prevent extinction or irreversible decline for the Pine Hill plants. The insertion of "where feasible" only serves to highlight an intention to avoid consistency with the Recovery Plan.

Very truly yours,



Michael W. Graf

Final Comment Letter.wpd

Shawna Purvines <shawna.purvines@edcgov.us>

Re: Comments on Biological Resources Policy Update and Oak Resources Manageme...

1 message

Mwgraf@aol.com <Mwgraf@aol.com> Mon, Aug 15, 2016 at 5:01 PM
To: shawna.purvines@edcgov.us

Here are the two attachments to the comments of Center for Sierra Nevada Conservation, California Native Plant Society (El Dorado Chapter) and the Maidu Group of the Sierra Club on the Biological Resources Policy Update and Oak Resources Management Plan Draft EIR .

Please let me know if you have any problem accessing these documents.

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2 attachments

ATTACHMENT 1 TO COMMENTS OF CSNC ET AL.pdf
13578K

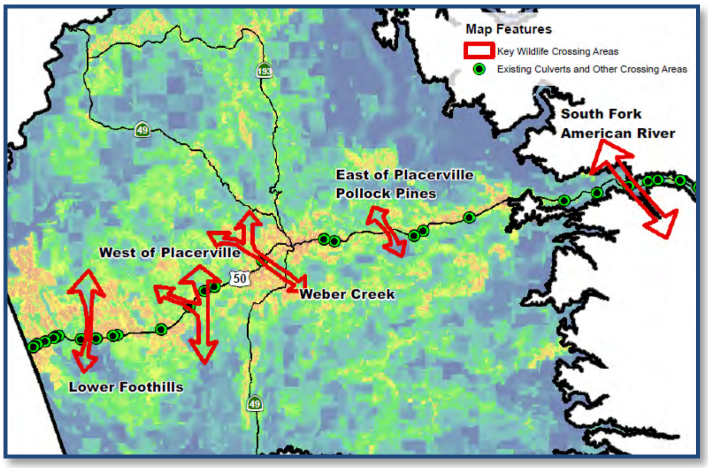
ATTACHMENT 2 TO COMMENTS OF CSNC ET AL.pdf
956K

ATTACHMENT 1

TO COMMENTS OF CSNC ET AL.
AUGUST 15, 2016

El Dorado County
Integrated Natural Resources Management Plan - Phase I

Final Wildlife Movement and Corridors Report
December 7, 2010



Prepared for
El Dorado County
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Table of Contents

Page #

List of Tables

List of Figures

List of Appendices

Executive Summary

This report is the third of four being prepared by El Dorado County (County) as part of Phase I of the County's Integrated Natural Resources Management Plan (INRMP). The County's 2004 General Plan requires the INRMP as a mitigation measure to help compensate for impacts from development in the western County (General Plan Mitigation Measure 5.12-1).

One of the important roles of the INRMP is to plan for connectivity through the use of wildlife corridors and other improvements in land use and transportation to protect wildlife and their habitat. The goals of Objective 7.4.2 of the 2004 General Plan include the identification and protection, where feasible, of wildlife corridors, which are areas of habitat connecting wildlife populations separated because of human development or natural causes. Corridors are a subset of the idea of connectivity.

Connectivity is a habitat quality that is critical for many animal and plant species' well-being because it allows species to meet their daily, seasonal, and other ecological needs. Wildlife populations need connectivity of habitats just as they need sufficient space to provide for food, shelter, and social structures. Connectivity is essential for dispersal of young animals and plant seeds, migration routes, reproduction, and gene flow, and it allows plants and animals to re-colonize from one area to another when habitats are lost (e.g., from a catastrophic wildfire or development). Maintaining connectivity and sufficient habitat area for wildlife will help to ensure the continuation of the County's natural legacy for current and future generations and will meet General Plan goals for conserving biodiversity. In addition, as is the case with other counties that traverse the Sierra Nevada foothills, the County's land-use and transportation footprints and decisions affect wildlife and plant diversity in the region as a whole.

Connection with Habitat Mapping and Indicator Species Selection

Earlier INRMP Phase 1 tasks included preparing:

1. A Habitat Inventory and Mapping Report, which updated the County's habitat map database, including mapping landscape disturbance and large expanses of native vegetation, and
2. An Indicator Species Report, which identified indicator species that may be useful for monitoring effects of General Plan implementation.

These previous reports contribute to the Wildlife Movement and Corridors Report by showing where road and development fragmentation effects are greatest in the study area, and by identifying the extent and types of habitat for specific indicator species. This Wildlife Movement and Corridors Report covers the connectivity and movement needs of all vertebrate species in the study area, including the needs of the indicator species selected for possible future INRMP monitoring. Collectively, these reports will be applied in the future Phase II INRMP tasks to define areas where connectivity and corridors are needed, and to assess the sufficiency of existing [e.g., Weber Creek and Important Biological Corridors (IBC)] connectivity.

Connectivity

Conserving connectivity is an essential element of habitat conservation. In the western portion of the County, there is high quality habitat for 316 terrestrial vertebrate species (according to the California Wildlife Habitat Relations Model, Appendix E – Vertebrate Species Affected by

Transportation and Land Use Fragmentation). All of these species, including the 25 vertebrate indicator species, potentially will need to move in various compass directions, including north-south. Inhibition of this movement, or complete prevention of movement, will reduce available habitat area, reduce population size, segment populations, and create loss of genetic and population structure. Without planning and provisions for connectivity, these effects will be exacerbated as the level of road and land-use fragmentation increases, with local and regional isolation and possible extinction for many species.

Corridors & Linkages

Wildlife corridors or linkages are zones of varying widths that are either the last places left for wildlife or other ecological flows to move through an area, or are the planned areas for potential movement. As fragmentation and development increase, animal populations are more affected by adverse environmental conditions including human disturbance, disease, climate change, and other stressors. Therefore, connectivity among core habitat conservation areas (via corridors and linkages) becomes increasingly important with increasing human development.

Risk Management

Protecting important habitat properties like connectivity is a critical conservation action that will help protect biodiversity in general, as well as rare species and species of management concern. The reasons for this are described in more detail later in this report.

Protecting the ability of wildlife and plant species to move and disperse is a risk management strategy that can be incorporated into the County's transportation and land use planning through the INRMP. Connectivity conservation actions will reduce the risk of negative impacts to biodiversity, individual species' survival, habitat quality, and listed species. Additionally, these actions will help support the connectivity provisions of General Plan Policy 7.4.2.8, including Subsection D, which addresses connectivity for important habitat.

Focus of Report

This report analyzes prior research studies, describes the need for wildlife habitat connectivity and corridors, and evaluates existing connectivity in the study area, particularly the potential barrier effect of U.S. Route 50 (Highway 50) on wildlife movement and habitat connectivity. The report recommends ways that the barrier effects of Highway 50, major roads, and urban areas could be reduced through retrofit of existing transportation infrastructure (e.g., installation of new structures, parkways, etc.).

Retrofitting existing culverts with ledges, for example, is a relatively inexpensive way to improve connectivity. Ledges can be constructed for as little as $17 per linear foot, or $60,000 to retrofit all culverts surveyed along Highway 50. New structures are also an option, like the box culvert that Nevada County installed along Highway 49 and the under-crossing planned by Caltrans between the Greenstone and El Dorado interchanges along Highway 50 to facilitate deer crossings. When these new structures are built and include habitat improvements in the vicinity of the crossing itself, habitat connectivity can be improved and vehicle-wildlife collisions can be reduced. Design and implementation of these types of measures would be consistent with General Plan Policy 7.4.2.8 B, which identifies considerations for wildlife movement on future 4- and 6-lane roadways, as well as improving crossings of existing roadways.

Figure ES-1 shows the key Highway 50 wildlife crossing areas that have been identified in this report. Table ES-1 summarizes the information found in Appendix C, Potential Highway 50 Wildlife Crossings, and identifies the potential value of existing under-crossings (e.g., culverts and roads) to ground-dwelling mammals if improvements are made to the under-crossing features. In general, more structures are needed under Highway 50 to meet the crossing needs of ground-dwelling animals. Lastly, this report describes options to more accurately understand connectivity and corridors in the County when the County's INRMP is prepared.

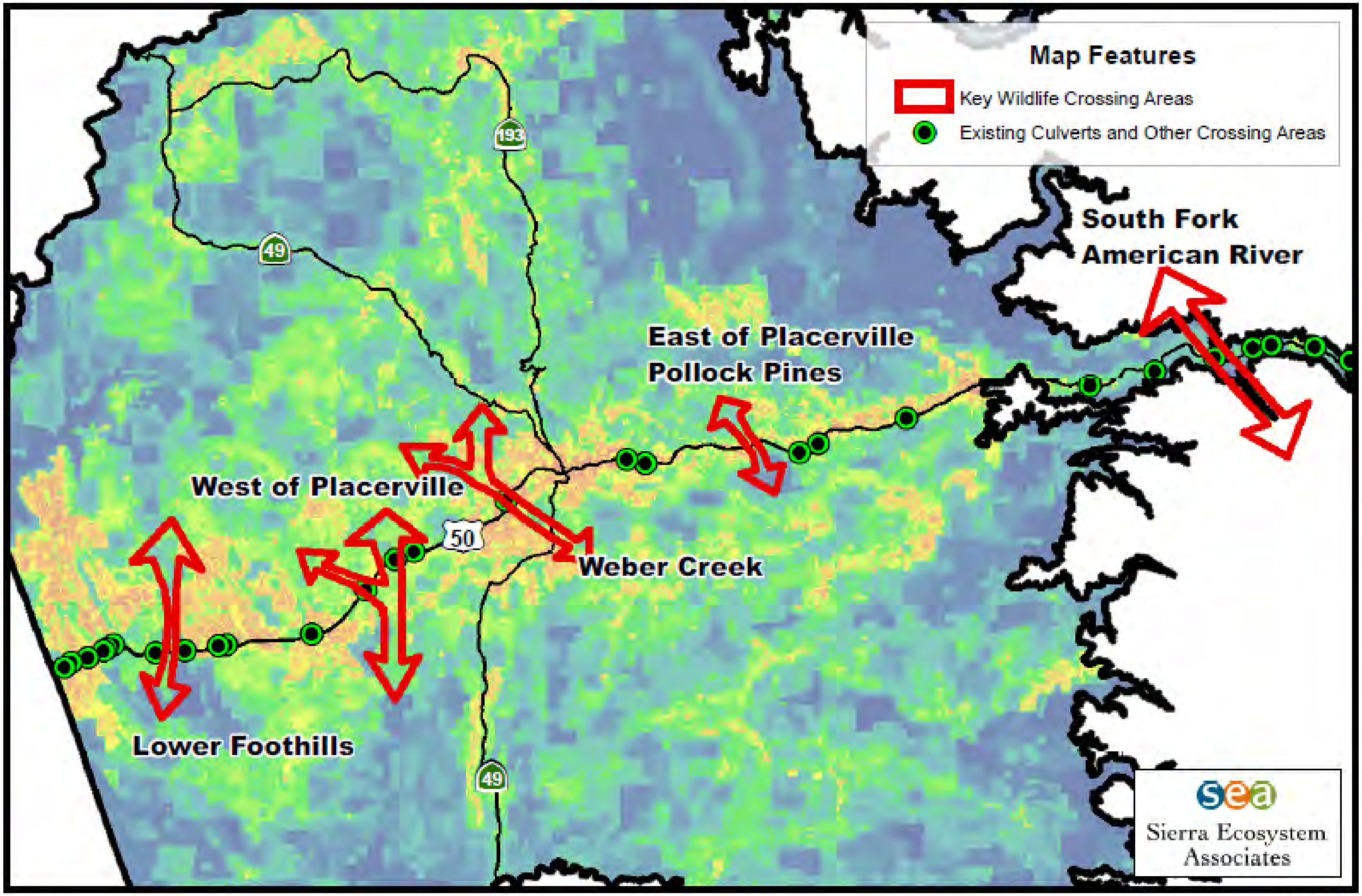

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Figure ES-1. Key Highway 50 Wildlife Crossing Areas

Disturbance Gradient[1]

3 - Least disturbed … 30 - Most disturbed

[1] Disturbance map created using County road density, parcel sizes, and parcel development status.

Table ES-1. Summary of Potential Value of Highway 50 Wildlife Under-Crossings

Appendix C Crossing #	Existing Highway 50 Crossings Name	Potential Value to Reptiles and Amphibians H= High Value M= Medium Value L = Low Value (e.g., lizard)	Potential Value to Small/Medium/Large Mammals H= High Value M= Medium Value L = Low Value (e.g., mouse, fox, deer)	Feasibility (General Plan consistency, cost) of Modifying Existing/Adding new connectivity H = High M = Moderate L= Low
1	Dunwood	M	M/L/L	H
2	Finders	M	M/L/L	M
3	Nugget	M	M/L/L	M
4	Joerger	M	M/L/L	H
5	Silva Valley Parkway	M	M/H/H	H
6	Tong Road	M	M/L/L	M
7	Bass Lake Road	M	M/H/H	H
8	Faith Lane	M	M/L/L	H
9	Cambridge Rd. #1	H	H/M/L	H
10	Cambridge Rd. #2	H	H/H/H	H
11	Chaparral	M	M/L/L	M
12	Shingle Springs Rd.	M	M/H/H	H
13	Dry Creek Tributary	H	H/H/M	M
14	Greenstone Rd.	M	M/H/H	H
15	Weber Creek Bridge	H	H/H/H	H
16	Smith Flat Rd.	H	H/H/H	H
17	Point View Dr. Bridge	M	M/H/H	H
18	Carson Rd. Bridge	M	H/H/H	H
19	Snows Rd. Bridge	M	M/H/H	H
20	Ridgeway Rd. Bridge	M	H/H/H	H
21	Pacific House	H	H/H/M	H
22	Ogilby Cyn	H	H/H/M	H
23	Riverton Bridge (SFAR) W	H	H/H/H	M
24	S. Fork Am. River E (#1)	H	H/H/H	M
25	S. Fork Am.River E (#2)	H	H/H/H	M
26	White Hall 1	H	M/L/L	M
27	White Hall 2	H	H/L/L	M
28	White Hall 3	H	H/L/L	M
29	Kyburz West	H	M/L/L	M
30	Kyburz East	H	M/L/L	M

1.0 Introduction

Wildlife corridors are a subset of the idea of connectivity. Connectivity is a habitat quality that is critical for many animal and plant species' well-being because it allows for species to meet their daily, seasonal, and other ecological needs. In the science and practice of conservation, landscape attributes are challenging to describe and protect compared to parcels of the landscape. Although connectivity has been an attribute of conservation area designs for the last 20 years, current approaches to species, habitat, and landscape conservation have not addressed the need for extensive connectivity. Current approaches also do not capture the changes in connectivity that are likely to occur in the near future. An important role of the INRMP is to plan for connectivity through the use of wildlife corridors and other improvements in land use to protect wildlife and their use of habitat. As climate change and other factors continue to modify landscapes and habitat, connectivity will remain important, allowing animals and their habitats to gradually adapt to new conditions.

Planning activities associated with preserving or restoring connectivity in a landscape must acknowledge the changes that are most likely to occur in the near future, including habitat disturbance caused by changes in the use of the land, edge effects on intact patches of suitable habitat, and barriers to wildlife movement created by structures or roadways. An important role of the INRMP is to plan how best to maintain connectivity through the management of land use patterns and the protection of existing wildlife movement, making informed choices for changes in land use designations or improvements to compromised habitats in order to protect wildlife and plants to the best ability of the County. Provisions for connectivity and freedom of movement can prevent genetic isolation and reduce the effects of fragmentation, which can otherwise lead to local or regional extinction.

Current conservation approaches sometimes overlook the needs of species by not maintaining wildlife movement. Certain wildlife species have nonetheless adapted to human activities and may even benefit from certain changes in land uses (e.g., agriculture) or transportation structures (e.g., road-sides). These are typically the less sensitive species such as medium-size omnivores (e.g., raccoons, opossums), medium-size carnivores, and certain rodents. Species sensitive to human activities and structures are unlikely to adapt or to have adapted, as is made evident by their absence in developed areas and by studies investigating relationships between disturbance and species responses.

This Introduction provides an overview of connectivity and its components. Section 2 discusses connectivity and wildlife movement in the western County, including the barrier effects of Highway 50 and other major roadways, and Section 3 provides strategies for improving wildlife movement and connectivity, such as protecting habitats and landscape corridors. Background scientific information, including information regarding habitat loss and fragmentation, wildlife corridors, the scientific basis supporting the need for connectivity, genetic and population effects of fragmentation, and threats to connectivity and permeability, is provided in Appendix A – Background Scientific Information. A glossary of terms is provided in Appendix B – Glossary of Terms, and Appendix C – Potential Highway 50 Wildlife Crossings identifies potential Highway 50 wildlife crossings. Appendix D – Crossing Structure Alternatives by Species provides a table of crossing structure attributes useful for medium and large mammals, and

Appendix E – Vertebrate Species Affected by Transportation and Land Use Fragmentation lists vertebrate species occurring within the INRMP study area. Lastly, Appendix F – Potential Approaches to Address Connectivity in the INRMP (Phase II) discusses possible future investigations for addressing wildlife movement, including tracking, wildlife cameras, Global Positioning System (GPS) and radio-collars and devices, and genetic testing.

1.1 General Plan Nexus

The importance of protecting wildlife corridors and movement to the County is shown in General Plan Objective 7.4.2. This Objective states in part: "*Identification and protection, where feasible, of critical fish and wildlife habitat including deer winter, summer, and fawning ranges; deer migration routes; stream and river riparian habitat; lake shore habitat; fish spawning areas; wetlands; wildlife corridors; and diverse wildlife habitat*." Protecting connectivity is an essential component of conserving habitat quality for wildlife and movement of specific species (i.e., deer), as well as the diverse wildlife of the County.

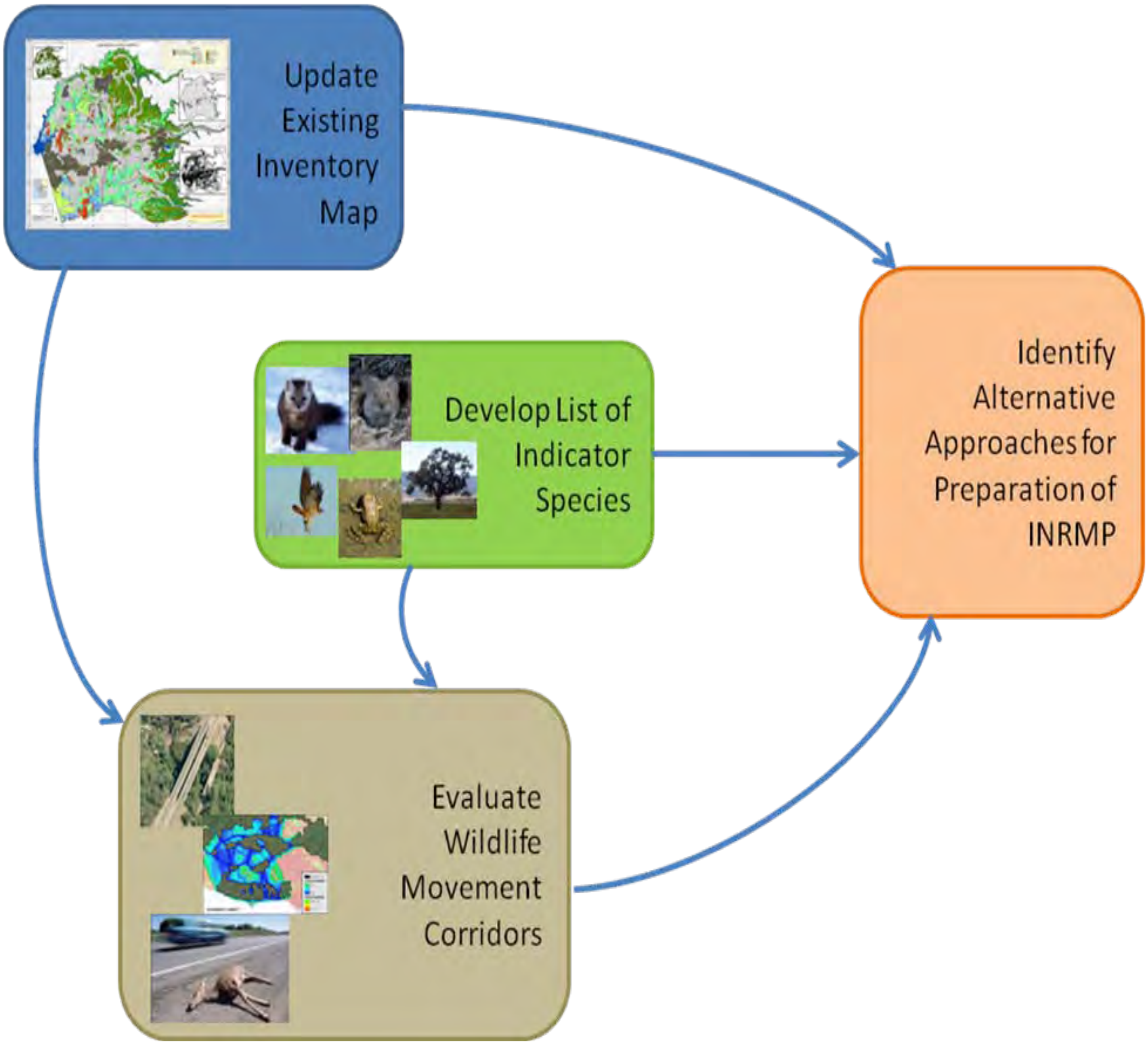
In addition to Objective 7.4.2, General Plan Policy 7.4.2.8, which establishes the INRMP, instructs the County to consider wildlife movement for four- and six-lane roadway projects, and to consider connectivity to adjacent protected lands and important habitats when planning or evaluating habitat acquisition. For these reasons a thorough understanding of the biology of connectivity and the application to the County is essential to the development of the INRMP.

For Phase I of the INRMP, the County has identified the need to evaluate habitat corridors and the barrier effects of roadways in the County. Appendix C of this report evaluates potential crossing locations along Highway 50, the characteristics of those crossings and methods to enhance their use. Evaluation of connectivity and wildlife movement in the western County in Phase II of INRMP activities will be used to update the location and function of the IBCs, which have regulatory functions in land use decision-making under General Plan Policy 7.4.2.9.

1.2 Connection with Habitat Mapping and Indicator Species Selection

Earlier INRMP Phase 1 tasks included updating the County's habitat map database, including mapping landscape disturbance and large expanses of native vegetation, as well as identification of indicator species that could be used in the future to evaluate effects of General Plan implementation. Products of these tasks contribute to the wildlife corridors report by providing useful information about road and development fragmentation effects in the study area and through identification of habitat needs of specific species. This report covers the connectivity and movement needs of all vertebrate species in the study area, including the needs of the indicator species. Figure 1. Connections among INRMP Phase I Tasks displays the relationships among these reports.

Figure 1. Connections among INRMP Phase I Tasks



1.3 Connectivity

Habitat and landscape quality for wildlife needs is often defined by a combination of forage availability and quality, how well reproductive needs are met, and relative connectivity for movement on daily to evolutionary time-scales. Connectivity is an attribute of habitat patches, where they exist, as well as of landscapes as a whole. Although connectivity is often used to describe habitat and landscape structure, it is most meaningful as a functional attribute that is particular to individual species. In areas with high diversity of motile species, a high proportion of the landscape may be required to meet movement needs for all species. Connectivity has also been described as one of the most critical elements in biodiversity conservation planning in the presence of climate change effects (Heller and Zavaleta, 2009). Saving and Greenwood (2002) analyzed habitat loss and fragmentation for various General Plan build-out and conservation policy options. Their conclusion was that the greatest concerns were the degradation of habitat quality that accompanies rural residential development (~1 unit/10 to 40-acre parcel) and the absence of a natural connection between the northern and southern sides of Highway 50 in the lower and mid-foothills. The first conclusion is important because of the proportion of the County fragmented by rural residential development – 40%. This fragmented area is greater than the area physically lost to development due to structures or roads – 4%.

Conserving connectivity is as fundamental a conservation concern as improving forage quality and about as easy to estimate and model for actual landscapes. Ultimately, connectivity is conserved for individual species or groups with similar needs. Connectivity is successfully conserved when movement across all spatial and temporal scales is possible, for a given species in a given landscape. It is also successful when movement within and among populations is protected to such a degree that genetic bottlenecks, population separations, population declines, local extinctions, failed re-colonizations, and species endangerment do not occur due to movement inhibition. It is also important to remember that other factors affecting species and population persistence may over-ride positive or negative aspects of the degree of connectivity. In the western County, there is high quality habitat for 316 terrestrial vertebrate species and habitat of any quality for 366 vertebrate species (according to the California Wildlife Habitat Relations Model, Appendix E – Vertebrate Species Affected by Transportation and Land Use Fragmentation). To maintain population well-being, all of these species, including the 25 vertebrate indicator species, will almost certainly need to move in various compass directions, including north-south. Inhibition of this movement, or complete prevention of movement, will almost certainly result in reduction in available habitat area, reduction in population size, segmentation of populations, and loss of genetic and population structure. This effect will be greatest for the species most sensitive to disturbance and least apparent for the least sensitive species that have adapted to human activities. Without planning and provisions for connectivity, these effects will be exacerbated as the level of road and land-use fragmentation increases, with local and regional isolation and possible extinction for many species. Barrier effects of developed corridors such as Highway 50 will be greater for ground-dwelling animals than for flying animals; there are 62 mammals and 33 herpetofauna (reptiles and amphibians) among the 316 terrestrial vertebrates with high quality habitat in the study area, and the remainder are birds.

1.4 Corridors and Linkages

In the context of the County, the effects of human development and activity have resulted in two general types of corridors: 1) existing linkages within zones of varying width (e.g., riparian corridors) that are either the last places left for wildlife or other ecological flows to move through an area (Figure 2A. Methods for Identifying Corridors – Western El Dorado County), and, 2) planned areas (i.e., IBCs) for potential movement (Figure 2B. Methods for Identifying Corridors – Potential Corridors for Mountain Lion in Southern California Using GIS Modeling, Figure 2C. Methods for Identifying Corridors – Prioritizing Deer Movement "Corridors" Based on Deer Herd Movement). For certain organisms and in certain places corridors may serve as critical connection solutions to maintain biodiversity and ecological flows. Because corridors primarily meet the needs of species least-sensitive to disturbance, including fragmentation effects, they may not effectively connect other species' habitat, depending on the species and the degree of fragmentation.

Figure 2A. Methods for Identifying Corridors – Western El Dorado County

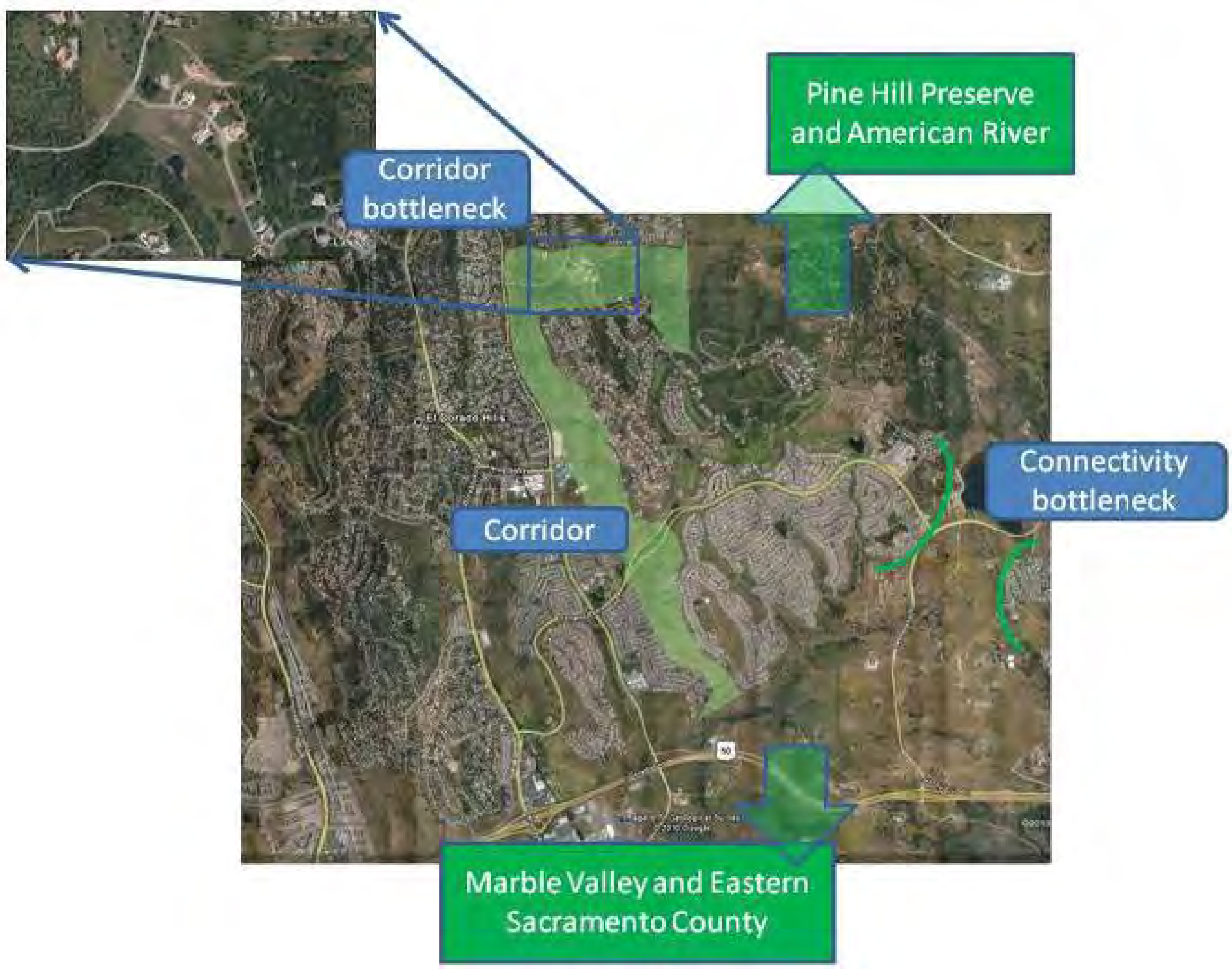


Figure 2B. Methods for Identifying Corridors – Potential Corridors for Mountain Lion in Southern California Using GIS Modeling

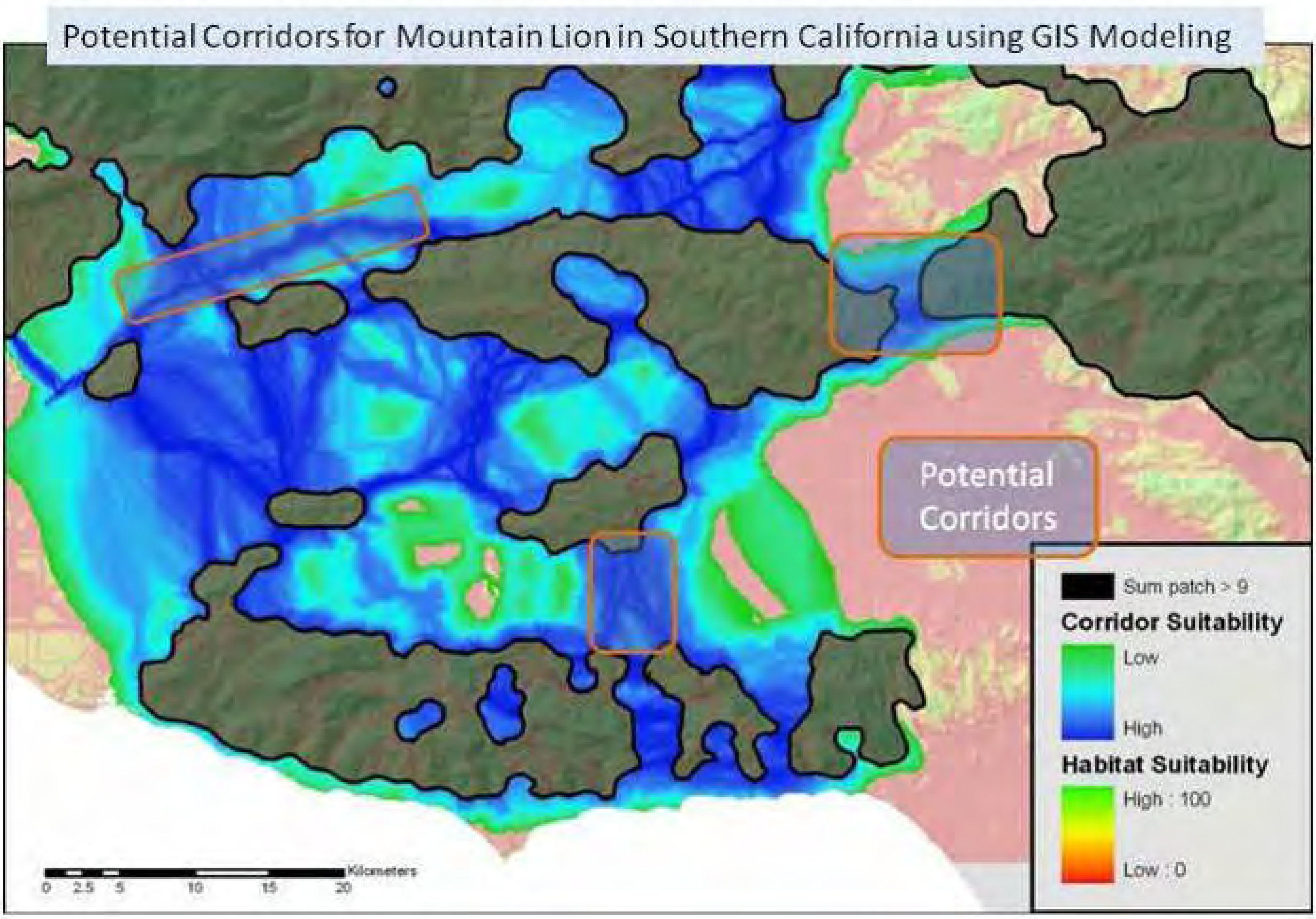
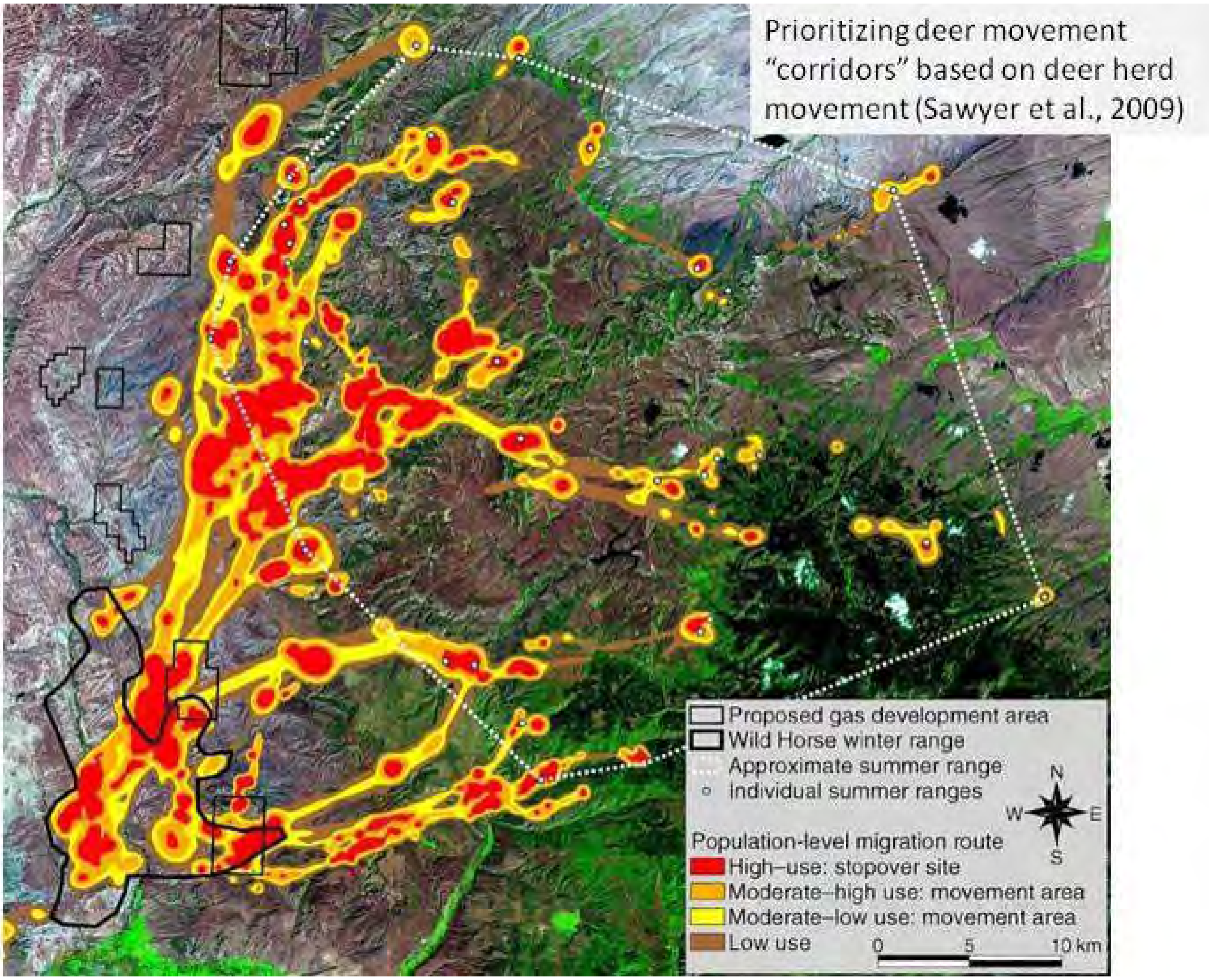


Figure 2C. Methods for Identifying Corridors – Prioritizing Deer Movement "Corridors" Based on Deer Herd Movement



In the western County, there are several parts of the landscape that could be called corridors because of their narrowness and likely role in limited wildlife movement (e.g., Figure 2A). In other parts of the County, there may be no movement of animals sensitive to humans (e.g., through housing sub-divisions; dark green areas in Figure 3A. Disturbance Gradient of Road Density and Small Parcel Sizes) or free movement of sensitive animals because they occupy unfragmented areas of native vegetation with little disturbance (Figure 3B. Large Expanses/Patches of Least Disturbed Lands). In the latter case, there are not necessarily corridors, though connectivity within and among areas of suitable habitat is still important.

IBCs have been mapped for the western County and have ramifications for permitted development within these areas (General Plan Policy 7.4.2.9). The placement and function of IBCs and areas not covered by IBCs will be reviewed with the new information contained within this report and the mapping conducted as part of INRMP Phase I. A preliminary scope for updating of IBCs will be described in the Task 2 “Optional Approaches”. Revision of IBCs will take place in the INRMP Phase II planning activities. Existing and revised IBCs may overlap with riparian zones, but they may just as easily not do so, as their function is to provide connectivity among less-disturbed landscapes in the County. Areas not included in current or revised IBCs may have important connectivity function. In other words, not all connectivity functions for wildlife and plant community needs will be provided by IBCs; by themselves corridors provide only a part of connectivity needs for wildlife and plant communities. Remaining needs are met by appropriate planning in non-corridor areas.

This report describes the need for landscape connectivity, including maintaining wildlife corridors and linkages through developed areas, and evaluates wildlife corridors and connectivity in the INRMP study area (particularly the potential barrier effect of Highway 50 and nearby development on wildlife movement and habitat connectivity). This report also describes ways and estimates costs to reduce the barrier effects of Highway 50, major roads, and urban areas through retrofit of existing transportation structures and construction of new structures, including features like very wide vegetated buffers for animal cover. Conserving connectivity function will be important in general to maintaining biodiversity, especially for species most sensitive to human disturbance.

1.5 Risk Management

Protecting critical habitat properties like connectivity is an important conservation action that will help protect biodiversity in general, as well as rare species and species of management concern. It is a method for reducing the chance of eliminating subpopulations or populations of species sensitive to fragmentation. The reasons for this are described in the sections below, but include the following: 1) Many species are sensitive to human activity, including roads and traffic, and almost certainly will stay away from these areas even if that means failing to disperse or move to other habitat areas. This aversion effect of roads and other development results in fragmented populations and subpopulations of species. 2) Species that are fragmented into small, less effective populations are more likely to go extinct locally, or throughout their range. 3) Road impacts on individuals can be so great that populations may be reduced in size or eliminated, resulting in an increased chance of local or total extinction. 4) Fragmented populations may fail to re-colonize abandoned habitat, are more likely to suffer from genetic in-breeding effects, and almost certainly will genetically diverge from other subpopulations.

For these and other reasons, protecting the ability of wildlife and plant species to move and disperse is a risk management strategy that can be incorporated into transportation and land use planning. Connectivity conservation actions will reduce the risk of negative impacts to biodiversity, habitat quality, and listed species. Additionally, these actions will help support the connectivity provisions of General Plan Policy 7.4.2.8, including Subsection D, which addresses connectivity for important habitat.

Figure 3A. Disturbance Gradient of Road Density and Small Parcel Sizes

The darker green shown below is more disturbed.

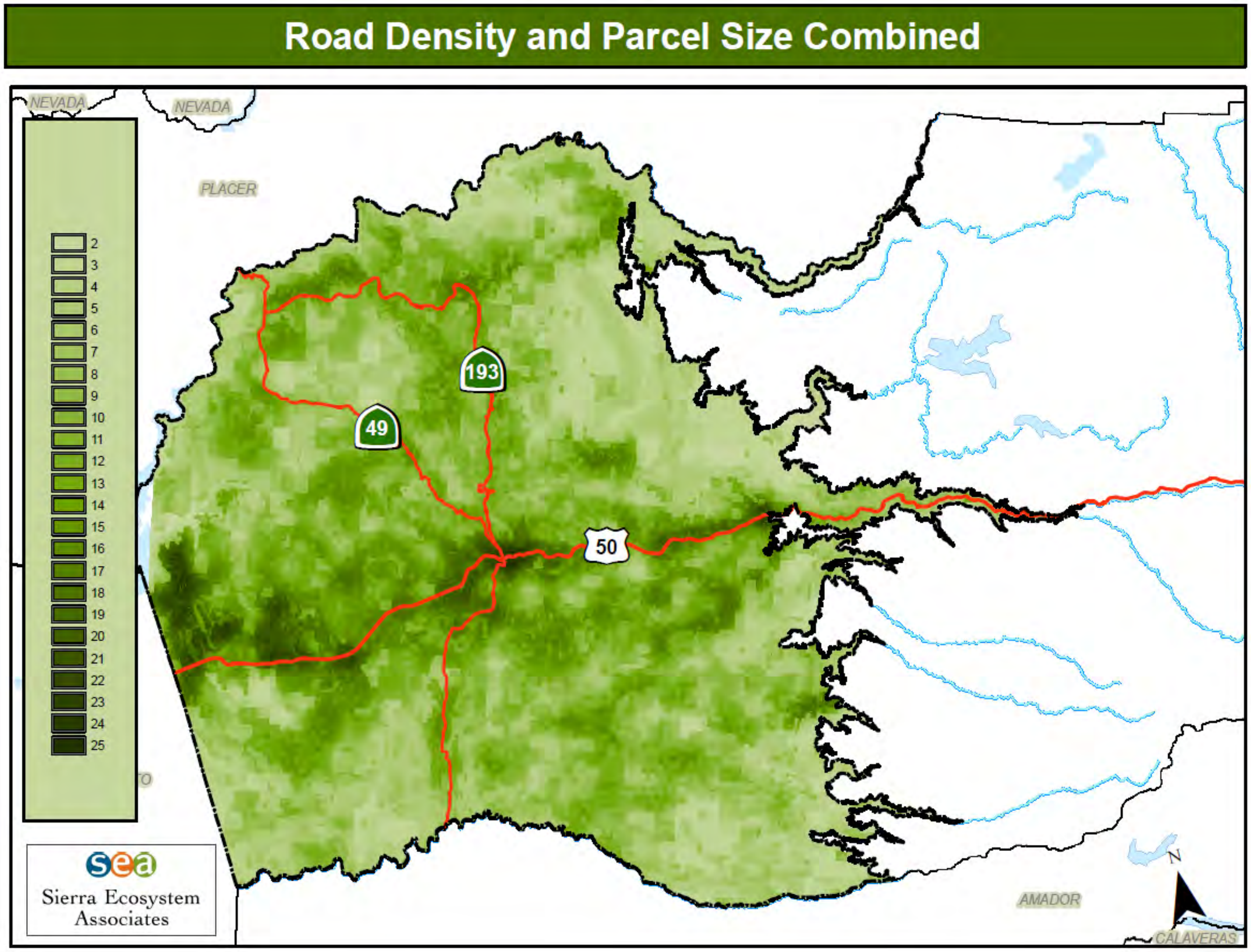
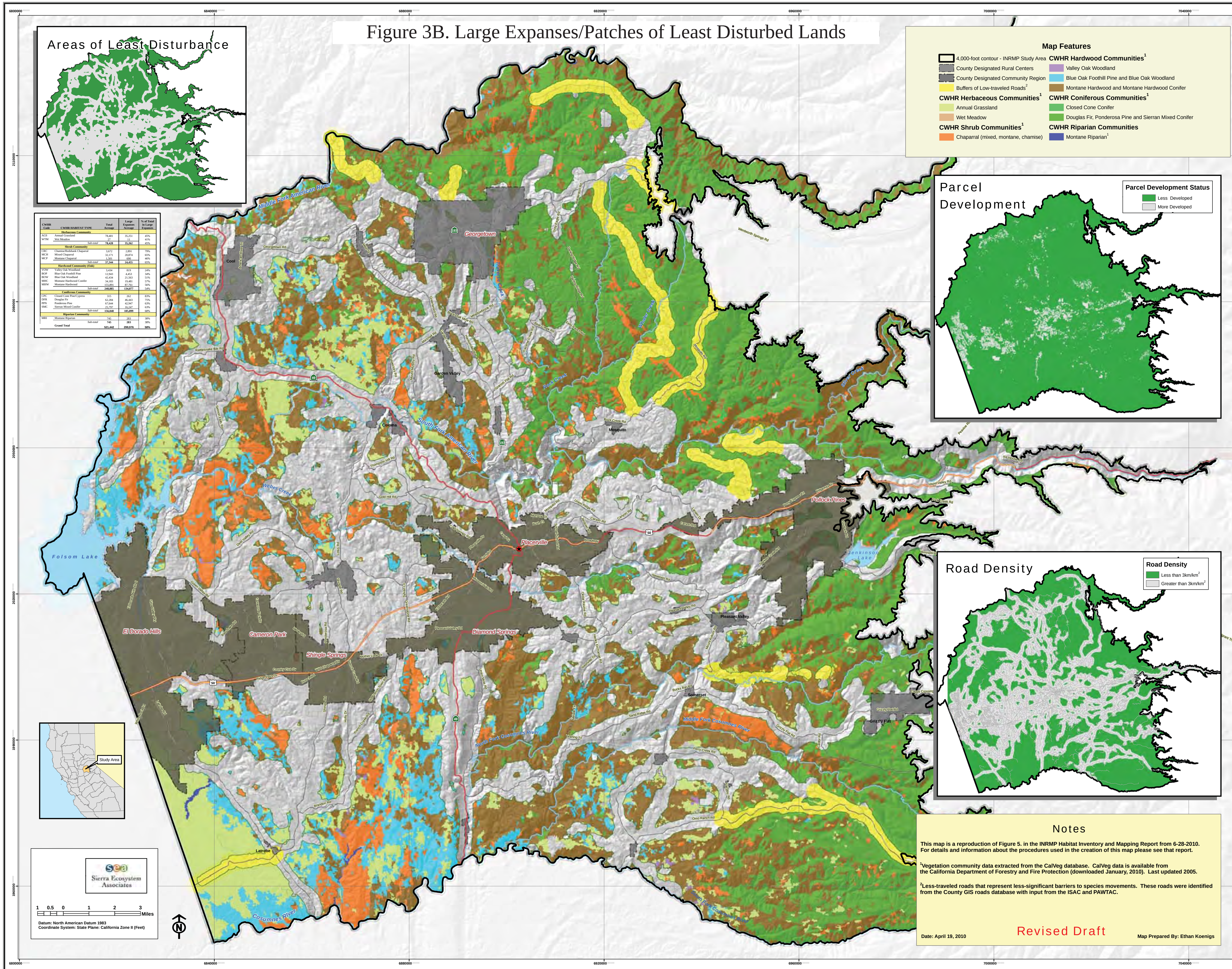


Figure 3B. Large Expanses/Patches of Least Disturbed Lands



CWHR Code	CWHR HABITAT TYPE	Total Acreage	Large Expanses Acreage	% of Total in Large Expanses
	Herbaceous Community			
AGS	Annual Grassland	78,401	35,251	45%
WTM	Wet Meadow	27	11	41%
	Sub-total	**78,428**	**35,262**	45%
	Shrub Community			
CRC	Chamise/Redshank Chaparral	3,672	2,891	79%
MCH	Mixed Chaparral	32,171	20,874	65%
MCP	Montane Chaparral	1,501	690	46%
	Sub-total	**37,344**	**24,455**	65%
	Hardwood Community (Oak)			
VOW	Valley Oak Woodland	3,434	819	24%
BOP	Blue Oak Foothill Pine	12,943	4,453	34%
BOW	Blue Oak Woodland	42,434	21,563	51%
MHC	Montane Hardwood Conifer	34,183	19,481	57%
MHW	Montane Hardwood	155,891	87,761	56%
	Sub-total	**248,885**	**134,077**	54%
	Coniferous Community			
CPC	Closed Cone Pine/Cypress	315	262	83%
DFR	Douglas Fir	62,284	46,443	75%
PPN	Ponderosa Pine	67,644	42,947	63%
SMC	Sierran Mixed Conifer	25,797	16,247	63%
	Sub-total	**156,040**	**105,899**	68%
	Riparian Community			
MRI	Montane Riparian	745	283	38%
	Sub-total	**745**	**283**	38%
	Grand Total	**521,442**	**299,976**	**58%**

Notes

This map is a reproduction of Figure 5. in the INRMP Habitat Inventory and Mapping Report from 6-28-2010. For details and information about the procedures used in the creation of this map please see that report.

[1]Vegetation community data extracted from the CalVeg database. CalVeg data is available from the California Department of Forestry and Fire Protection (downloaded January, 2010). Last updated 2005.

[2]Less-traveled roads that represent less-significant barriers to species movements. These roads were identified from the County GIS roads database with input from the ISAC and PAWTAC.

Date: April 19, 2010

Revised Draft

Map Prepared By: Ethan Koenigs

2.0 Connectivity and Wildlife Movement in the INRMP Study Area

The western portion of the County has a variety of landscapes and levels of disturbance, from urban areas to wild areas, low-density rural development, agriculture, and actively-logged areas. These different levels of disturbance correspond to varying levels of fragmentation, which will affect wildlife and plant occupancy and dispersal. Moderately and highly fragmented areas will tend to have reduced likelihood of wildlife movement in any direction. Two possible directions of wildlife and other taxonomic groups' movement are north-south and east-west. Obviously, movement in other compass directions is possible and likely, but these directions are oriented roughly up and down the Sierra Nevada foothills and up and down the elevational gradient from the valley to the Pacific Crest. Barriers to wildlife movement and impacts to connectivity come from land uses and transportation networks. Previous plans in the County have attempted to deal with certain aspects of habitat conditions, for example, the Oak Woodland Management Plan (OWMP) (El Dorado County 2007). Previous analyses of general planning have expressed concern about the possible ramifications of different build-out scenarios (e.g., Saving and Greenwood, 2002). In particular, Saving and Greenwood point out that maintaining connectivity in the face of General Plan build-out is best accomplished through strategic purchases in critical areas where connectivity would be lost due to development, primarily along Highway 50. They further pointed out that the fragmentation and disturbance patterns and impacts would eventually be a result of the way development already-permissible under the General Plan was laid-out and controlled through County ordinances. For a given increase in population, types of development that are likely to have the greatest effect across the landscape are low-density residential (1 unit/5 to 10-acres) and rural residential (1 unit/10 to 40-acres). This may seem counter-intuitive, but because many animals are sensitive to roads, houses, fences, people's activities, and pets, the larger landscape area often affected by low-density and rural residential developments means that the effects cover a larger area. This section evaluates the need for connectivity in the context of existing and proposed development and conservation activities in the study area.

2.1 Wildlife Movement

According to the California Wildlife Habitat Relations system, there are 366 vertebrate species that could occur in western County habitats (Appendix E – Vertebrate Species Affected by Transportation and Land Use Fragmentation). 316 of these species have high habitat quality in the lower elevation plant communities in the western part of the study area. In comparison, 262 of the 366 could occur in the western 1/3 of the study area and 150 of these have high habitat quality (Appendix E – Vertebrate Species Affected by Transportation and Land Use Fragmentation). Of the 316 species, 95 are ground-dwelling (62 are mammals and 33 are herpetofauna) and the remainder are flying (birds and bats). Previous research, some of which is cited in this study, shows that wildlife move during daily, seasonal, and multi-annual time-frames. To do so, individuals, populations, and species need connected landscapes. Fragmentation almost certainly will inhibit the movement of all vertebrate species in the study area to varying degrees. Those species that move the most, which are usually the largest, almost certainly will require the highest level of connectivity. However, even the smallest organisms with the most limited individual home ranges need to disperse and mate with others of the same species in order to retain population and genetic structure. The movement of all species almost certainly will be affected by the presence of roads and similar development (Figure 4. Roads and

Rural Development Fragment Habitats in Western El Dorado County), meaning that as roads and associated development proliferates, species and population level effects almost certainly will occur, even if they are not measured.

Figure 4. Roads and Rural Development Fragment Habitats in Western El Dorado County

East-West Connectivity

East-west connectivity is likely to be affected by Highway 49 and major roads in the study area: Latrobe Road, South Shingle Road, Salmon Falls Road, Lotus Road, and others. This effect will depend on the wildlife species, position of the road in the landscape/habitat, traffic volumes, traffic speeds, road sinuousity (how curved it is), adjacent fencing, and opportunities to cross the road safely. Because the whole study area is hilly, most roads have a lot of curves. Fast-moving cars may not have time to avoid collision as they go around curves. Because of the degree of roadedness (combination of road density and road effects) in the study area, wildlife movement in any compass direction is likely to be affected at some point by roads and their use. North-south connectivity and wildlife movement is discussed in more detail below, especially as related to the Highway 50 urban and transportation corridor.

2.2 Barrier Effect of Highway 50 and Other Major Roadways

Highway 50 and other major roadways in the study area are very likely to function as partial or complete barriers to movement of ground-dwelling, terrestrial vertebrates. Complete barrier effects will result from some combination of physical characteristics of the right-of-way (ROW), traffic volumes, and sensitivity of the animals to roads and traffic. Less-sensitive animals and lower-use roads will result in lower barrier effects. The sections below discuss the barrier effects associated with Highway 50. Major roadways are likely to have many of the same types of effects, but these are likely to be less intense.

Highway 50 as Barrier

Highway 50 is a busy highway bisecting the Sierra Nevada and its foothill habitats between Folsom and Lake Tahoe. For much of its length, west of Placerville, it has associated urbanization in rural areas that add to the fragmenting effect of the highway (e.g., Saving and Greenwood, 2002). The combination of the 220-foot wide highway ROW, the >10,000 cars/day along the highway within the study area, and the associated rural-developed and urban areas provide a relatively effective barrier for ground-dwelling wildlife movement in the north-south compass direction in the foothills. Animals and ecological processes will be affected by the Highway 50 transportation corridor to varying degrees, with flying animals and seed dispersal affected less than ground-dwelling animals.

In three recent publications (Shilling et al., 2002, 2007; Spencer et al., 2010), Highway 50 stands out as a barrier to several identified corridor or linkage zones at the scale of the Sierra Nevada foothills. Shilling et al. (2002, 2007) used a landscape integrity index as the basis for a fine-resolution connectivity analysis of the Sierra Nevada using a least-cost corridor modeling approach within habitat zones. Spencer et al. (2010) used a similar approach, but with a more generalized analysis of the whole state. These two teams identified two slightly different linear connection strategies for the western County. Spencer et al. (2010) proposed one connectivity area in the western County, traversing east El Dorado Hills and Marble Valley to connect the grasslands to the south with the undeveloped lands around eastern Folsom Lake to the north (Figures 5A. Essential Habitat Connectivity Project – Sierra Nevada Foothills and Figure 5B. Essential Habitat Connectivity Project – Western El Dorado County). This area includes many roads and subdivisions, but is also the last open habitat in the western County in close proximity on either side of Highway 50. Shilling et al. (2002) identified two main areas for conservation of wildlife movement, one east of Placerville and the other west (Figure 6. Distribution of Intact Habitat Patches and Potential Corridors). These independent analyses, combined with the disturbance and habitat mapping from INRMP Task 1b, provide a relatively complete picture of the landscape connectivity and potential wildlife corridors in the western County. In all cases, remnant wildlife habitat connections (e.g., Marble Valley and Weber Creek) and rural residential development areas (e.g., east of Placerville) provide a few remaining landscape connections for north-south movement of wildlife in this portion of the Sierra Nevada foothills. Connections like the lower foothill corridor that traverses the Bass Lake Road interchange are important both regionally and within the County because they are unique and irreplaceable. In other words, there are no comparable wildlife corridors in the habitat zones each occupies; once developed, wildlife movement north and south across the Highway 50 corridor in the lower foothills almost certainly will cease.

The importance of Highway 50 in this picture is that its ROW surface is effectively an almost complete barrier to ground-moving wildlife, while a few under-crossing opportunities still exist. It is both a developed transportation corridor disturbing the surrounding ecology and the location of critical junctions between built and natural systems. Conserving and expanding remaining connections across the highway west of Placerville will be a critical action in the protection of foothill species requiring the ability to move and disperse within their habitat zones.

One way to assess Highway 50 is in terms of the number of wildlife that die from collisions with vehicles. The California Department of Transportation (Caltrans) has created a geo-referenced database of larger animals that its maintenance crews have cleaned up. Although the database goes back 40 years, it is not complete. In other words, there have been roadkilled animals that are not in the database. The distribution of deer roadkill and traffic volumes is shown in Figure 7. Comparison of Traffic Volumes and Deer Kill on Highway 50. Volumes of traffic are very high west of Placerville, becoming lower as the highway goes eastward. There are two primary peaks in deer roadkill along the highway. One is near Placerville itself and the other is roughly where Highway 50 runs along the American River.

Figures 5A. Essential Habitat Connectivity Project – Sierra Nevada Foothills Area

Shown below is the position of "essential connectivity areas" (a) in the Sierra Nevada foothills and (b) within El Dorado County (Source: Spencer et al. 2010).

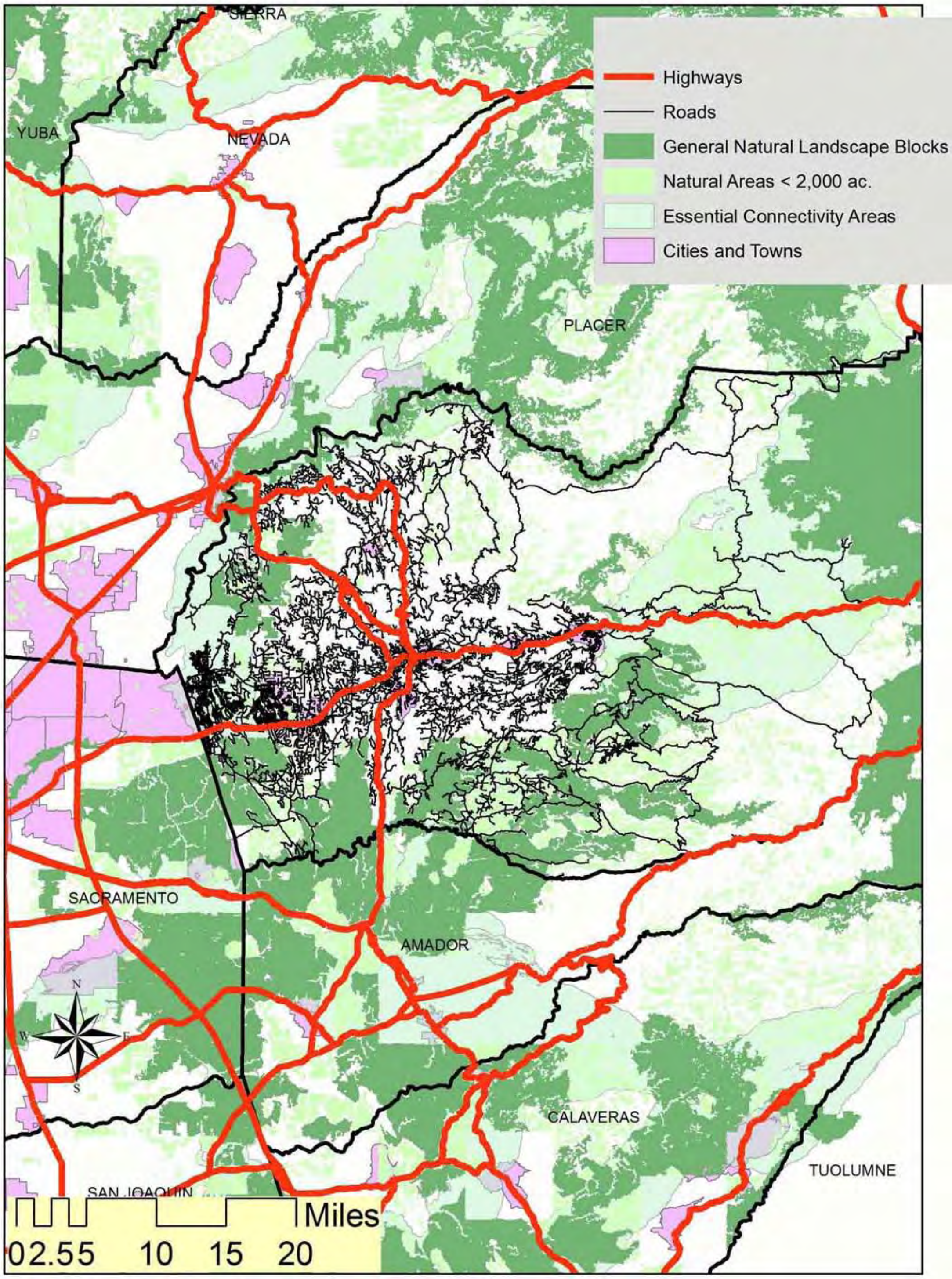


Figure 5B. Essential Habitat Connectivity Project – Western El Dorado County

The position of “essential connectivity areas” (a) in the Sierra Nevada foothills and (b) within El Dorado County (Source: Spencer et al. 2010) are shown below.

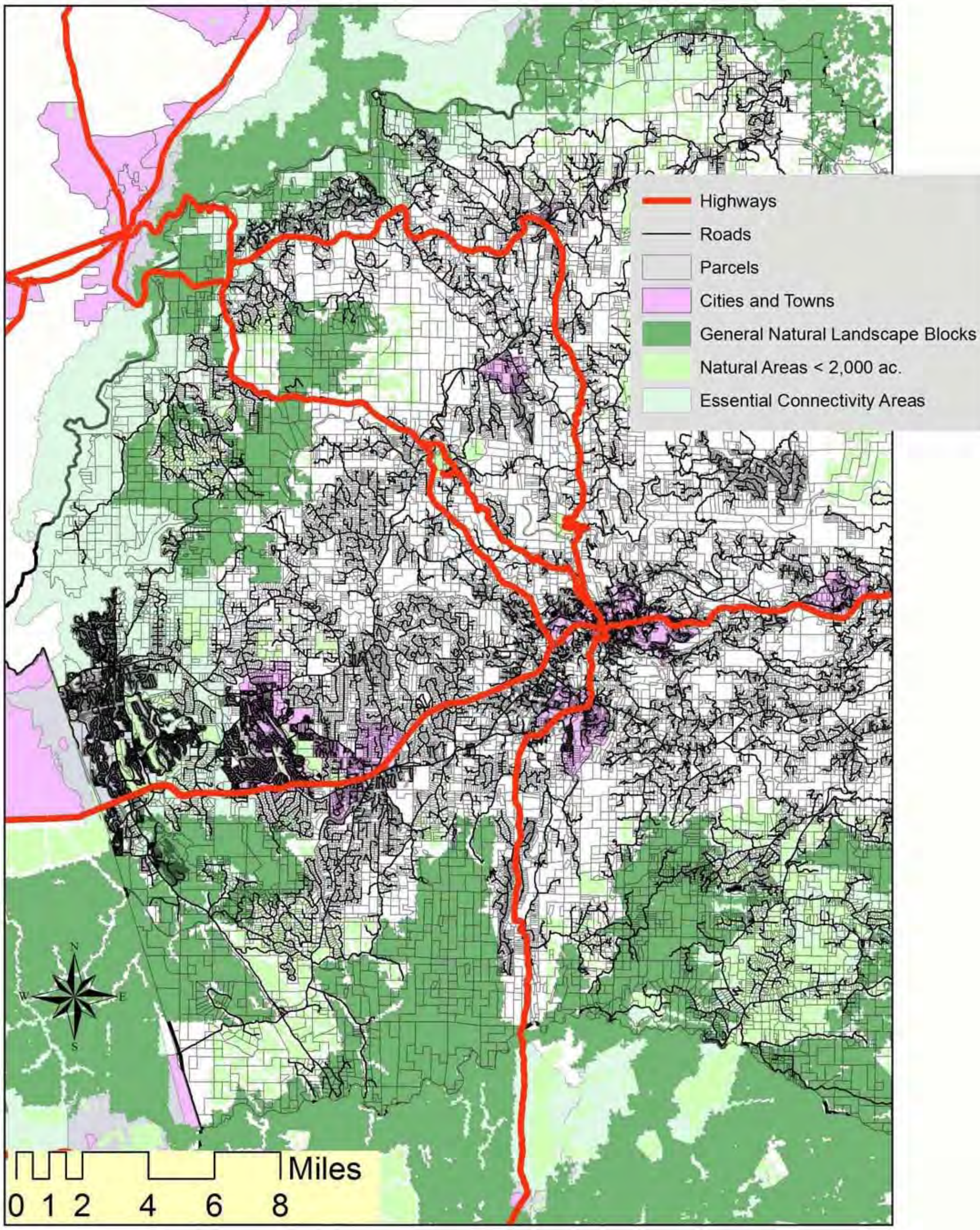


Figure 6. Distribution of Intact Habitat Patches and Potential Corridors

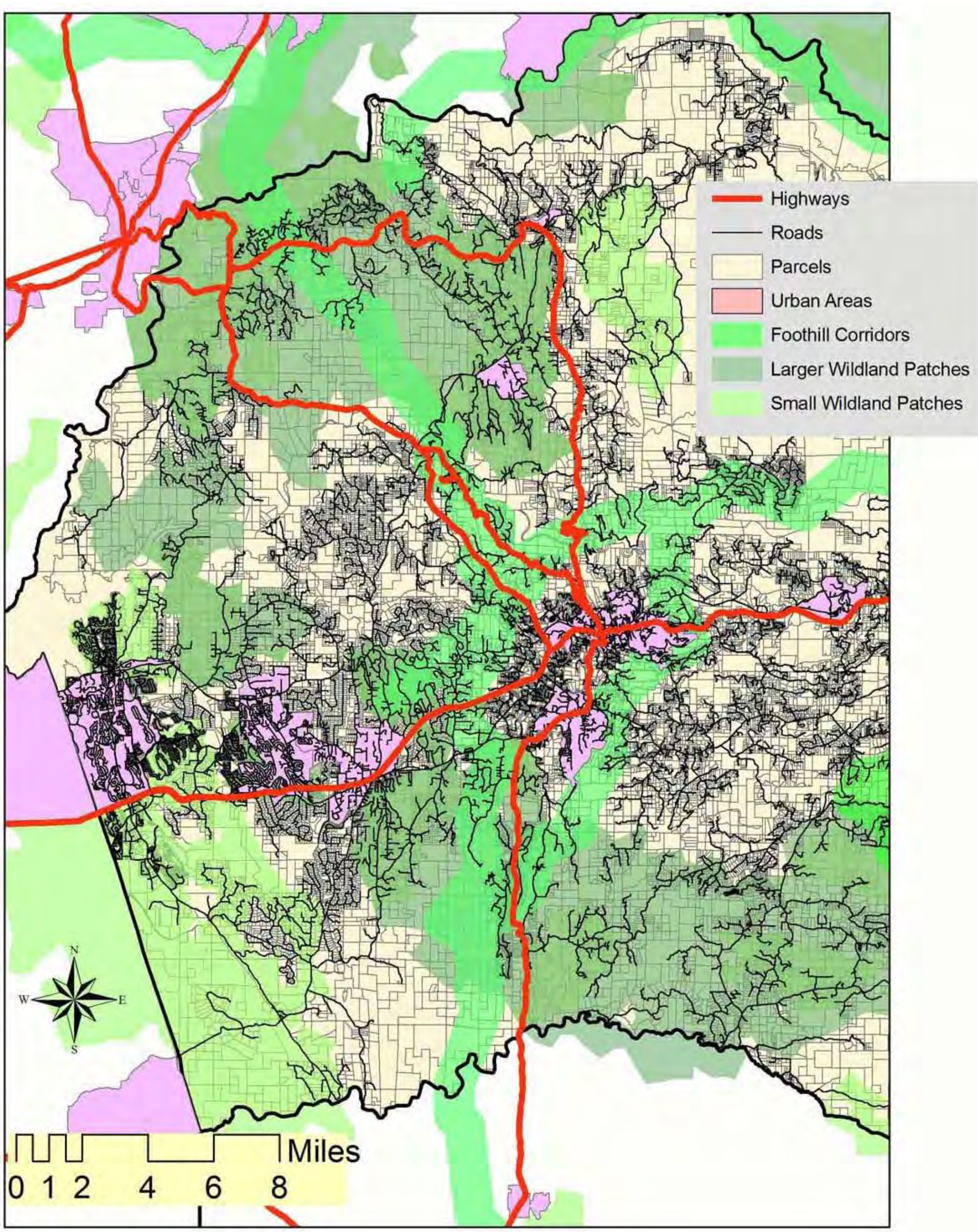
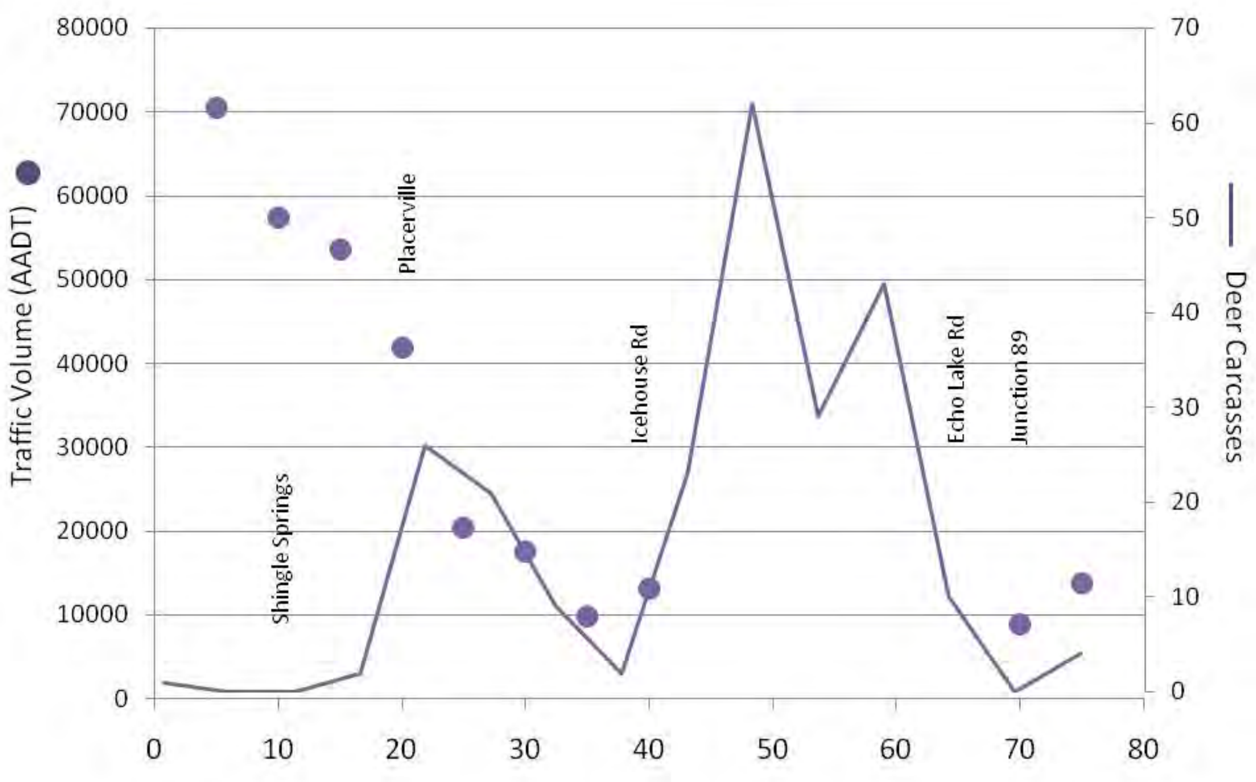


Figure 7. Comparison of Traffic Volumes and Deer Kill on Highway 50 (data from Caltrans)



2.3 Potential Crossing Locations along Highway 50

The surface of any busy highway is a dangerous place for animals. Most animals will avoid crossing the road surface itself, unless they have become habituated to the sound and sight of fast-moving vehicles. When highways have both concrete median barriers and high traffic volumes, it is less likely that animals will attempt to cross the surface and if they do, that they will survive. In some places, there are crossing opportunities that allow animals to cross the ROW, without using the road surface. For example, culverts, road and stream under-crossings, and road over-crossings all provide potential passage from one side of a highway to the other. These potential crossings vary in size from metal pipe culverts only a foot in diameter to bridged streams and roads up to 100 feet wide.

Between the border with Sacramento County and 4000’ elevation, Highway 50 is traversed by two dozen potential crossing locations, ranging from small drainage pipes to Weber Creek. Each of these was surveyed as a potential opportunistic crossing device for wildlife moving from one side of the highway to the other. Each was evaluated for its potential to provide wildlife with the connections needed to move within its habitat and to maintain important population structure and processes. Characteristics of these potential crossings are described in Appendix C – Potential Highway 50 Wildlife Crossings.

Locations

Potential locations to cross under Highway 50 were identified using a combination of field information and aerial imagery. Thirty potential locations were mapped for detailed evaluation, 24 of which were accessible (Figure 8A. Locations of Existing Potential Highway 50 Crossings in the Western Study Area, Figure 8B. Locations of Existing Potential Highway 50 Crossings in the Placerville to Pollock Pines Area, and Figure 8C. Locations of Existing Potential Highway 50 Crossings in the Eastern Study Area)). Each accessible location was characterized in detail in the field (Appendix C – Potential Highway 50 Wildlife Crossings).

The locations are: 1) Dunwood Corrugated Culvert Pipe; 2) Finders Concrete Box Culvert; 3) Nugget Concrete Box Culvert; 4) Joerger Concrete Box Culvert; 5) Silva Valley Parkway Bridge Under-Crossing; 6) Tong Road Concrete Box Culvert; 7) Bass Lake Road Under-Crossing; 8) Faith Lane Corrugated Culvert Pipe; 9) Cambridge Road Concrete Box Culvert (1); 10) Cambridge Road Concrete Box Culvert (2); 11) Chaparral Corrugated Culvert Pipe and Concrete Box Culvert; 12) Shingle Springs Road Bridge Under-Crossing; 13) Dry Creek Tributary at Red Hawk Pipe Culvert; 14) Greenstone Road Bridge Under-Crossing; 15) Weber Creek Bridge Under-Crossing; 16) Smith Flat Road Under-Crossing (this under-crossing is within the city limits of Placerville); 17) Point View Drive Bridge Under-Crossing (this under-crossing is within the city limits of Placerville); 18) Carson Road Bridge Under-Crossing; 19) Snows Road Bridge Under-Crossing; 20) Ridgeway Road Bridge Under-Crossing; 21) Pacific House Concrete Box Culvert; 22) Ogilby Canyon Concrete Box Culvert; 23) Riverton Bridge (South Fork American River); 24) South Fork American River Bridge Under-Crossing East #1; 25) South Fork American River Bridge Under-Crossing East #2; 26) White Hall 1 Corrugated Culvert Pipe; 27) White Hall 2 Corrugated Culvert Pipe; 28) White Hall 3 Corrugated Culvert Pipe; 29) Kyburz West Corrugated Culvert Pipe; 30) Kyburz East Corrugated Culvert Pipe.

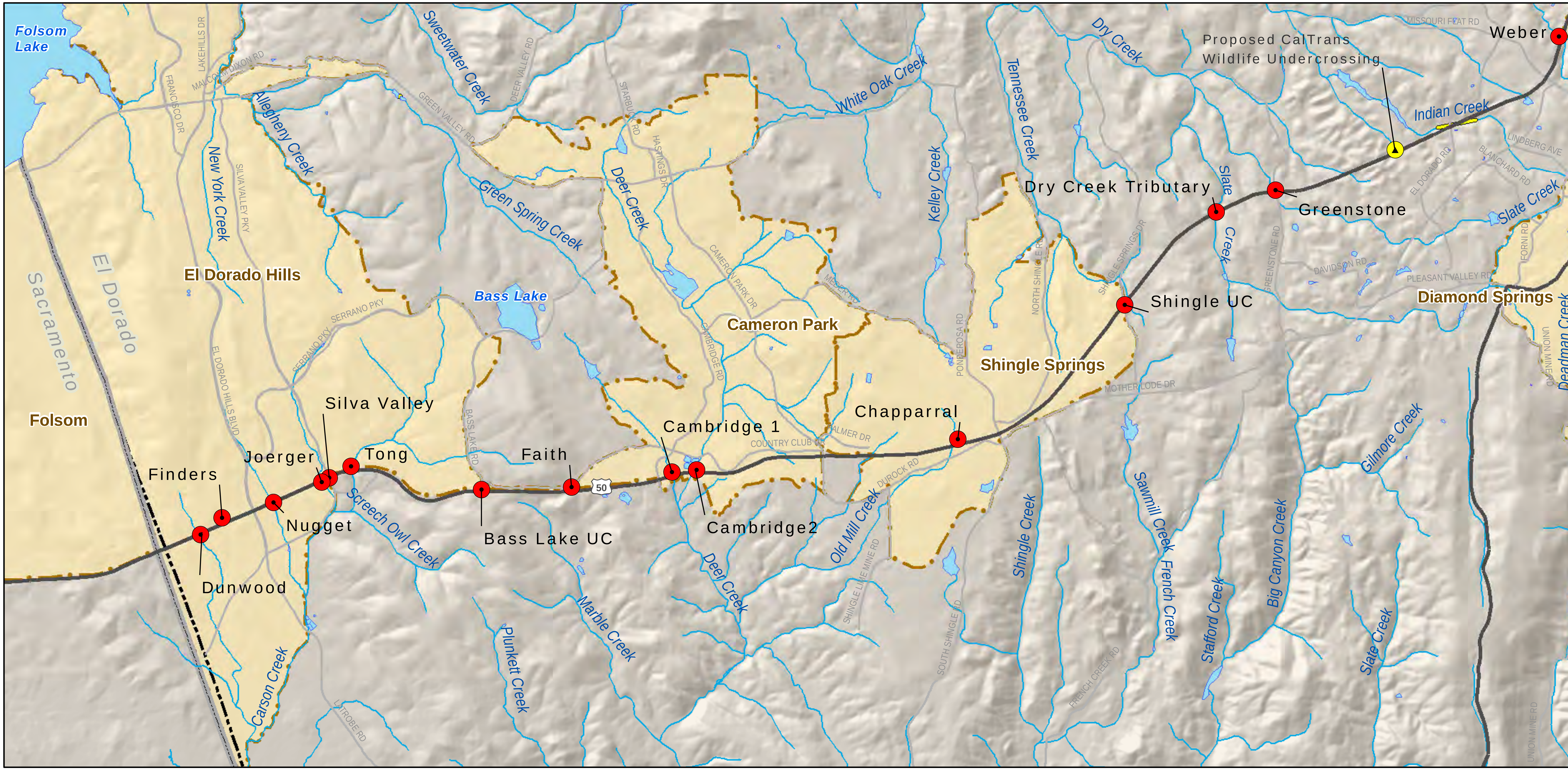


Figure 8a. Locations of Existing Potential Highway 50 Wildlife Crossings in the Western Study Area

El Dorado County Integrated Natural Resources Management Plan - Phase I

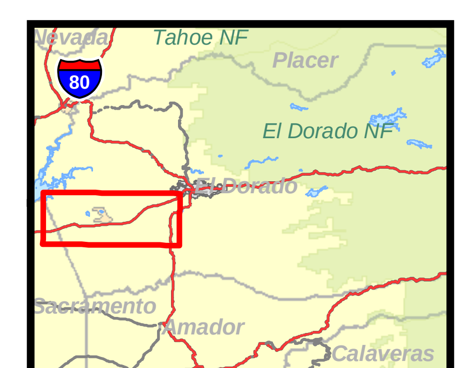
Wildlife Movement and Corridors Report

Legend

Administrative Boundaries
- Communities
- USFS Land
- INRMP Study Area
- Highway
- Major Roads

Hydrology
- Canal/Ditch
- Connector
- Pipeline
- Stream/River
- Existing Crossings

0 0.5 1 2 Miles



Date: 12/07/2010 Created By: Ethan Koenigs

N

1 inch = 5,000 feet

NAD 1983 State Plane California II Feet

Prepared By:

Sierra Ecosystem Associates

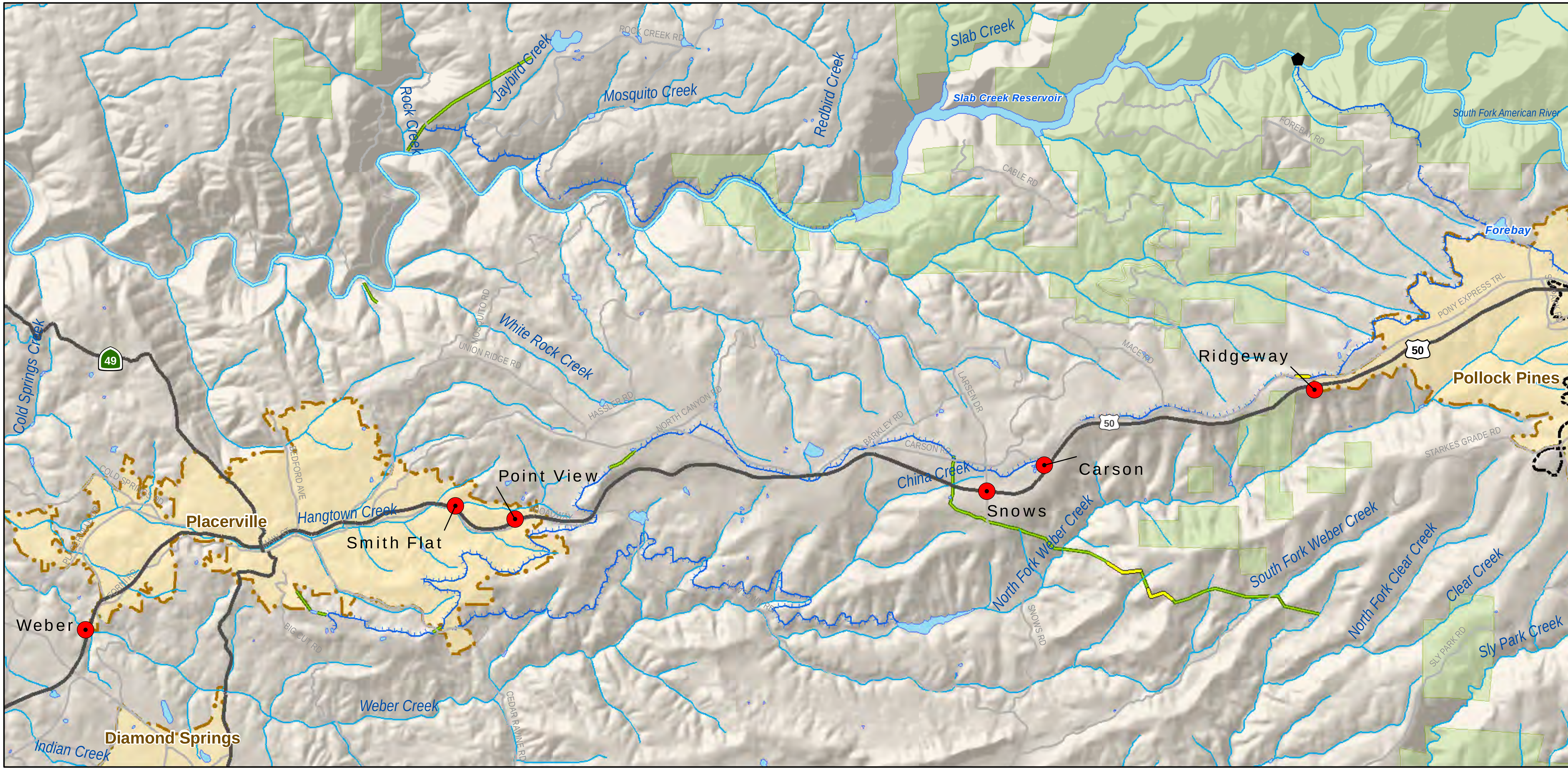


Figure 8b. Locations of Existing Potential Highway 50 Wildlife Crossings in the Placerville to Pollock Pines Area

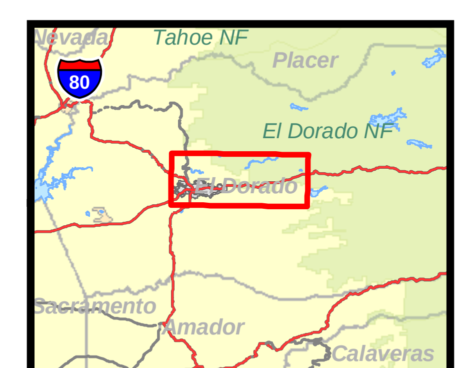
El Dorado County Integrated Natural Resources Management Plan - Phase I

Wildlife Movement and Corridors Report

Legend

Administrative Boundaries	**Hydrology**
Communities	Canal/Ditch
USFS Land	Connector
INRMP Study Area	Pipeline
Highway	Stream/River
Major Roads	Existing Crossings

0 0.5 1 2 Miles



Date: 12/07/2010 Created By: Ethan Koenigs

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1 inch = 5,000 feet

NAD 1983 State Plane California II Feet

Prepared By:

Sierra Ecosystem Associates

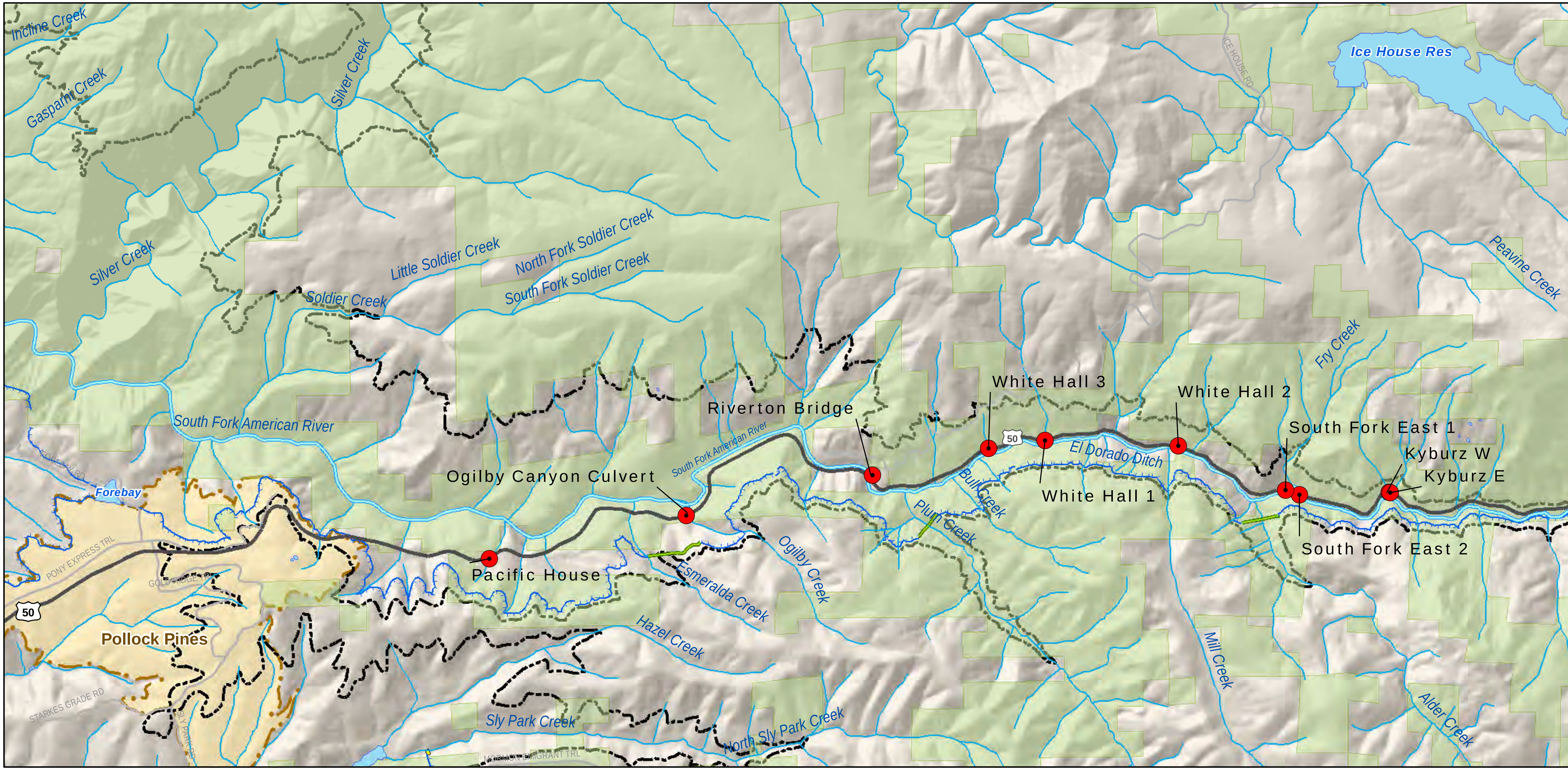


Figure 8c. Locations of Existing Potential Highway 50 Wildlife Crossings in the Eastern Study Area

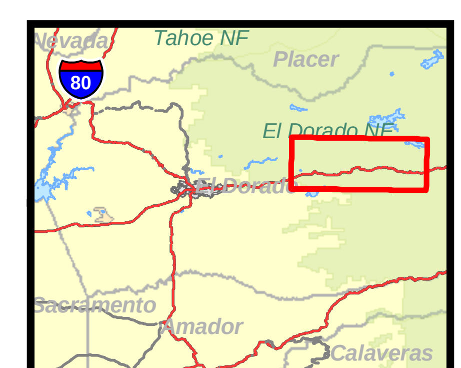
El Dorado County Integrated Natural Resources Management Plan - Phase I

Wildlife Movement and Corridors Report

Legend

Administrative Boundaries	Hydrology
Communities	Canal/Ditch
USFS Land	Connector
INRMP Study Area	Pipeline
Highway	Stream/River
Major Roads	Existing Crossings

0 0.5 1 2 Miles



Date: 12/07/2010 Created By: Ethan Koenigs

N

1 inch = 5,000 feet

NAD 1983 State Plane California II Feet

Prepared By:

Sierra Ecosystem Associates

Figure 9. Weber Creek Under-Crossing

Crossing Characteristics

Each potential highway crossing location was characterized using formal field surveying methods, aerial imagery analysis, and photography.

The following field methods were used:

1. Potential locations were identified using Google Maps and expert opinion;
2. A field visit was made to confirm the actual presence of a crossing and exact geographic coordinates;

3. The crossing and opening dimensions were measured, when possible, using a tape measure or laser range finder, depending on size of the opening;
4. The crossing type, substrate, and construction materials were recorded;
5. The environmental and infrastructural context of each opening of the crossing was characterized from the opening itself to a 0.62-mile distance;
6. If the crossing opening was not accessible from some form of public ROW, then it was characterized from a distance; and,
7. All potential crossings and their landscape context were photographed.

The characteristics of all potential crossings were captured in a spreadsheet and series of photographs. The primary information for each site is presented in Appendix C – Potential Highway 50 Wildlife Crossings.

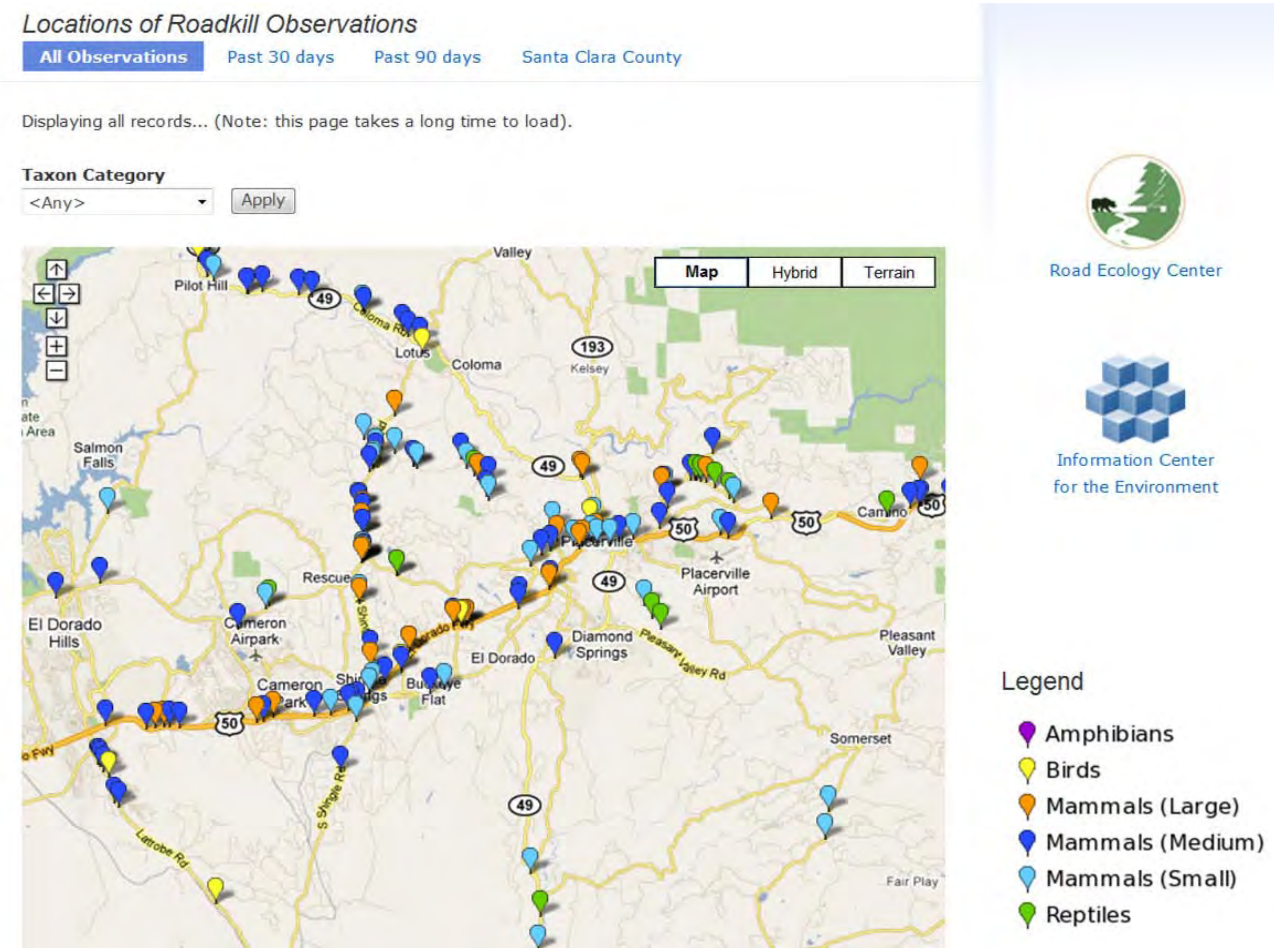
<u>Likelihood of Crossing Structure Use</u>
Each crossing was evaluated in the field and based on its context and characteristics for the likelihood that it could serve as a passage for wildlife to cross from one side of Highway 50 to the other. Likelihood of use was based on the potential crossing structure's attributes (e.g., appropriate substrate within the crossing, accessibility of the opening, dimensions of structure) and its adjacent landscape and habitat context. The results of this evaluation are presented in Appendix C – Potential Highway 50 Wildlife Crossings.

2.4 Other Roadway Barriers to Movement

Highway 50 is one barrier to wildlife movement in the County. There are other major roads that may have sufficient traffic to inhibit movement by wildlife, reduce genetic connections among populations, and result in wildlife-vehicle collisions. These include: Latrobe Road, South Shingle Road, Serrano Parkway, Green Valley Road, Salmon Falls Road, Lotus Road, North Shingle Road, Mother Lode Drive, Greenstone Road, Gold Hill Road, Highway 49, Georgetown Road, Missouri Flat Road, Sand Ridge Road, Pleasant Valley Road, Sly Park Road, Wentworth Springs Road, many of which have had roadkills reported on them (Figure 10. Locations of Roadkill in Western El Dorado County). All are not equal in the types or intensity of impacts because they vary in their location relative to natural systems (oak woodlands vs. conifer forests), have different traffic patterns, and are located in a range of development conditions, from sub-division to very rural.

Figure 10. Locations of Roadkill in Western El Dorado County

*Information reported on the California Roadkill Observation System (http://www.wildlifecrossing.net/California/)



Smaller roads may have fewer and smaller opportunistic under-crossings for wildlife than highways because they will tend to intersect with perpendicular roads rather than bridging them and may have been constructed when stream passage requirements were different than they were for highway construction. Busy rural roads and roads between urban areas can have quite different and disproportionately high impacts to wildlife compared to highways. A highway may function as an effective barrier between populations, but cause few roadkill compared to traffic volume. In contrast, rural county roads in hilly areas may allow sufficient individual animals through to maintain genetic connections, but because of blind-spots in the road and larger gaps between cars, more animals may try to cross road surfaces and get killed doing so.

For certain taxonomic groups, roads are complete barriers to movement due to traffic. It is not uncommon for busy rural roads to account for 50-100% mortality of turtles, salamanders, toads, and frogs (reviewed by: Andrews et al., 2008), especially when rain or other environmental stimuli trigger movement associated with breeding. In one intensive study of a road between two ponds involving daily observations for over 2 years, the investigator never observed a successful crossing by a turtle from one side of the road to the other (Aresco, 2005). Mortality rates on roads are so high for amphibians and reptiles that in some areas they are likely to be the primary cause of death and may risk population sustainability (Andrews et al., 2008).

3.0 Strategies for Improving Wildlife Movement and Connectivity

Protection and enhancement of wildlife connectivity has been acknowledged as an important component of California statewide conservation strategies (Bunn et al. 2007). A recent planning and analysis effort (Spencer et al. 2010) was undertaken to identify linkages of statewide importance in California at low planning resolution. Momentum has been increasing globally over the past decade to include connectivity as a vital aspect of conservation planning at more local levels. This section describes some approaches to connectivity planning and implementation that could be applied to the ecological setting of the County.

3.1 Habitat Protection

The most effective management actions for landscape connectivity center on conservation of existing natural land cover and other ecological elements that enable wildlife movement. Intact landscapes facilitate these movement events more so than narrow corridors, stepping stones, or other types of linkage designs. However, due to human presence and activities across most of the planet, it is challenging to provide connectivity for all species in all places. Habitat intactness depends both on the distribution of our human infrastructure AND its use. For example, a road by itself may inhibit a few species from moving within a habitat type. Once cars travel on that road, the number of species inhibited from movement increases. Similarly, a 20-acre parcel with a house on it in one corner will inhibit nearby movement of certain sensitive species. If fences are present, dogs and cats allowed to roam, and the house and/or driveway placed near the center of the parcel, then fewer animals may move across the parcel, depending on adjacent land-uses. The location of development on the parcel is likely to affect the habitat and connectivity value of the parcel.

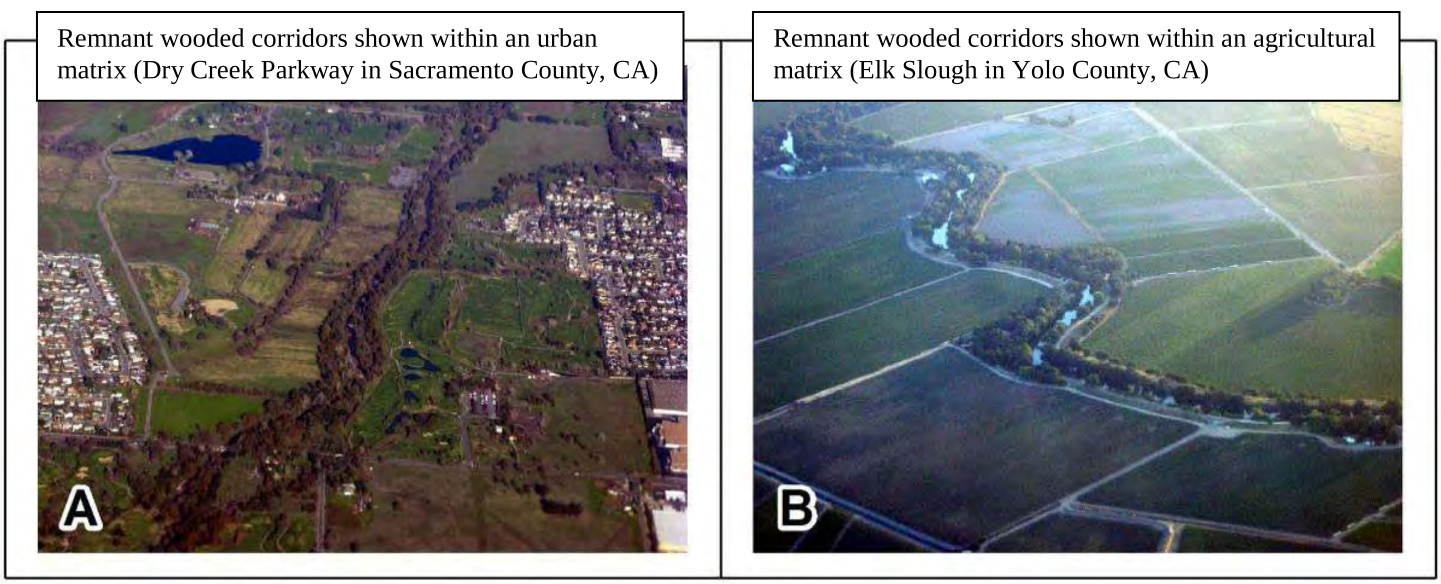
Habitat protection can consist of acquiring parcels for conservation by fee title purchase or easement from willing sellers, restrictions on development (Shilling and Girvetz 2007), or education of landowners about habitat stewardship. A comprehensive habitat and wildlife protection program would employ these tools and more (Saving and Greenwood, 2002). No one strategy is likely to work in all cases. The most extensive, but least protective mechanism for habitat and connectivity protection is education. The least extensive and most protective mechanisms are parcel acquisition and development restrictions.

While there are some areas of the County that might be categorized as intact landscapes, they are mostly confined to the higher elevation portions of the County. Within the INRMP planning area, there are opportunities to adopt various approaches for connectivity protection, depending on the location and the species and habitat targeted. The most difficult places are near urban areas and the most challenging species to protect are large, wide-ranging mammals. While acquisition of existing undisturbed patches may be necessary to retain landscape connectivity, especially at connectivity bottlenecks, the existing levels of human disturbance within the planning area likely necessitate additional management actions for future connectivity needs (Saving and Greenwood, 2002). In order to avoid species going locally, regionally, or completely extinct, land use and transportation planning based on the habitat and movement needs of animals and plants is inevitable.

3.2 Landscape Corridors

Where human impacts to the landscape have severely constrained wildlife movement (e.g., in urban and agricultural settings), one approach to connectivity conservation has been through management of linear movement corridors. These corridors often consist of remnant natural land cover that has remained undeveloped, in contrast to adjacent areas (Figure 11. Remnant Wooded Corridors). A typical corridor of this sort would be a riparian forest strip buffering a stream or river. Corridors can take the form of either continuous vegetation or “stepping stones”, between which individuals move across less hospitable habitat (Bennett 2003). Corridors can also result from active restoration for the purposes of linking two larger population source areas. Obviously, one of the most critical aspects of these corridors is that they lead from one place or habitat that animals want to be to another place they want to be. This management approach operates under the assumption that animals will in fact use these linear features to move across the landscape. For narrow corridors, only less sensitive wildlife (e.g., raccoons) will use these corridors; wider corridors will permit most animals to move through. While successful use of these corridors is far from universal, there are a number of studies that have been conducted over the past two decades that indicate that, in some circumstances at least, they are used for movement by some individuals (Tewksbury et al. 2002, Damschen et al. 2006). However, it is unlikely that all species of concern will be able to use the same corridor for movement; corridors need to be designed to meet the needs of particular species (Sieving et al. 2000). For species that use them, corridors can be one management approach for enabling movement through human-impacted landscapes. Restoration of wide vegetated buffers through developed landscapes is one way to return animal movement to these landscapes, where width primarily will determine actual use of the vegetation strip. Modifications to land use can be another management approach to facilitate wildlife movement through developing landscapes. However, caution should be taken in assuming that corridors can fully mitigate for additional habitat loss (Rosenberg et al. 1997).

Figure 11. Remnant Wooded Corridors



* Photos P. Huber.

In the INRMP planning area, corridors might be one effective means by which to allow movement between identified large patches of native vegetation, especially in narrow strips separating urbanized areas in the vicinity of Highway 50. Saving and Greenwood (2002) identified one area between Shingle Springs and Placerville where landscape fragmentation was less severe near the Highway 50 corridor and a landscape corridor remnant was evident (their figure 5). Other areas near Pollock Pines are also evident from their modeling and analysis of General Plan buildout that could provide crossing of Highway 50. In parts of the landscape away from Highway 50, there is less evidence of landscape corridors. The OWMP identified several possible north-south corridor concepts for addressing the intense fragmentation effect of Highway 50-associated development. Besides Weber Creek, the Plan suggests the Dry Creek tributary and area just east of Greenstone Road as another important movement corridor. Other OWMP potential corridors have been identified to interconnect the OWMP Priority Conservation Areas (PCAs). There is considerable overlap between the PCAs and the large expanses of native vegetation mapped in the earlier task of INRMP Phase I. There is also overlap between the OWMP-identified potential corridors and the large expanses. Finally, there is moderate overlap among the IBCs, OWMP potential corridors, and landscape corridors from Shilling et al. (2002) and Shilling and Girvetz (2007). Many of these analyses relied on similar computational (e.g., GIS) or visual overlap of less-developed areas with areas of high habitat value, or connection between these areas. Therefore, the overlap of potential corridors among these studies may reinforce the findings of each other, but in areas of little overlap, the identified corridors may still be important. For example, a recent state agency report (Spencer et al., 2010) proposed an "essential habitat connection" between the southwest County grasslands and oak savannah and less-disturbed areas north of Highway 50. This finding affirms previous more-detailed studies (Shilling et al., 2002; Saving and Greenwood, 2002; Shilling et al., 2007) and suggests that from a regional perspective, this connection is vital to maintenance of regional wildlife movement, within and beyond the County.

Besides corridors and less-fragmented areas identified in earlier studies, other corridors that might be considered for conservation management are remnant riparian strips and adjacent uplands in the grasslands of the western portion of the County. If a corridor was identified through an intact habitat patch, then developing the remainder actually reduces overall connectivity. In other words, allowing development of a sub-division with a narrow strip of habitat left behind as a corridor is not effective to protect the movement needs of any but the least-sensitive species (e.g., raccoons). Restoring habitat in vegetated buffers or strips through developed landscapes is one option that could benefit wildlife movement, with the location, habitat composition, and width of the buffer-strip determining its effectiveness at providing movement.

3.3 Landscape Permeability

Wildlife movement and the gradual movement or dispersal of plant species depend on the intactness or permeability of the landscape. Depending on the ecological context, some species are able to use the land cover types more dominated by human use for movement or as part of their home ranges. For example, the giant garter snake (*Thamnophis gigas*) uses rice fields in the Central Valley of California as habitat and for dispersal between source populations. Management actions can be undertaken to make the human-dominated landscapes more permeable to animal movement and plant dispersal. This can include, for example, planting native vegetation in urban areas, reducing or eliminating harmful land use practices (e.g., heavy pesticide application in agricultural or residential areas or allowing free-roaming household pets in urban areas), or planting hedgerows (Baudry et al. 2003) or woodland "islands" in farming regions (Benayas et al. 2008). As with corridors, actual landscape permeability depends on the species (Hilty et al. 2006); management plans should therefore be tailored according to the needs of all biota in order to protect biodiversity. While increasing the permeability of the human-dominated landscape will not necessarily create the best habitat for resident individuals, it could provide enough ecological structure and function to the landscape to allow individuals and populations to disperse to more appropriate areas (Figure 12. Managing Agricultural Lands for Wildlife Usage).

There are several types of human-dominated landscape types within the INRMP planning area. In the western portion of the County, there are large pasture areas. East of this zone, there is a large amount of forested exurban, rural development, and agricultural lands. Finally, there are urban areas scattered throughout the planning area. In Saving and Greenwood (2002), landscape fragmentation is more apparent toward the western edge of the County and less apparent in the mid-County, near the eastern edge of the INRMP study area. These differences in fragmentation patterns will have different effects on wildlife movement and plant community processes, potentially necessitating different management and policy responses, or intensity of focus on the different parts of the study area. The fragmentation impacts and corresponding management responses will be different for the different study area zones because the animal and plant communities vary elevationally. The OWMP describes oak woodland loss as primarily being a fragmentation impact, as opposed to an impact on total habitat area. This is similar to the Saving and Greenwood (2002) finding. The Plan also cites the General Plan goal of maintaining landscape permeability as a way to preserve and restore wildlife movement. Different management strategies should be investigated since a planning goal of General Plan Policy 7.4.2.8 B is to conserve and restore landscape connectivity within these areas. For example, managing development to maintain rural characteristics is likely to also benefit wildlife and plant movement, assuming land management is consistent with these goals. Rural characteristics include roads with low traffic volumes and slow traffic speeds and large open spaces with either small clumps of houses, or very dispersed houses (>1/2 mile apart). Rural residential development (1 unit/10 to 40-acre parcel) will fragment habitat and impede movement of wildlife across the landscape. This is primarily due to avoidance of infrastructure, human activity, and pets that accompany even this low-density development. The effects will be less than the effects of higher-density development, but if the same number of people are accommodated, then the total habitat area affected will be greater. Potential solutions to this problem are available at many stages of land development activities, from subdivision, to zoning, to county ordinances, to permitting development plans, consistent with the GP land use pattern.

Figure 12. Managing Agricultural Lands for Wildlife Usage

Managing agricultural lands for wildlife usage (such as the wading birds in this flooded field in Solano County, California) is one example of increasing matrix permeability

*Photo P. Huber

3.1 Traffic

Traffic volume and speed are critical determinants of wildlife-vehicle collisions. However, there may be a complicated relationship between traffic volumes and the likelihood of collisions. For example, low traffic volumes may lead to a reduced aversion effect of roads (i.e., animals avoid roads because of noise and headlights), an increased rate of animal attempts to cross roads, and thus increased likelihood of collisions (Ng et al., 2004). Other investigators have found that traffic volume is a reasonable predictor of wildlife-vehicle collisions (Clevenger et al., 2003; Lode, 2000) or that speed was more significantly correlated with collisions than volume (Case, 1978). These findings have led to two main proposals for managing traffic to reduce collisions: reduced speed limits and warning signs in areas thought to be important for animal crossing. Reducing traffic speed can be accomplished by reducing speed limits and by placing speed bumps or rumble strips in roadways to discourage speeding. This may be an important management activity for roadways that consistently have wildlife-vehicle collisions. Signs have mixed effectiveness in terms of reducing traffic speeds. Studies of standard deer crossing signs have found them to be ineffective at reducing driver speed or number of crashes (FHWA, 2008). Placing warning signs seasonally or temporarily (Sullivan et al., 2004) or adding warning lights (Carr et al., 2003) may be more effective in reducing vehicle speed, but has only mixed effects on reducing collisions.

3.4 Crossing Structures

When areas that are being managed for wildlife connectivity intersect roads or other features that could reduce or eliminate animal movement, several options are available for mitigating the impacts. Speed reduction or enhanced and temporary warning signage might be enough to enable occasional road crossings, for example. In many cases, however, these measures would prove inadequate to achieve the goal of allowing movement of most individual animals and animal species across the barrier.

One solution that has been studied and in some cases implemented over the past decade is the construction of crossing structures. These can either be under-crossings (more common) or overpasses (less common). Under-crossings often take advantage of existing passages under barriers, such as road bridges over waterways (Figure 13. Level Walkway Added Under Existing Highway Bridge in Northern Minnesota to Facilitate Lynx Crossing). These existing passages can be enlarged or otherwise altered to make them more amenable to wildlife movement (Clevenger et al. 2001). Because the passages are already either in place or are required during construction, they are relatively inexpensive to implement. Overpasses are generally exclusively constructed for use by wildlife, making them a more expensive option than ad hoc under-crossings. A major advantage, though, is that the location of the overpasses can be optimized to what is known about animal movement in the planning area.

Figure 13. Level Walkway Added Under Existing Highway Bridge in Northern Minnesota to Facilitate Lynx Crossing

*Photo P. Huber

Some general caveats in using crossing structures to enhance landscape connectivity include the need to take species-specific traits into consideration in the planning phase (Clevenger and Waltho 2005). Species respond to crossing structure variables in different ways. Therefore, a variety of crossing structure types will generally be required to account for multi-species connectivity in a given planning area. Another caveat is that structures alone will probably not address management concerns with movement barriers. Additional infrastructure such as fencing to funnel animals towards crossing structures is often required for successful use. An example of this can be seen locally. As part of its license agreement to operate the El Dorado Hydroelectric Project, the El Dorado Irrigation District reduced animal drowning in its canals by building fences to direct or funnel animals to safe canal crossing areas.

As noted above, one consequence of designing contemporary crossing structures is that funneling of animals to the crossing structure is often required. Two issues associated with this funneling effect are: A) that the fencing used to funnel animals will have variable effectiveness depending on: i) abutment of fence ends against impassable barriers, ii) effectiveness of the fence in stopping all animal passage, iii) escape ramps for animals trapped on the road side of the fence to escape, and iv) appropriate behavioral response of animals to fencing; and B) that animals funneled together by fencing to individual crossings will be forced to interact in ways that may be to the detriment of animals that are prey for other animals.

The major barriers within the INRMP planning area that could most likely be mitigated through construction or enhancement of crossing structures are the major roads bisecting the County. Highway 50, with its large traffic volume and few current crossing opportunities is a promising candidate for investigation of crossing structure opportunities. However, before implementation of structures, analyses should be conducted to determine if there are adequate landscape connectivity opportunities in the land bordering possible structure locations. California Highway 49 in the County could be modified to provide under-crossings, fencing, and escape ramps similar to Nevada County Highway 49, as could other local roads with a higher traffic volume.

3.5 Existing Crossing Structures

Any ground-dwelling wildlife crossing of Highway 50 is currently accomplished across the highway surface or through opportunistic use of structures not originally designed for wildlife use. These existing structures include drainage culverts, bridged streams, and road under-crossings. Depending on the characteristics of the structure and the immediate environment of the opening, it may be useful for wildlife crossing of the Highway 50 ROW. To assess existing locations where wildlife may be attempting to cross Highway 50, all accessible ROW crossing structures were field-surveyed for: their structural attributes (e.g., width and height), the environment of the openings at each end, and the landscape context (data in Appendix C – Potential Highway 50 Wildlife Crossings). Photographs were also taken of each structure and its immediate environment. This information gives a first look at the potential of these structures as wildlife crossings.

Culverts

There are 10 corrugated metal pipes and pipe pairs and 7 concrete box culverts and culvert pairs across the Highway 50 ROW. They range in width from 2 to 15 feet and in height from 2 to 14 feet. All 17 culverts could be made suitable for crossing the ROW for small mammals, reptiles, and amphibians and in some cases for medium-sized mammals, too.

Bridged Streams

There are 2 bridged stream crossings by the Highway 50 ROW in the study area. These provide some of the best opportunities for wildlife movement because they are usually natural bottomed and provide riparian access at either end of the crossing. Weber Creek might be the most well-known of these, though it was not surveyed in detail here because of access issues. The bridge over Weber Creek is high and wide enough that any wildlife that tolerated the proximity to roads and houses to get to a spot under the bridge would probably readily cross. The Highway 50 bridge over the South Fork American River (near the turnoff to Ice House Road) is much lower than over Weber Creek, but still provides adequate passage space and line-of-sight for most wildlife to use it as a crossing.

Road Under-Crossings

There were 10 road under-crossings under the Highway 50 ROW. At lower elevations these tended to be busier interchanges than at higher elevations. They ranged in width from 38 to 100 feet and in height from 15 to 82 feet. An advantage of this type of under-crossing is that they tend to be very large and therefore will allow even the largest animals to pass through, some of which are sensitive to the height of the crossing roof. A disadvantage to this type of crossing is that cars use them to traverse the ROW, so any animal using the crossing opportunistically would have to avoid cars.

3.6 Adequacy of Existing Structures

The vegetation types, levels of development, and biodiversity present are different in the far western part of the County compared to the eastern edge of the study area (e.g., in the South Fork American River canyon). Because of these differences, the study area and corresponding potential highway crossings were separated into broadly defined zones. The lower foothill zone (Zone 1) extends from the County line to Shingle Springs and includes suburban development, degraded riparian zones, lower elevation grasslands, chaparral, and oak-dominated woodlands. The mid-foothills zone (Zone 2) extends from Shingle Springs to Camino and includes rural development and urban areas, oak woodlands, chaparral, and riparian zones. The upper foothills zone (Zone 3) extends from Camino to Kyburz and includes rural development and towns, mixed hardwoods/conifer, and closed-cone conifer.

The structures were evaluated for their suitability for large mammal, medium-sized mammal, small mammal, and herpetofauna use for opportunistic crossing (see Appendix C – Potential Highway 50 Wildlife Crossings for details on individual crossings). In the lower foothills, Zone 1, only the street under-crossings are likely to be currently adequate for medium and large mammals, assuming that they cross when traffic levels are low. Because the pipe and box culvert crossings are very long with no natural light, they may not be used by certain amphibians and small mammals. The street under-crossings may be occasionally used, but for small organisms, they are likely to pose a risk. In Zone 2 the situation is similar, except that there are more street under-crossings beneath the ROW and the Weber Creek under-crossing is available, providing more opportunities for medium and large mammals to cross. Again, the pipe and box culverts are long and lit only from the ends, meaning that small mammals and herpetofauna may not use them. The street under-crossings may provide for very rare crossings by less sensitive small mammals and herpetofauna. In Zone 3, there are street under-crossings for medium and large mammals and several pipe and box culverts for small mammals and herpetofauna that are short enough to permit natural lighting from each end. There is also the South Fork of the American River, which traverses under the ROW bridges.

Table 1 – Adequacy of Existing Road Crossings for Various Animal Groups

Zone	Description	Animal Group Adequacy
1	Lower Foothills, below Shingle Springs	Medium and large mammals – Silva Valley and Bass Lake Under-Crossing; Small mammals and herpetofauna -- none
2	Mid-Foothills, Shingle Springs to Camino	Medium and large mammals – Shingle Road, Greenstone Road, Weber Creek, Smith Flat Road, Point View Road; Small mammals and herpetofauna -- none
3	Upper Foothills, Camino to Kyburz	Medium and large mammals – Carson Road, Snows Road, Ridgeway Road, and South Fork American River; Small mammals and herpetofauna – White Hall and Kyburz crossings

Currently, there is no plan to maintain culverts and their openings for wildlife use and the conditions in the field reflect that. Some culvert bottoms were inundated and had no usable ledges for animals to walk on. Others had no easy access to the crossing itself, due to fencing, vegetation, and water pooling. Most culverts are concrete, which most animals (except certain amphibians when the concrete is wet) will not cross, especially for 200 feet through a tunnel. Although less sensitive animals (e.g., raccoons) may use these culvert crossings, previous research suggests that most won't because of the lack of appropriate substrate (Ehinger, et al., 2006, Carr et al., 2003)

Although individual crossings provide some potential for animal movement, the <u>frequency</u> of crossing types is very low in each zone, meaning that there are few crossings per mile. Medium and larger mammals can travel further in search of crossing a barrier like a highway, but small mammals and herpetofauna will not. Without frequent crossings, smaller animals will cross the surface of the ROW. In the western County part of Highway 50, this will bring them into contact with heavy traffic and/or a concrete median barrier, either of which make the surface a complete barrier to movement. Because of limited home range sizes and dispersal distances, the Arizona Game and Fish Department (2007) and Washington Department of Fish and Wildlife (Bates 2003) recommend a spacing of 150-300 feet between culvert under-crossings for small mammals and 500-1000 feet for medium-sized mammals. If crossings also have openings that are naturally-vegetated and accessible, then herpetofauna may also use them. This is true for most of the culverts, but not for the street under-crossings, which often have pavement centers and are challenging to access.

The immediate and landscape environmental context for crossings are critical determinants of the likelihood that crossings will be used by different animal groups. For example, most animals prefer a natural surface at the opening of the crossing structure, some absolutely require it. Even slight separations (i.e., a few inches) between a culvert opening and the adjacent landscape will determine whether or not a moving animal can access the opening. Ideally, an opening for a wildlife crossing will have an opening with natural vegetation and be attached at both ends to a natural habitat area that provides access and egress. Most of the culverts and street under-crossings were accessible at both ends from naturally-vegetated areas connected to less-disturbed habitat, allowing for functioning as wildlife corridors. Finders, Nugget, Faith, Cambridge, and

Chaparral culvert locations all had development near one or both ends of the crossings, which may limit use of these crossings by mammals and herpetofauna.

An important consideration for the accessibility and use of under-road crossings is the level of landscape disturbance in the vicinity of each opening. In the Habitat Inventory and Mapping Report, landscape disturbance was calculated based on road and developed parcels density (Figure 3A). These are two good proxy indicators for human-disturbance of the landscape. An estimate was made of the range of disturbance values within 500 meters of the opening of each potential crossing and the potential crossings grouped into 5 categories of landscape intactness between low (substantial landscape disturbance) and high (little landscape disturbance). These groupings are shown in the table below.

Table 2 – Current Level of Disturbance for Existing Roadway Crossings

Landscape Intactness Condition (Low, Medium, High)	**Crossing Name**
Low	Finders, Nugget, Cambridge 1, Cambridge 2,
Low-Medium	Dunwood, Ridgeway
Medium	Joerger, Tong, Chaparral, Shingle, Greenstone, Point View, Snows, Carson
Medium-High	Silva Valley, Bass Lake, Faith, Weber Creek, South Fork American, White Hall 2
High	White Hall 1, White Hall 3, Kyburz West, Kyburz East

3.7 Potential for Additional Crossings of Highway 50

Currently, there is a potential Highway 50 crossing density of about 1 crossing of some type every 2-3 miles. They are likely to vary considerably in their utility for different wildlife groups because of their landscape context, size, and structure texture (e.g., natural vs. metal bottom). For example, the culvert crossings west of Shingle Springs may provide opportunities for amphibians and smaller mammals, but not for deer. Conversely, the larger openings of the road under-crossings in all zones may provide crossing opportunities for larger mammals such as deer and coyote, but not amphibians. Thus, there are few potential functional crossings of highway for each taxonomic group. It is possible that by working collaboratively with Caltrans, enhancements of existing structures and creation of new structures could be carried out with little cost to the County. Because Highway 50 is a state facility, its impacts are primarily the responsibility of the state. These impacts are considered with varying degrees of completeness in environmental documents for regional plans and proposed projects. Caltrans' continuing modification of Highway 50 results in many opportunities to fund mitigation actions for impacts to County wildlife. Caltrans usually welcomes local partners to help prioritize environmental mitigation actions.

Caltrans is currently constructing a deer under-crossing across the Highway 50 ROW west of El Dorado Road (see Figure 14. Caltrans Proposed Deer Under-Crossing – Highway 50 West of El Dorado Road). This crossing will be a 12-foot by 12-foot diameter, 203-foot long box culvert, with an openness ratio of 0.7, wingwalls at each end, and ~1/4 mile of fencing directing animals to the crossing entrance. The purpose of the crossing is to reduce deer mortality in the area. Coincidentally, the crossing is positioned just a short distance to the east of the IBC that crosses Highway 50 near Shingle Springs and the landscape corridor proposed by Shilling et al. (2002).

Figure 14. Caltrans Proposed Deer Under-Crossing – Highway 50 West of El Dorado Road

The smaller the animal and corresponding home range and dispersal distance, the greater the number of potential crossings needed. Conversely, for large mammals with larger home ranges and dispersal distances, fewer crossings are needed to maintain population structure.

A variety of types of crossing enhancements have been used to aid amphibian and reptile traversal of roads and highways (Andrews et al., 2008). For example, along Highway 58 in the Mojave Desert, a barrier fence, 3 bridges, and 24 culverts were constructed to aid the desert tortoise (*Gopherus agassizzii*) in crossing the highway ROW.

<u>Size of New Structures</u>
Individual wildlife species will vary in their use of crossing structures. There are several general rules for the design or retrofit of structures to increase their utility. Smaller mammals and herpetofauna prefer more enclosed spaces with some diffuse natural lighting. Large mammals prefer open spaces with a clear line of sight to the other side of the crossing. One measure of the combination of the size of a crossing opening and the length of the "tunnel" is the openness ratio: *Openness Ratio = (Culvert Height x Culvert Width)/Culvert Length* (e.g., Arizona Game and Fish Department, Bridge Guidelines, 2008: http://www.azgfd.gov/hgis/pdfs/BridgeGuidelines.pdf).

The openness ratio for the Smith Flat Road Bridge under-crossing is 85, which is ample size for any mammal. In contrast, the pipe-culvert under-crossing near Dunwood Drive near the western edge of the County is 0.04, which is too small for medium-sized mammals and possibly also for small mammals and herpetofauna. Design of new crossings should use openness and other crossing attributes – aperture opening, line of sight – to make the structures as useful as possible to the widest range of target species.

Appendix D – Crossing Structure Alternatives by Species provides a table of crossing structure attributes useful for medium and large mammals, generated by the Safe Passages program in 2007 (http://www.carnivoresafe passage.org/). These attributes are useful when proposing designs for crossings because they can be linked to engineering and cost requirements. The Arizona Game and Fish Department (2006) developed guidance for bridge and culvert design to facilitate animal crossings over or under the ROW. The values they give are smaller than those provided in Appendix D – Crossing Structure Alternatives by Species, but they also provide more detail about the relationships between opening dimensions and ROW width, crossing structure bottom material (e.g., natural substrate vs. metal or concrete), and other design features. A few of the size-related rules are listed in the table below:

Table 3 – Crossing Size Requirements for Various Animal Groups

Animal Group	Crossing Width	Crossing Length
Herpetofauna	1-2 feet okay	Short as possible, need natural lighting for longer crossings
Small Mammals	>1 foot high, cross-sectional area 2-4 square feet	Need natural lighting for longer crossings
Medium Mammals	>3 feet high, openness ratio >0.4, cross-sectional area >60 square feet for >75-foot crossing length	As short as possible
Large Mammals	>6 feet high, openness ratio >0.9, cross-sectional area >30 square feet for >75-foot crossing length	Open line of sight to other end

Frequency of New Structures

There are currently fewer crossing structures under the Highway 50 ROW than are needed to meet the crossing needs of the animals in the study area. As stated above, because of limited home range sizes and dispersal distances, a spacing of 150-300 feet between culvert under-crossings for the small mammals taxonomic group and 500-1000 feet for the medium-sized mammal taxonomic group is needed (Arizona Game and Fish Department, 2007; Bates 2003). Greater spacing may be adequate for larger mammals (~1 mile) depending on other environmental factors (e.g., nearby development). As future development occurs in the County, and to improve wildlife movement in the study area, crossings could be modified and new crossings added to meet the taxonomic group-based function and frequency requirements.

Costs for Crossing Enhancements

Typically, small city and county local government don't fund the type of improvements discussed in this section. Usually, state and federal funding sources are available to assist with these types of projects.

There are a variety of costs that accompany developing wildlife connections across transportation rights-of-way. Retrofitting existing structures will almost always be less expensive than building new structures. Serving the crossing needs of multiple animal groups with a single structure will be more cost-effective than with several single-group structures. Monitoring the use of crossings must be done to encourage future crossing enhancements and to demonstrate biological effectiveness. The following sections provide cost estimates for crossing enhancements.

Retrofitting and Maintaining Culverts

In a study for the Colorado Department of Transportation, Meaney et al. (2007) found that retrofitting culverts with ledges for small mammals was both effective at providing passage for several species and relatively inexpensive. The cost at the time was $17-$20/linear foot, including shipping and installation. If all culvert crossings surveyed in the present study (~3,000 linear feet) were retrofitted with a single ledge, the total cost would be ~$60,000. There were several culverts that were not surveyed due to access issues, which may increase costs by 10-20%.

Maintaining culverts so that the openings are usable by herpetofauna, small mammals, and medium-sized mammals is an additional expense. Arched culverts with natural bottoms are more expensive to install than pipe culverts, but have natural bottoms and are very inexpensive to maintain. There are a variety of maintenance needs that drainage structures have to provide for (e.g., water flows) while maintaining both the structure's integrity and that of the immediate environment (Kocher et al., 2007). A study in Maine estimated an annual maintenance cost for a 2.5-foot pipe round culvert of $600 (ftp://ftp-fc.sc.egov.usda.gov/Economics/Technotes/EconomicsOfCulvertReplacement.pdf). Given the ~15, 2- to 4-foot pipe and box culverts under Highway 50, twice/year maintenance of culvert openings to facilitate wildlife use should not exceed about $1,000/culvert-year, or $15,000/year.

One additional cost that is difficult to estimate from available data is the planning cost for biologists, planners, and engineers to design new crossings or enhance existing crossings, including coordination among partner agencies and communicating with nearby landowners. It is likely that these costs could add roughly 50% or more to the cost of enhancing existing culverts.

Many countries and states have developed amphibian tunnels to reduce impacts to common and endangered amphibians alike (Federal Highways Administration web site: http://www.fhwa.dot.gov/environment/wildlifecrossings/main.htm). One common feature of these is to provide down-welling light into the tunnel through periodic openings in the tunnel ceiling. Culverts are essentially tunnels, but they lack the apertures that could enable natural lighting and use of the culverts by amphibians and small mammals. Retrofitting culverts to function as tunnels would require cutting apertures from the road-surface through the roof of the culvert. Factors such as engineering, design, and construction costs may prohibit this retrofit.

Building New Structures

Building new wildlife crossings is sometimes the only solution to connection problems across road and highway rights-of-way. The most expensive of these solutions are wildlife over and under-passes that have similar dimensions to street over- and under-passes. These typically cost approximately $1-2 million for a 30- to 50-yard long bridge under-pass, although installation of large pre-cast box or arched culverts has reduced the cost to <$1 million for under-passes that still provide wildlife passage (Huijser et al. 2007). Caltrans recently opened a bid for a box culvert along Highway 49 in Nevada County to facilitate deer crossing (bid # EA 03-2A6904) with a cost of $117,600 to construct (http://sv08data.dot.ca.gov/contractcost/details.php?Num=1362886) and associated costs for 3 deer ramps (which allow escape from roadway, $30,000, http://sv08data.dot.ca.gov/contractcost/details.php?Num=1362905) and fencing ($50,100, http://sv08data.dot.ca.gov/contractcost/details.php?Num=1362924). This combined cost of $200,000 for a single new deer crossing is a reasonable estimate for permitting passage of all-sized animals in the County under 2-lane major roads and highways. Costs would presumably be higher for the wider segments of Highway 50.

Monitoring Crossing Effectiveness

There are several ways to cost-effectively monitor the use of crossing and thus determine how well they meet biological and management goals. These methods vary in cost and in the types of information provided. Parks Canada commissioned a recent study of the most economical ways that local organizations and agencies could scientifically monitor wildlife movement and use of crossings (Ford et al., 2009). For short-term studies (several months to a year), the most economical method that provided sufficient data was the use of track-pads, which is a way to record the type and sometimes individual animal crossing a particular area. In their example, a 4-month study with 200 animal passages cost $7,552 for track-pads and $22,375 for cameras. For longer-term studies (>1 year), the most economical method was the use of cameras alone. Cameras have high up-front costs, but for many hundreds of crossings and over long use-periods, they are less costly per animal passage than track-pads, require less maintenance and can withstand a wider range of weather conditions. These values are in line with a 2010-2011 study by U.C. Davis investigators along I-80, which costs ~$60,000 for 10 monitoring locations between Auburn and Blue Canyon for ~6 months of field study.

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Web Resources
Southern Rockies Ecosystem Project "Carnivores Safe Passage" website
http://www.carnivoresafepassage.org/index.htm

Federal Highways Administration "Critter Crossing" web site
http://www.fhwa.dot.gov/environment/wildlifecrossings/main.htm

5.0 Annotated Bibliography

Andrews, K.M., J.W. Gibbons, and D.M. Jochimsen 2008. Ecological effects of roads on amphibians and reptiles: a literature review. In: Urban Herpetology, J.C. Michael, R.E. Jung Brown, and B. Bartholomew (eds.), Herpetological Conservation 3: 121-143.

These authors review the primary direct and indirect effects of roads on amphibians and reptiles (herpetofauna), from road construction through utilization. The present research provides guidance for ways to study the ecological effects of roads on herpetofauna and offers suggestions for resolving conflict.

Aresco, M.J. 2005. Mitigation measures to reduce highway mortality of turtles and other herpetofauna at a north Florida lake. Journal of Wildlife Management 69: 540-551.

During this study, a stretch of road was checked daily for animals that had failed to cross or that were trying to cross between two ponds. Greater than 95% of certain species were killed on the roadway when attempting to cross. The installation of fencing directed to culvert under-crossings reduced mortality by 99% for amphibians.

Bates, K. 2003. Design of Road Culverts for Fish Passage. *Washington State Department of Fish and Wildlife*, Olympia, WA. 110 pp.

This is a guide for landowners and engineers for designing culverts to improve fish passage. Detailed information is provided about meeting hydraulic and other needs, cost, and fish needs.

Baudry, J., F. Burel, S. Aviron, M. Martin, A. Ouin, G. Pain, and C. Thenail. 2003. Temporal variability of connectivity in agricultural landscapes: do farming activities help? *Landscape Ecology*, 18(3):303-314.

This paper addresses the question of how agricultural incentives influence connectivity and whether these incentives can be used for biodiversity conservation management. Results from modeling simulations demonstrate differences in connectivity between farming systems over the course of multiple years. Policies should address the landscape level for greater effectiveness.

Beier, P. 1993. Determining minimum habitat areas and habitat corridors for cougars. *Conservation Biology*, 7(1):94-108.

A population model is used to simulate mountain lion populations in order to predict minimum areas and levels of immigration needed to prevent extinction. Extinction risk is found to increase in areas less than 2200 km², and that immigration of as few as one to four individuals per decade was enough for population persistence. This implies that corridors can benefit small populations in areas with future potential loss of habitat.

Beier, P., D.R. Majka, and W.D. Spencer. 2008. Forks in the road: choices in procedures for designing wildland linkages. Conservation Biology, 22(4): 836-851.

This paper outlines the major decisions that are necessary to effectively design wildland linkages. Recommendations include designing linkages for multiple species, explicitly acknowledging assumptions and uncertainty, and treating corridor dwellers differently than passage species. One issue the authors address is the subjective translation problem, i.e., how to translate from resource selection to resistance models.

Benayas, J.M.R., J.M. Bullock, and A.C. Newton. 2008. Creating woodland islets to reconcile ecological restoration, conservation, and agricultural land use. *Frontiers in Ecology and the Environment*, 6(6):329-336.

The authors suggest that creation of "wooded islets" is a potentially effective alternative to either passive or active restoration in agricultural areas. These islets are small, dense blocks of native trees that can serve as seed sources in the event of farmland abandonment and provide ecosystem services.

Bennett, A.F. 2003. *Linkages in the Landscape: the Role of Corridors and Connectivity in Wildlife Conservation*. IUCN, Cambridge, UK. 254 pp.

This book provides details on design and management of corridors for mitigating the negative effects of habitat fragmentation. The corridors considered in this in-depth review function as either habitat or avenues of movement. There are recommendations for both management and further scientific study.

Berger, J. 2006. The last mile: how to sustain long-distance migration in mammals. *Conservation Biology*, 18(2):320-331.

The Greater Yellowstone region is home to a globally significant long-distance migration corridor used by multiple species. This corridor is historic, narrow, and threatened by potential development. The authors call for the creation of national migration corridors for protection of these ecological features.

Brückmann, S.V., J. Krauss, and I. Steffan-Dewenter. 2010. Butterfly and plant specialists suffer from reduced connectivity in fragmented landscapes. *Journal of Applied Ecology*, 47(4):799-809.

This paper investigates the impact of habitat connectivity on butterfly and plant species in fragmented grasslands in Europe. Results show that total loss of connectivity would reduce species richness and that an effective connectivity index would combine patch size and distance in the surrounding landscape. The authors conclude that connectivity is very important for conservation of specialized butterfly and plant species and that grassland restoration should be used to increase connectivity in the region.

Bunn, D., A. Mummert, M. Hoshovsky, K. Gilardi, and S. Shanks. 2007. *California Wildlife: Conservation Challenges*. California Department of Fish and Game, Sacramento, CA. 597 pp.

This is the California State Wildlife Action Plan. It includes both statewide and regional conservation planning themes and recommendations.

Burbrink, F.T., C.A. Phillips, and E.J. Heske. 1998. A riparian zone in southern Illinois as a potential dispersal corridor for reptiles and amphibians. *Biological Conservation*, 86(2):107-115.

The study describes the usefulness of corridor design and designation using just riparian corridor width or other easily-measured parameters. Two-thirds of reptiles and amphibians surveyed had limited distribution along a riparian corridor and their distribution was best explained by habitat variables important for individual species. The study concludes with the observation that corridors are best designed based on habitat needs of each of the species of concern.

Carr, T., R. Dacanay, K. Drake, C. Everson, A. Sperry and K. Sullivan. 2003. Wildlife Crossings: Rethinking Road Design to Improve Safety and Reconnect Habitat. *Portland State University Planning Workshop*, Prepared for Metro. 111 pp.

These workshop proceedings describe the best practices for reducing wildlife-vehicle collisions through wildlife crossings. The report includes descriptions of wildlife crossings and ways to implement them.

Carroll, C., J.R. Dunk, and A. Moilanen. 2010. Optimizing resiliency of reserve networks to climate change: multispecies conservation planning in the Pacific Northwest, USA. *Global Change Biology*, 16(3):891-904.

The authors evaluate the effectiveness of using a focal species as an umbrella for protection of other species under climate change and how reserve networks can be made more resilient to climate change. The programs MAXENT and ZONATION are used to model distribution and identify an effective reserve network. The focal species reserves are found to overlap areas of high species richness but do poorly in representing core areas of other species. Results suggest that reserve systems designed for resilience can increase the likelihood of ecosystem preservation under climate change.

Carroll, C., M.K. Phillips, N.H. Schumaker, and D.W. Smith. 2003. Impacts of landscape change on wolf restoration success: planning a reintroduction program based on static and dynamic spatial models. *Conservation Biology*, 17(2):536-548.

The authors use static and dynamic spatial models to investigate whether wolf reintroduction in the Southern Rockies would advance species recovery more than simple range expansion. The models predict that >1000 wolves could be supported but the dynamic models indicate that one of four subpopulations could be lost to future development. Active reintroduction to two sites could reduce the probability of extinction of the species in the region.

Carroll, C. 2007. Interacting effects of climate change, landscape conversion, and harvest on carnivore populations at the range margin: marten and lynx in the northern Appalachians. Conservation Biology, 21: 1092-1104.

This fairly unique study looked at the interacting effects of climate change, land-use (logging), and trapping on marten and lynx in the U.S. Northeast. Spatially-explicit population models were used to measure degree of impact of these 3 population drivers. Climate change had the most impact and the author notes the advantage of population modeling over other models based only on biogeographic and climatic information.

Case, R.M. 1978. Interstate highway road-killed animals: A data source for biologists. Wildlife Society Bulletin 6: 8-13.

This early study of roadkill identified the importance of animal carcasses as a source of data for biologists wanting to understand animal distribution.

Clark, R.W., W.S. Brown, R. Stechert, and K.R. Zamudio. 2010. Roads, interrupted dispersal, and genetic diversity in timber rattlesnakes. *Conservation Biology*, 24(4):1059-1069.

This study uses molecular genetics and behavioral and ecological data to investigate the impact of roads on population structure and connectivity of timber rattlesnakes (*Crotalus horridus*). The authors find that snakes isolated by roads had significantly lower genetic diversity and higher genetic differentiation because of interruption of seasonal migration. Genetic effects are found despite the relatively recent construction of roads.

Clevenger, A.P., B. Chruszcz, and K. Gunson. 2001. Drainage culverts as habitat linkages and factors affecting passage by mammals. *Journal of Applied Ecology*, 38(6):1340-1349.

The authors investigate culvert use by small- and medium-sized mammals in Banff National Park, Canada. Weasels (*Mustela erminea* and *M. frenata*) and deer mice (*Peromyscus maniculatus*) used culverts for passage most frequently. Traffic volume, noise levels, and road width were found to be significant factors affecting culvert use. Structural variables affected use by weasels and martens (*Martes americana*). The authors conclude that culverts can potentially mitigate road effects and provide linkage. They recommend frequent spacing of culverts and abundant vegetation near culvert entrances.

Clevenger, A.P., B. Chruszcz, and K. Gunson. 2003. Spatial patterns and factors influencing small vertebrate fauna road-kill aggregations. Biol. Cons. 109: 15-26.

The authors studied roadkills of mammals and birds along a stretch of the Trans-Canada Highway. They found that landscape and highway variables such as nearby vegetation and availability of under-crossings determined roadkill distribution. They recommend mitigation measures for existing and new roads.

Clevenger, A.P., and N. Waltho. 2005. Performance indices to identify attributes of highway crossing structures facilitating movement of large mammals. *Biological Conservation*, 121(3):453-464.

The authors study the issue of confounding variables in the assessment of wildlife crossing structure efficacy in Banff National Park, Canada. They find that in the absence of high human activity, crossing structure attributes best explained performance indices (however, these attributes differed between species). Distance to cover was found to be an important landscape variable for many species. The authors conclude that in order to maximize connectivity, a variety of species-specific crossing structures should be included in conservation planning.

Corlatti, L., Hackländer, K., and Frey-Roos, F. 2009. Ability of wildlife overpasses to provide connectivity and prevent genetic isolation. Conservation Biology 23: 548-556.

This paper reviews the effectiveness of wildlife overpasses in facilitating habitat connectivity between road-isolated populations. Although many studies have observed overpass use by wildlife, they rarely evaluated the effectiveness of wildlife overpasses on genetic connectivity.

Crooks, K.R. 2002. Relative sensitivities of mammalian carnivores to habitat fragmentation. C*onservation Biology*, 16(2):488-502.

The author investigates the effects of habitat fragmentation on the distribution and abundance of mammalian carnivores in southern California. Using track surveys, he found that fragment area and isolation were the two strongest descriptors. In urban habitat fragments, visitation rates increased at sites that had higher exotic cover and were closer to the urban edge because of increased abundance of fragmentation-enhanced carnivores at those sites. These results can be used to identify appropriate focal species depending on planning area fragmentation.

Damschen, E.I., N.M. Haddad, J.L. Orrock, J.J. Tewksbury, and D.J. Levey. 2006. Corridors increase plant species richness at large scales. *Science*, 313:1284–1286.

The authors use large-scale, replicated field experiments to test the effectiveness of corridors in preserving biodiversity at large scales. Results showed that habitat patches connected by corridors retained more native plant species than did isolated patches. These differences increased over time and did not promote invasion by exotic species. The authors conclude that use of corridors in biodiversity conservation planning was appropriate.

Dobson, A., K. Ralls, M. Foster, M.E. Soulé, D. Simberloff, D. Doak, J.A. Estes, L.S. Mills, D. Mattson, R. Dirzo, H. Arita, S. Ryan, E.A. Norse, R.F. Noss, and D. Johns. 1999.Corridors: reconnecting fragmented landscapes. Pages 129-170 in: Soulé, M.E., and J. Terborgh (eds). *Continental Conservation: Scientific foundations of Regional Reserve Networks*. Island Press, Washington, DC. 227 pp.

This book chapter details some of the scientific considerations in corridor planning within the context of regional conservation networks.

Dyer, S.J., J.P. O'Neill, S.M. Wasel, and S. Boutin. 2002. Quantifying barrier effects of roads and seismic lines on movements of female woodland caribou in northeastern Alberta. *Canadian Journal of Zoology*, 80(5):839-845.

The authors study the effects of roads seismic lines, and pipeline right-of-ways on woodland caribou movement in Canada using GPS collars to track 36 individuals. While seismic lines were not found to be barriers to movement, roads with moderate vehicle traffic were found to be semipermeable barriers. The greatest barrier effects of roads were found to be in late winter. The authors conclude that semipermeable barrier effects could lead to functional habitat loss.

Ehinger, W., P. Garvey-Darda, R. Gersib, K. Halupka, P. McQueary, W. Meyer, R. Schanz and P. Wagner. 2006. Interstate 90 Snoqualmie Pass East Mitigation Development Team: Recommendation package. Submitted to: *U.S. Department of Transportation, Federal Highway Administration and Washington State Department of Transportation*.

This report from Washington Department of Transportation describes recommended mitigation actions for Interstate 90 in Washington.

El Dorado County 2007. El Dorado County Development Services Department – Planning Services. Oak Woodland Management Plan.

The purpose of the OWMP is to outline the County's strategy for conservation of its valuable oak resources. Through the OWMP, the County identifies areas where conservation easements may be acquired from willing sellers as a means to offset and mitigate the loss or fragmentation of oak woodlands in other areas as a result of implementation of its 2004 General Plan. Additionally, the OWMP provides guidance for voluntary conservation and management efforts by landowners and land managers.

Epps, C. W., Palsboll, P. J., Wehausen, J. D., Roderick, G. K., Ramey II, R. R., and McCullough, D. R. 2005. Highways block gene flow and cause a rapid decline in genetic diversity of desert bighorn sheep. Ecology Letters 8: 1029-1038.

> The authors analyze the effects of road barriers on genetic diversity in desert bighorn sheep (*Ovis canadensis nelsoni*). They used statistical analyses to infer changes in gene flow and diversity. They found rapid reduction in genetic diversity due to road barrier effects. They conclude that roads pose a severe threat to the persistence of naturally fragmented populations.

Fahrig, L. 2003. Effects of habitat fragmentation on biodiversity. Annual Reviews of Ecology and Systematics 34: 487-515.

> The author uses a quantified "road-effect zone" to estimate the area affected by roads in the United States. He found that approximately one-fifth of the total area of the U.S. is directly affected ecologically by roads. He suggests that over time this number is likely to rise rather than fall. He concludes by suggesting possible methods of reducing this affected area.

Falush, D., Stephens, M., and Pritchard, J.K. 2003 Inference of population structure using multilocus genotype data: loci and correlated allele frequencies. Genetics 164: 1567-1587.

> This paper presents a new method to analyze linkage loci, which infers population structure from multilocus genotype data. The authors note that this method has extended a previous method.

Falush, D., Stephens, M., and Pritchard, J.K. 2007 Inference of population structure using multilocus genotype data: dominant markers and null alleles. Molecular Ecology Notes 7: 574 - 578.

> This paper extended a previous method to infer population genetic structure. Using the new approach, more data types, such as AFLP, can be analyzed.

FHWA. 2008. Wildlife-vehicle collision reduction study. Report to Congress by Federal Highway Administration, FHWA-HRT-08-034. Pp. 254.

> This report by the federal Highways Administration describes the impact of wildlife-vehicle collisions on people and animals, including endangered species. It describes in detail mitigation measures that should be pursued to reduce wildlife-vehicle collisions.

Fischer, J., Lindenmayer, D.B. & Fazey, I. 2004. Appreciating ecological complexity: habitat contours as a conceptual landscape model. Conserv. Biol., 18, 1245–1253

The authors describe a new way of thinking about landscape connectivity beyond the design concept of “corridors”. They describe the ecological reality of gradations in connectivity from disconnected urban areas to well-connected natural areas. They recommend a combined approach of reflecting connectivity as a sort of topographic map, while recognizing species-specific and planning-specific constraints.

Fischer, J., Brosi, B., Daily, G.C., Ehrlich, P.R., Goldman, R., Goldstein, J., Lindenmayer, Manning, A.D., Mooney, H.A., Pejchar, L., Ranganathan, J., Tallis, H. 2008. Should agricultural policies encourage land sparing or wildlife-friendly farming. Frontiers in Ecology and the Environment, 6(7): 380-385

The authors describe two ways that agriculture and conservation have interacted – setting aside land for conservation and intensive farming as dichotomous land-uses and wildlife-friendly farming where both uses are pursued in the same place. They recommend that both approaches be used depending on the setting and need.

Ford, A.T., A.P. Clevenger, and A. Bennett 2009. Comparison of methods of monitoring wildlife crossing-structures on highways. Journal of Wildlife Management, 73(7): 1213-1222 (http://www.transwildalliance.org/resources/2009929105144.pdf)

The authors compare and describe different ways to monitor the use and effectiveness of wildlife crossings under and over highways. They focus on tracking and camera methods and concluded that cameras are cost-effective for long-term monitoring and tracking for short-term.

Forman, R.T.T. 2000. Estimate of the area affected ecologically by the road system in the United States. *Conservation Biology*, 14(1):31-35.

The author uses a quantified “road-effect zone” to estimate the area affected by roads in the United States. He found that approximately one-fifth of the total area of the U.S. is directly affected ecologically by roads. He suggests that over time this number is likely to rise rather than fall. He concludes by suggesting possible methods of reducing this affected area.

Forman, R. T. T. and Alexander, L. E. 1998. Roads and their major ecological effects. Annual Review of Ecology and Systematics 29: 207-231.

The paper reviews main ecological effects of roads on their surrounding biotic and abiotic environment. It mainly focuses on roadkills occurrence, road avoidance and the genetic consequence of roads on the isolated wildlife populations. In addition, roads can cause local hydrologic, erosion effects and chemical effects, etc.

Frankham, R., Ballou, J.D. and Briscoe, D.A. 2002 Introduction to Conservation Genetics. Cambridge: Cambridge University Press.

> This textbook on conservation genetics is nicely presented and easy to understand. It suits a broader audience to anyone interested in conservation biology.

Gerlach, G., and Musolf, K. 2000. Fragmentation of landscape as a cause for genetic subdivision in bank voles. Conservation Biology 14:1066–1074.

> The authors found that only highways caused significant population subdivision of band vole, while other roadways, like country roads and railways, didn't have such an effect.

Gillies, C.S., and C.C. St. Clair. 2008. Riparian corridors enhance movement of a forest specialist bird in fragmented tropical forest. *Proceedings of the National Academy of Sciences USA*, 105(50):19774-19779.

> The authors separated a forest-specialist bird (requires forest cover) and a forest-generalist bird (less specific about forest cover) from their home ranges and tracked their returns through mixed landscapes. Forest specialists used forested corridors, while generalists used other features, such as hedgerows and open fields.

Hamilton, M.B. 2009. Population Genetics. Chichester: Wiley-Blackwell.

> A book on population genetics. Population genetics concerns the genetic constitution of a population and how this constitution changes with time. This book is written for post-graduate students in biology or related fields.

Heller, N.E. and Zavaleta, E.S. (2009). Biodiversity management in the face of climate change: A review of 22 years of recommendations. Biological Conservation, 142: 14-32.

> This synthesis of recommendations identifies appropriate scales for planning and planning gaps in conservation. Greater integration is recommended with planning on human-dominated landscapes and improvement of adaptive management of landscapes.

Hilty, J.A., W.Z. Lidicker Jr., and A.M. Merenlender. 2006. *Corridor Ecology: the Science and Practice of Linking Landscapes for Biodiversity Conservation*. Island Press, Washington, DC. 323 pp.

> This book provides guidelines for corridor design and management based on both scientific research and practical experience. It is written with both researchers and managers in mind.

Hilty, J.A., and A.M. Merelender. 2004. Use of riparian corridors and vineyards by mammalian predators in northern California. *Conservation Biology*, 18(1):126-135.

Riparian corridors were investigated as a method for encouraging or allowing wildlife movement through the landscape. Native carnivores were more likely to use wide riparian zones near large areas of undisturbed habitat than adjacent vineyards. Non-native predators were more common in vineyards far from less-disturbed habitat.

Hitchings, S.P. and Beebee, T.J. 1997. Genetic substructuring as a result of barriers to gene flow in urban *Rana temporaria* (common frog) populations: implications for biodiversity conservation. Heredity 79: 117-127.

This paper studies the effect of urbanization on urban common frog populations. It shows that urbanization causes population differentiation and reduces genetic diversity of frog populations. Additionally, some inbreeding depression in the urban populations are also found.

Hodgson, J.A., C.D. Thomas, B.A. Wintle, and A. Moilanen. 2009. Climate change, connectivity and conservation decision making: back to basics. Journal of Applied Ecology 46: 964-969.

Climate change is likely to affect many habitat qualities, including connectivity, which is increasingly a target of climate change adaptation. These authors argue that protecting habitat quality and total area will automatically protect connectivity.

Hoekstra, J.M., T.M. Boucher, T.H. Ricketts, and C. Roberts. 2005. Confronting a biome crisis: global disparities of habitat loss and protection. *Ecology Letters*, 8(1):23-29.

The authors examine a current “biome crisis”, the loss not just of species but whole ecosystems. They found that the ratio of habitat conversion to protected habitat in Mediterranean biomes to be 8:1, among other heavily impacted ecosystems. They conclude that a concerted and comprehensive response is needed to confront the loss of landscapes, ecological interactions, ecosystem services, and evolutionary potential.

Holderegger, R., and Wagner, H.H. 2006. A brief guide to Landscape Genetics. Landscape Ecology 21: 793-796.

The paper gives a brief introduction to landscape genetics and provides a list of suggestions for landscape ecologists who want to conduct such landscape genetics research.

Huber, P.R., S.E. Greco, and J.H. Thorne. 2010a. Spatial scale effects on conservation network design: trade-offs and omissions in regional versus local scale planning. *Landscape Ecology*, 25(5):683-695.

> The authors investigate the effects of spatial scale on reserve selection and corridor identification. Using Marxan and Least Cost Corridor modeling tools, they compared results from regional and local analyses in the Central Valley of California. Large differences between conservation networks identified at the different scales were found. The results suggest that planning results from any one scale can omit potentially important ecological features identified at other spatial scales. The authors suggest that combining results from multiple scales of inquiry can be used to prioritize conservation actions.

Huber, P.R., F.M. Shilling, J.H. Thorne, S.E. Greco, and N.E. Roth. 2010b. *Safe Passages and the City of Riverbank: wildlife connectivity in the San Joaquin Valley, California*. Final report. Wildlife Conservation Society, New York. 37 pp.

> This report describes the results of a project that investigated landscape connectivity in the vicinity of the city of Riverbank, California. The authors used a new technique ("least cost surface modeling") to measure connectivity for four focal species in the planning area. They integrate the results with urban density, road density, and future urban development to identify areas where conflicts between wildlife connectivity and human impacts could be expected.

Huijser, M.P., A. Kociolek, P. McGowen, A. Hardy, A.P. Clevenger, R. Ament. 2007. Wildlife-vehicle collision and crossing mitigation measures: A toolbox for the Montana Department of Transportation. FHWA/MT-07-002/8117-34. Report prepared for the State of Montana Department of Transportation. 126 pages.

> This manual describes the ways that transportation agencies can reduce wildlife-vehicle collisions on state highways. The report describes mitigation measures in terms of animal community served, implementation considerations, and information about potential effectiveness.

Jaeger, J.A.G., and L. Fahrig. 2004. Effects of road fencing on population persistence. *Conservation Biology*, 18(6):1651-1657.

> The authors investigate the trade-off between potential movement and animal mortality inherent in road fencing. Their models predicted a level of roadway mortality below which fencing is always harmful and above which always beneficial. In between these mortality values the degree of road avoidance by animals was most important. They recommend the use of fences when there is a very low road crossing success rate or when the population is low and road mortality threatens the overall population

Karban, R., and Huntzinger, M. 2006. How to do ecology. A concise handbook. Princeton, NJ: Princeton University Press.

> This excellent book gives an overview of important strategies in ecology research, including picking an important question, developing a testable work hypothesis, designing an experiment, analyzing data, and presenting a manuscript.

Kautz, R., R. Kawula, T. Hoctor, J. Comiskey, D. Jansen, D. Jennings, J. Kasbohm, F. Mazzotti, R. McBride, L. Richardson, and K. Root. 2006. How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*, 130(1):118-133.

> The authors identify regions in south Florida of high conservation value for Florida panther (*Puma concolor coryi*) protection. They investigated the importance of land cover and forest patch size in habitat selection. They identified Primary and Secondary zones and used least cost path analysis to identify linkages between these zones. They estimate that the network formed by these components could support 80-94 panthers for 100 years.

Keller, I., and Largiader, C.R. 2003. Recent habitat fragmentation caused by major roads leads to reduction of gene flow and loss of genetic variability in ground beetles. Proceedings of the Royal Society London, Series B 270:417–423.

> This paper shows that large roads are effective barriers to movement of a flightless ground beetle. The road barrier also leads to a loss of genetic variability in fragmented populations.

Kindlmann, P. and Burel, F. 2008. Connectivity measures: a review. Landscape Ecology, 23: 879-890.

> This article reviews the various metrics of connectivity that are relevant to conservation planning. The authors explain the meaning of landscape connectivity and make suggestions for pursuing connectivity research.

Kocher, S.D., J.M. Gerstein, and R.R. Harris. 2007. Rural roads: A construction and maintenance guide for California landowners. DANR Publication 8262, University of California Division of Agriculture and Natural Resources. 23 pp.

> The majority of roads are rural paved and un-paved roads. This guide describes how to design, build, and maintain these roads so as to reduce harm to the environment.

Kuehn, R., Hindenlang, K. E., Holzgang, O., Senn, J., Stoeckle, B., and Sperisen, C. 2007. Genetic effect of transportation infrastructure on Roe deer populations (*Capreolus capreolus*). Journal of Heredity. 98:13–22.

The authors evaluate the effect of a fenced motorway in Central Switzerland on the genetic consequence of the roe deer, and revealed a barrier effect of the transportation infrastructure on movement of the roe deer population examined, but its effects on genetic diversity have not been detected.

Latta, R. 2006. Integrating patterns across multiple genetic markers to infer spatial processes. Landscape Ecology 21: 809–820.

The author gives a guide about how to use different molecular markers to study landscape genetics because different molecular markers have their own merits and limitations.

Lees, A.C., and C.A. Peres. 2008. Conservation value of remnant riparian forest corridors of varying quality for Amazonian birds and mammals. *Conservation Biology*, 22(2):439-449.

Riparian corridors are assumed to provide movement possibilities for animals through developed landscapes. This study investigated this idea and found that corridor benefits for birds and mammals were species-specific and dependent on width and intactness of the corridor.

Lesbarrères, D., Primmer, C.R., Lodé, T., and Merilä, J. 2006. The effects of 20 years of highway presence on the genetic structure of *Rana dalmatina* populations. Ecoscience 13: 531-538.

The authors investigate the genetic consequence of highways on a frog and find that the highway effectively reduces the individual movement, which further caused significant population subdivision and genetic diversity decrease.

Li, T., F. Shilling, J. Thorne, F. Li, H. Schott, R. Boynton, and A.M. Berry. 2010. Fragmentation of China's landscape by roads and urban areas. *Landscape Ecology*, 25(6):839-853.

The authors use the effective mesh size method to evaluate the fragmentation caused by roads, railways, and urban areas in China. Fragmentation effects varied widely across China. Some areas of high biodiversity occurred in highly fragmented areas. The authors recommend the consideration of existing land division by planners when making development decisions.

Lindsay, D.L., Barr, K.R., Lance, R.F., Tweddale, S. A., Hayden, T. J., and Leberg, P. L. 2008 Habitat fragmentation and genetic diversity of an endangered, migratory songbird, the golden-cheeked warbler (*Dendroica chrysoparia*). Molecular Ecology 17: 2122-2133.

> This is one of few case studies on effects of anthropogenic barriers on bird population structure. The paper shows that habitat fragmentation like land use causes genetic differentiation among fragmented populations of the endangered golden-cheeked warbler.

Lodé, T. 2000. Effect of a motorway on mortality and isolation of wildlife populations. Ambio 29: 163-166.

> This study investigated the causes of road-way mortality of animals on one section of highway in France. The authors found 97 species, including endangered species, and measured mortality rates with and without animal passageways. They concluded that high traffic volumes affected population demography and exchanges across the highway from one side to the other.

Loiselle, B.A., C.H. Graham, J.M. Goerck, and M.C. Ribeiro. 2010. Assessing the impact of deforestation and climate change on the range size and environmental niche of bird species in the Atlantic forests, Brazil. *Journal of Biogeography*, 37(7):1288-1301.

> The authors examine the effects of deforestation and how future climate change could affect biodiversity. They used species distribution modeling to predict niches for bird species in Brazil. They found that large-scale deforestation has led to changes in spatial pattern and habitat use in bird species. Future climate change was also found to likely affect habitat use, although to a lesser degree than land use change. The authors conclude that future biodiversity planning should consider both past land use and future climate change.

Machtans, C.S., M.-A. Villard, and S.J. Hannon. 1996. Use of riparian buffer strips as movement corridors by forest birds. *Conservation Biology*, 10(5):1366-1379.

> Certain bird species prefer closed canopy forest-cover for home range and dispersal needs. These investigators looked at the occurrence and movement of birds in corridors (remnant habitat left after logging) and open areas. Their main findings were that dispersing juveniles used corridors and the number of adults decreased following logging due to loss of total habitat and therefore number of birds. Opening size determined frequency of movement of birds across gaps.

Manel, S., Schwartz, M.K., Luikart, G., and Taberlet, P. 2003. Landscape genetics: Combining landscape ecology and population genetics. Trends in Ecology and Evolution 18: 1807-1816.

> This landmark paper gives an overview of the new discipline, landscape genetics. The authors give an introduction to genetic tools and statistical approaches used to determine the effect of landscape feature on genetic consequence.

Marsh, D.M., Page, R.B., Hanlon, T.J., Corritone, R., Little, E.C., Seifert, D.E., and Cabe, P.R. 2008. Effects of roads on patterns of genetic differentiation in red-backed salamanders, *Plethodon cinereus*. Conservation Genetics 9:603-613.

> This research shows that interstate highways cause much more of a barrier effect to the red-backed salamanders than other secondary roads, which further makes a significantly greater genetic differentiation by highway than that of other small roads.

McRae, B.H., and P. Beier. 2007. Circuit theory predicts gene flow in plant and animal populations. *Proceedings of the National Academy of Sciences USA*, 104(50):19885-19890.

> The authors test an ecological connectivity model based on electrical circuit theory. It integrates all possible pathways connecting populations, therefore improving gene flow predictions. When the authors applied the model to mammal and tree species data, they found that the circuit-based model outperformed conventional gene flow models. They conclude that circuit theory provides the best method of bridging landscape and genetic data.

McRae, B.H., B.G. Dickson, T.H. Keitt, and V.B. Shah. 2008. Using circuit theory to model connectivity in ecology, evolution, and conservation. *Ecology*, 89(10):2712-2724.

> The authors introduce electrical circuit theory models for use in landscape connectivity modeling. This paper serves as a review of the theory, including ecological applications. The authors provide examples of how these models can be used in conservation planning.

Meaney, C., M. Bakeman, M. Reed-Eckert, and E. Wostl. 2007. Effectiveness of ledges in culverts for small mammal passage. Report for the Colorado Department of Transportation, Report # CDOT-2007-9. 36 pp.

> The authors investigated the effectiveness of culvert ledges in actually improving the movement of small mammals through culverts under roadways. They found the ledges to be effective in providing passage for small mammals and a cost-effective method for providing for movement.

Meegan, R.P., and D.S. Maehr. 2002. Landscape conservation and regional planning for the Florida panther. *Southeastern Naturalist*, 1(3):217-232.

> The authors use GIS methods to develop a conservation and restoration blueprint for Florida panthers (*Puma concolor coryi*). They used least cost path analysis to model colonization events. They argue that land protection is needed in the very near future and that the alternative of management of isolated populations is unfeasible.

Naiman, R.J., H. Decamps, and M. Pollack. 1993. The role of riparian corridors in maintaining regional biodiversity. *Ecological Applications*, 3(2):209-212.

> This paper focuses on the various benefits to landscapes, aquatic systems, and ecology in general of intact riparian zones. Riparian zones can regulate many natural functions and are a key driver of the health of natural landscapes.

National Research Council. 1997. *Toward a sustainable future: addressing the long-term effects of motor vehicle transportation on climate and ecology*. National Academy Press, Washington, DC. 261 pp.

> This book focuses on the long-term ecological effects of transportation networks and the challenges faced in addressing them. It details future research needs and issues that will need to be addressed.

Ng, S.J., J.W. Dole, R.M. Sauvajot, S.P.D. Riley, and T.J. Valone. 2004. Use of highway undercrossings by wildlife in southern California. Biol. Cons. 115: 499 – 507.

> This study focuses on the barrier effects of a highway in Southern California and the effectiveness of underpasses and culverts in alleviating some of these impacts. The authors found that the crossings could be effective, depending on species and dimensions of the crossings.

Nicholls, C.I., M. Parrella, and M.A. Altieri. 2001. The effects of a vegetational corridor on the abundance and dispersal of insect biodiversity within a northern California organic vineyard. *Landscape Ecology*, 16(2):133-146.

> Natural habitat areas can be home to native predators of various types and sizes. This study looked at the role of riparian corridors and natural habitat strips through vineyards in influencing pest insect presence and abundance in the vineyards. They found that near to natural habitat, insect predators were suppressing pest insect populations, pointing to a benefit of natural habitat near agriculture.

Noël, S., Ouellet, M., Galois, P., and Lapointe, F. 2007. Impact of urban fragmentation on the genetic structure of the eastern red-backed salamander. Conservation Genetics 8: 599-606.

> This study shows that the habitat fragmentation by urbanization causes genetic differentiation and reduces the genetic diversity of the urban populations.

Noss, R.F., C. Carroll, K. Vance-Borland, and G. Wuerthner. 2002. A multicriteria assessment of the irreplaceability and vulnerability of sites in the Greater Yellowstone Ecosystem. *Conservation Biology*, 16(4):895-908.

> The authors use a reserve selection algorithm with habitat suitability and population viability analyses to identify unprotected sites that are irreplaceable and vulnerable to degradation in the Greater Yellowstone Ecosystem. These sites would significantly contribute to conservation goals in the region if added to the conservation lands portfolio.

Noss, R.F., and K.M. Daly. 2006. Incorporating connectivity into broad-scale conservation planning. Pages 587-619 in: Crooks, K.R., and M. Sanjayan, eds. *Connectivity Conservation*. Cambridge University Press, Cambridge, UK.

> This book chapter focuses on detailing a variety of methods used in connectivity and corridor analysis. The authors also include a section on non-corridor types of connectivity. They conclude with a summary of guidelines that should be used to improve corridor planning.

Pearson, R.G., and T.P. Dawson. 2005. Long-distance plant dispersal and habitat fragmentation: identifying conservation targets for spatial landscape planning under climate change. *Biological Conservation*, 123(3):389-401.

> The authors develop a stochastic, spatially-explicit model to simulate plant dispersal under future climate change. They analyze the potential for long distance dispersal events between suitable habitat patches. They demonstrate the declining importance in spatial arrangement of patches with higher dispersal potential.

Pritchard, J.K., Stephens, M., and Donnelly, P. 2000. Inference of population structure using multilocus genotype data. Genetics 155: 945-959.

> This important paper presents an effective method to infer population structure. This method is implemented in an easily-used software “Structure”, and is used extensively by population geneticists.

Prugnolle, F., and de Meeus, T. 2002. Inferring sex-biased dispersal from population genetic tools: a review. Heredity 88:161-165.

> Sex-biased dispersal is a wide-spread pattern in vertebrate organisms. This paper describes different methods for inferring sex-specific dispersal using population genetic tools and discusses the problems they can raise.

Reh, W., and Seitz, A. 1990. The influence of land-use on the genetic-structure of populations of the common frog *Rana temporaria*. Biological Conservation 54:239–249.

This paper gives a description of the barrier effect of a road on a common frog, and finds that the road causes a decrease in genetic diversity and increase in population differentiation.

Riley, S.P.D., R.M. Sauvajot, T.K. Fuller, E.C. York, D.A. Kamradt, C. Bromley, and R.K. Wayne. 2003. Effects of urbanization and habitat fragmentation on bobcats and coyotes in southern California. *Conservation Biology*, 17(2):566–576.

The authors investigate the effect of development in a fragmented landscape in southern California on bobcats (*Lynx rufus*) and coyotes (*Canis latrans*). They compared radio-collar data with landscape variables to measure effects. Adult female bobcats had low levels of urban association and consequently require sufficient open space habitat for future population viability.

Riley, S.P., Pollinger, J.P., Sauvajot, R.M., York, E.C., Bromley, C., Fuller, T.K., and Wayne, R.K. 2006. A southern California freeway is a physical and social barrier to gene flow in carnivores. Molecular Ecology 15: 1733–1741.

Highways can segment animal populations for species sensitive to roadways and traffic. This study focused on the role of a busy Southern California highway in segmenting carnivore populations – essentially dividing them in two so that they were genetically different.

Rosenberg, D.K., B.R. Noon, and E.C. Meslow. 1997. Biological corridors: form, function, and efficacy. *BioScience*, 47(10):677–687.

The authors describe the form that biological corridors can take, and then they explore the evidence of functionality and effectiveness of corridors. They describe the habitat role that corridors can play, and caution that corridors may not fully mitigate for additional habitat loss.

Saving, Shawn C. and Gregory B. Greenwood. 2002. The Potential Impacts of Development on Wildlands in El Dorado County, CA. USDA Forest Service Gen. Tech. Rep. PSW-GTR-184.

This paper describes the effects of the build-out of different 2004 General Plan alternatives on plant communities and landscapes in the County. The study relies on GIS modeling to assess these effects and draws conclusions about the extent and types of effects.

Schooley, R.L. and J.A. Wiens. 2003. Finding habitat patches and directional connectivity. Oikos, 102(3): 559-570.

> Functional connectivity means the connectivity of a landscape based on the needs of the process or organism flowing through the landscape. Many animals rely on senses to determine where to move, but this movement behavior is often not reflected in connectivity modeling. This paper describes perceptual ranges (how far and organism can sense its environment) and how they are important in connectivity analysis.

Schumaker, N.H. 1998. *A user's guide to the PATCH model*. EPA/600/R-98/135. U.S. Environmental Protection Agency, Corvallis, OR, USA.

> This report provides a guide for using the PATCH spatially explicit population model.

Schumaker, N.H. 2010. *HexSim Version 2.0*. U.S. Environmental Protection Agency, Corvallis, OR, USA. Available from http://www.epa.gov/hexsim.

> This report provides a guide for using the HexSim spatially explicit population model.

Schwartz, M.K., J.P. Copeland, N.J. Anderson, J.R. Squires, R.M. Inman, K.S. McKelvey, K.L. Pilgrim, L.P. Waits, and S.A. Cushman. 2009. Wolverine gene flow across a narrow climatic niche. *Ecology*, 90(11):3222-3232.

> The authors test a dispersal model for wolverines (*Gulo gulo*). They used least cost path analysis to represent genetic distance among individuals. Models focused on movement across spring snow better explained the data than did Euclidean distance. Least cost corridors for the U.S. Rocky Mountains were then generated using these findings.

Semlitsch, R.D. 2000. Principles for management of aquatic-breeding amphibians. *Journal of Wildlife Management*, 64(3):615-631.

> The author provides a review of threats, state of knowledge, and effective management of amphibian populations. He states that population dynamics and connectivity must be considered in effective management plans. Wetland loss is addressed, and finally landscape fragmentation is investigated.

Shilling, F.M., E.H. Girvetz, C. Erichsen, B. Johnson, and P.C. Nichols 2002. "A Guide to Wildlands Conservation Planning in the Greater Sierra Nevada Bioregion". California Wilderness Coalition, 187 pp.

> This was the first large-scale "wildlands" project in California and it focused on the Sierra Nevada bioregion. The intent of the study was to identify less-disturbed areas in the bioregion that were suitable for ecological reserves and determining the level of connectivity across the landscape.

Shilling, F.M and E.H. Girvetz 2007. Barriers to implementing a wildland network. *Landscape and Urban Planning*. Volume 80(1-2): 165-172.

The authors investigate the potential acquisition cost of a reserve network in the Sierra Nevada, California, based on GIS findings from Shilling et al. (2002). The high cost was found to be prohibitive for an acquisition-only conservation strategy. The authors also identified barriers to wildlife movement and suggest mitigation efforts that could ameliorate some of the barrier effects.

Sieving, K.E., M.F. Willson, and T.L. De Santo. 2000. Defining corridor functions for endemic birds in fragmented south-temperate rainforest. *Conservation Biology*, 14(4):1120-1132.

The authors analyze corridors for their function as either living space or suitable for movement by five bird species in Chile. They found a relationship between corridor length:width ratios and bird abundance. They also found that dense understory vegetation was important for short movement events. They conclude that corridors in agricultural areas can be designed for specific functions.

Singleton, P.H., W.L. Gaines, and J.F. Lehmkuhl. 2002. *Landscape permeability for large carnivores in Washington: a geographic information system weighted-distance and least-cost corridor assessment*. Res. Pap. PNW-RP-549. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest. 89 pp.

This U.S. Forest Service report details potential habitat for four large carnivore species in Washington State. The authors conducted permeability analysis between large blocks of potential habitat. Finally, areas of overlap between linkages and highways were identified.

Skagen, S.K., C.P. Melcher, W.H. Howe, and F.L. Knopf. 1998. Comparative use of riparian corridors and oases by migrating birds in southeast Arizona. *Conservation Biology*, 12(4):896-909.

This study focused primarily on the role of fragmented and continuous riparian zones in providing habitat for migrating birds in the Southwest. The primary finding was that size and isolation of riparian zones from each other was not important in use of the zones – all riparian areas were important. This was potentially because of the limitation on area of this habitat type.

Soulé, M.E. 1991. Land use planning and wildlife maintenance: guidelines for conserving wildlife in an urban landscape. Journal of the American Planning Association 57: 313-323.

This study focused on the impacts of urban and suburban land development on landscape connectivity and wildlife movement. The author recommends consolidating natural open spaces and providing wildlife corridors in urban areas to mitigate some of this impact.

Spackman, S.C., and J.W. Hughes. 1995. Assessment of minimum stream corridor width for biological conservation: species richness and distribution along mid-order streams in Vermont, USA. *Biological Conservation*, 71(3):325-332.

These investigators looked at plant, bird, and mammal distributions along riparian zones. They found that widths up to 175 meters were needed to retain 90% of bird species, whereas narrower widths were needed to provide for stream-side plant species. They conclude that no one-size-fits-all riparian width strategy could functionally replace stream-specific surveys and standards for riparian conservation.

Spellerberg, I. F. 1998. Ecological effects of roads and traffic: A literature review. Global Ecology and Biogeography Letters 7:317-333.

This early review of ecological effects of roads found that quantifying ecological impacts of roads was uncommon, but planning for mitigating road effects was becoming more common. The author suggested two areas of additional research – localized pollutant effects at road-sides and wildlife passage across the right-of-way.

Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

This report is an analysis of California landscape intactness. Large habitat blocks are identified and least cost corridor analysis is performed between adjacent blocks. Chapters are devoted to including future climate change in analyses and how to scale down from statewide to regional spatial scales.

Sullivan, T.L., A.E. Williams, T.A. Messmer, L.A. Hellinga, and S.Y. Kyrychenko. 2004. Effectiveness of temporary warning signs in reducing deer-vehicle collisions during mule deer migrations. Wildl. Soc. Bull. 32: 907-915.

This study looked at the relative effectiveness of warning signs for drivers, compared to permanent signs. They found that temporary signs and signs with enhancements were more effective than permanent and un-changing signs.

Taylor, P.D., L. Fahrig, and K.A. With. 2006. Landscape connectivity: a return to basics. In: Connectivity Conservation eds. K.R. Crooks and M. Sanjayan, Cambridge University Press. Pp 29-43.

This book chapter gets into the basics of defining and conserving connectivity. In particular, the authors differentiate between "structural connectivity" – how intact a landscape is for animal movement, and "functional connectivity" – how much animals can actually move through a landscape.

Taylor, P.D., L. Fahrig, K. Henein, and G. Merriam. 1993. Connectivity is a vital element of landscape structure. *Oikos*, 68(3):571-573.

The authors propose landscape connectivity as a measure of landscape structure. They describe four fundamental processes in terms of connectivity. They conclude that the inclusion of connectivity increases the utility of a previous ecological framework.

Tewksbury, J.J., D.J. Levey, N.M. Haddad, S. Sargent, J.L. Orrock, A. Weldon, B.J. Danielson, J. Brinkerhoff, E.I. Damschen, and P. Townsend. 2002. Corridors affect plants, animals, and their interactions in fragmented landscapes. *Proceedings of the National Academy of Sciences USA*, 99(20):12923–12926.

The authors report on a large-scale field experiment testing the effectiveness of corridors. Results show that corridors increase animal exchange between patches and facilitate pollination and seed dispersal. The authors conclude that corridors provide ecological function greater than their area would suggest and that they have positive impacts on plant and animal populations.

Theobald, D.M. 2006. Exploring the functional connectivity of landscapes using landscape networks. Pages 416-443 in: Crooks, K.R., and M. Sanjayan, eds. *Connectivity Conservation*. Cambridge University Press, Cambridge, UK.

The author explores several methods of connectivity analysis in this book chapter. First he details the computation of effective distance (in contrast to Euclidean distance). This analysis technique is then incorporated in graph theory, which is the subject of the second portion of the chapter. Graph theory can be used to quantify landscape connectivity.

Tischendorf, L. and L. Fahrig. 2000. On the usage and measurement of landscape connectivity. Oikos, 90(1): 7-19.

This is a seminal paper in contemporary studies of connectivity. It formalizes how connectivity should be defined and measured. It describes relationships between landscape structure and animal movement, including recommendations for how these relationships should be measured and interpreted.

Trakhtenbrot, A., R. Nathan, G. Perry, and D.M. Richardson. 2005. The importance of long-distance dispersal in biodiversity conservation. *Diversity and Distributions*, 11(2):173-181.

The authors review conservation issues for which long distance dispersal (LDD) is most important. They discuss assessments of the importance of LDD, tools for quantifying LDD, and management of LDD. They conclude by demonstrating how incorporation of LDD can improve conservation management.

Tremblay, M.A., and C.C. St. Clair. 2009. Factors affecting the permeability of transportation and riparian corridors to the movements of songbirds in an urban landscape. *Journal of Applied Ecology* , 46(6):1314-1322.

> These authors investigated forest-dwelling songbird movement in association with closed and open spaces on the landscape. They found that, in general, the wider the spaces, the less willing birds were to cross them. This included open spaces across rivers where riparian canopy did not provide a close enough connection.

Underwood, E.C., K.B. Klausmeyer, R.L. Cox, S.M. Busby, S.A. Morrison, and M.R. Shaw. 2009. Expanding the global network of protected areas to save the imperiled Mediterranean biome. *Conservation Biology*, 23(1):43-52.

> The authors conduct a global gap analysis for the Mediterranean biome. California-Baja California was one of the regions with higher levels of protection (9% of total area). They found that protection is skewed towards montane elevations and that only shrubland exceeds 10% protection. They conclude by identifying biodiversity assemblages with high conservation priority.

Urban, D., and T. Keitt. 2001. Landscape connectivity: a graph-theoretic perspective. *Ecology*, 82(5):1205-1218.

> The authors introduce the use of graph theory in connectivity analysis. A combination of nodes and edges is used to model conservation networks. The minimum spanning tree, a graph construct, can be used to identify the importance of individual components for the network. They use this approach to model Mexican spotted owl (*Strix occidentalis lucida*) habitat.

Urban, D.L., E.S. Minor, E.A. Treml, and R.S. Schick. 2009. Graph models of habitat mosaics. *Ecology Letters*, 12(3):260-273.

> The authors review the use of graph theory in conservation applications. They consider the conceptual model, implementation, parameterization, testing, and potential implications. The authors conclude that the model is a robust framework for connectivity evaluation and suggest some next steps in research.

Vandergast, A. G., Bohonak, A. J., Weissman D. B., and Fisher, R. N. 2007. Understanding the genetic effects of recent habitat fragmentation in the context of evolutionary history: phylogeography and landscape genetics of a southern California endemic Jerusalem cricket (Orthoptera: Stenopelmatidae: Stenopelmatus). Molecular Ecology 16: 977-992.

> This paper details a study undertaken to investigate the effect of habitat fragmentation on a California endemic insect. Genetic divergence was found to be correlated with contemporary urbanization. Genetic diversity within populations was found to be positively correlated with fragment size. The authors conclude by stressing the importance of connectivity for low vagility species.

Williams, P., L. Hannah, S. Andelman, G. Midgley, M. Araújo, G. Hughes, L. Manne, E. Martinez-Meyer, and R. Pearson. 2005. Planning for climate change: identifying minimum-dispersal corridors for the Cape Proteaceae. *Conservation Biology*, 19(4):1063-1074.

> This paper outlines a quantitative method developed to identify multiple corridors through shifting habitat suitabilities that minimize dispersal demands and area required. The authors were able to achieve the goal of species representation at a reasonable cost. They urge caution, however, in using current climate change models.

6.0 Acronyms and Other Terms

Caltrans	California Department of Transportation
County	El Dorado County
GIS	Geographic Information Systems
GPS	Global Positioning System
IBC	Important Biological Corridor
INRMP	Integrated Natural Resources Management Plan
LDD	Long-distance dispersal
OWMP	Oak Woodland Management Plan
PCAs	Priority Conservation Areas
ROW	Right-of-Way
SEPM	Spatially Explicit Population Models

7.0 List of Preparers

The following individuals prepared the text presented in this report.

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Appendix A
Background Scientific Information

Appendix A
Background Scientific Information

List of Figures **Page #**

1.0 Habitat Loss and Fragmentation

Habitat loss and the accompanying fragmentation due to human land uses constitute the greatest threats to biodiversity currently (Dobson et al. 1999). As of 2005, 21.8% of the planet's land area had been converted to human use (Hoekstra et al. 2005). Within the Mediterranean biome of California (the whole state minus the deserts), conversion has been measured at 17% of the total area (Underwood et al. 2009). Landscapes can be fragmented by a variety of human uses including: urbanization, agriculture, transportation corridor development, logging, mining, and other industrial development (Figure A-1. Landscape Fragmentation Can Be Caused By A Variety of Human Land Uses).

While these numbers are relatively large and constitute a potential threat to resident species in their own right, perhaps a greater risk to the global biota is found in the spatial pattern of the disturbed areas and their effect on connectivity, a critical ecological function (Taylor et al. 1993). Many, if not most, animal species will not cross areas of urban development. Agricultural areas similarly generally see much reduced usage by animals for movement. Effects of development on animal movement are not restricted to the actual footprint of disturbance, however. Edge effects associated with human land use can negatively influence sensitive species well away from urban or agricultural areas. Potential impacts include noise, night lighting, domestic pets, air and water pollution, and generally increased human presence near urban and agricultural areas. Individual animals with home ranges in the vicinity of human-dominated areas can experience higher rates of mortality even if able to use these areas as habitat (Riley et al. 2003).

Habitat fragmentation and reduced capacity for animal movement can lead to isolated populations of species with an increased risk of local extinction. These human impacts can have effects not only on sensitive, wide ranging species such as mountain lion (Beier 1993, Kautz et al. 2006), but small species with limited dispersal capabilities as well (Vandergast et al. 2007, Brückmann et al. 2010). Increased fragmentation and associated decrease in average habitat patch size was found to generally eliminate six carnivore species in southern California (Crooks 2002). Loss of intermediate stepping stone habitat patches crucial to connectivity within some metapopulation networks can lead to increased risk of population extinction, even if the overall footprint of development is small (Semlitsch 2000).

Figure A-1. Landscape Fragmentation Can Be Caused By A Variety of Human Land Uses

A) Urban development (Sacramento County, CA)
B) B) Agriculture (Placer County, CA)
C) Logging and reservoir construction (El Dorado County, CA)
D) Mining (Robinson Mine in White Pine County, NV)

* Photos P. Huber.

2.0 Wildlife Corridors

Connectivity can be defined broadly as the permeability of a landscape to ecological flows, including wildlife movement. Connectivity defined as a property of landscapes, or even large relatively homogeneous patches, is probably the most reflective of ecological processes and patterns. Others have described connectivity as ''*the degree to which landscape facilitates or impedes movement of organisms among patches*'' (Taylor et al. 1993; Tischendorf and Fahrig 2000; Schooley and Wiens 2003) and "*the functional relationship among habitat patches due to their spatial distribution and the movement of organisms in response to landscape structure & the ease with which these individuals can move about within the landscape*'' (Taylor et al. 1993; With et al. 1997; Kindlmann and Burel 2008). Wildlife corridors are a narrow expression of the concept of connectivity. They are geographically-constrained strips of land that are either the remnant habitat in a developed landscape, or are some geographer's idea of what areas of land might provide for wildlife movement.

2.1 Connectivity and Wildlife Corridors

Connectivity is an attribute of all landscapes that refers to how much ecological flow, such as wildlife movement, the landscapes allow. Corridors are narrow zones of connectivity and are useful for certain animals, but not all. Individually they are a sub-set of connectivity and are most useful in developed settings (urban and agricultural). At the landscape scale, connectivity for individual taxa may be the most important of physiographic properties because it is a measure of intactness, which along with habitat type and forage availability describes what individual taxa and biodiversity need across daily to evolutionary timeframes. Connectivity is also an emergent property of landscapes in that it is not predictable from any one characteristic of the landscape, but is a predictable or measurable attribute of the landscape as an aggregate of characteristics. Defining connectivity can have profound effects on how this attribute is conserved in any landscape. In its most constrained application, primarily in conservation implementation, connectivity is defined as a land-corridor or linkage set-aside to allow wildlife movement (or other ecological flows). This type of designation is often consigned to urban or urbanizing environments, natural areas with heavy resource extraction (e.g., Carroll, 2007), or in places where other working definitions of connectivity have just not been introduced. This definition and corresponding spatial analyses are probably heavily-influenced by the needs of land planners to arrange exclusive, non-complementary sets of activities on distinct parcels or patches. At the least-constrained end of the spectrum, connectivity is defined as the permeability of a landscape to ecological flows, including wildlife movement (Fischer and Lindenmayer, 2004). Connectivity defined as a property of landscapes, or even large relatively homogeneous patches, is probably the most reflective of ecological processes and patterns, but often requires both creative scientific explanations to land-holders/managers and creative implementation instruments. This definition and corresponding spatial analyses are probably most influenced by ecology, with its study of gradations across space and time, and among inter-dependent ecosystem components. The profound difference between these two definitions of connectivity lies less in the ability to apply them at the landscape level – both have been carried out – and more in their relative value for conservation of biodiversity.

Connectivity is defined here as an emergent landscape property that can be expressed at the habitat patch or other scales and is scaled according to the particular movement needs of individual taxonomic groups or other ecological flow (Fischer and Lindenmayer, 2004). This definition is most like the habitat continuum concept (Fischer et al., 2004), which can be contrasted with the island-based patch and corridor model ("fragmentation model" in Fischer et al., 2004). The use of this definition provides the broadest application of connectivity analyses in ecological conservation. Connectivity "surfaces" can be constructed for landscapes using particular combinations of species and spatial-temporal scales. If necessary, the highest quality ridgelines on these surfaces can be used to show the most important lands for conservation for particular taxa in highly-contested land-management scenarios. This approach also allows for connectivity as an ecological attribute to be accurately and effectively conveyed to land-holders and managers, opening the door to more creative and wildlife-friendly land-management (Fischer et al., 2008).

A common differentiation made in the connectivity literature is between "structural connectivity" and "functional connectivity", where the former is measured as landscape structure that may facilitate or inhibit wildlife movement and the latter is measured directly from wildlife movement, or estimated based on rules of organismal behavior and responses to landscape attributes (Kindlmann and Burel, 2008). The field of applied conservation is changing rapidly so that connectivity is more often estimated for several species on a landscape, rather than just calculating “structural connectivity” based on fragmentation patterns. Many landscapes will vary in their “functional connectivity” for different motile species. By measuring connectivity of landscapes for a wide-range of movement needs, conservation scientists can reveal the range of needs across landscapes and estimate how these needs might change or be impacted with future land-cover changes. Taylor et al. (2006) argue that structural connectivity is not a good stand-in for landscape connectivity, which was historically and is usually defined as being an attribute having relevance to moving animals (or similar flows). Landscape or habitat intactness is essentially what most investigators and land managers mean by “structural connectivity” and is an important landscape attribute when considering wildlife movement.

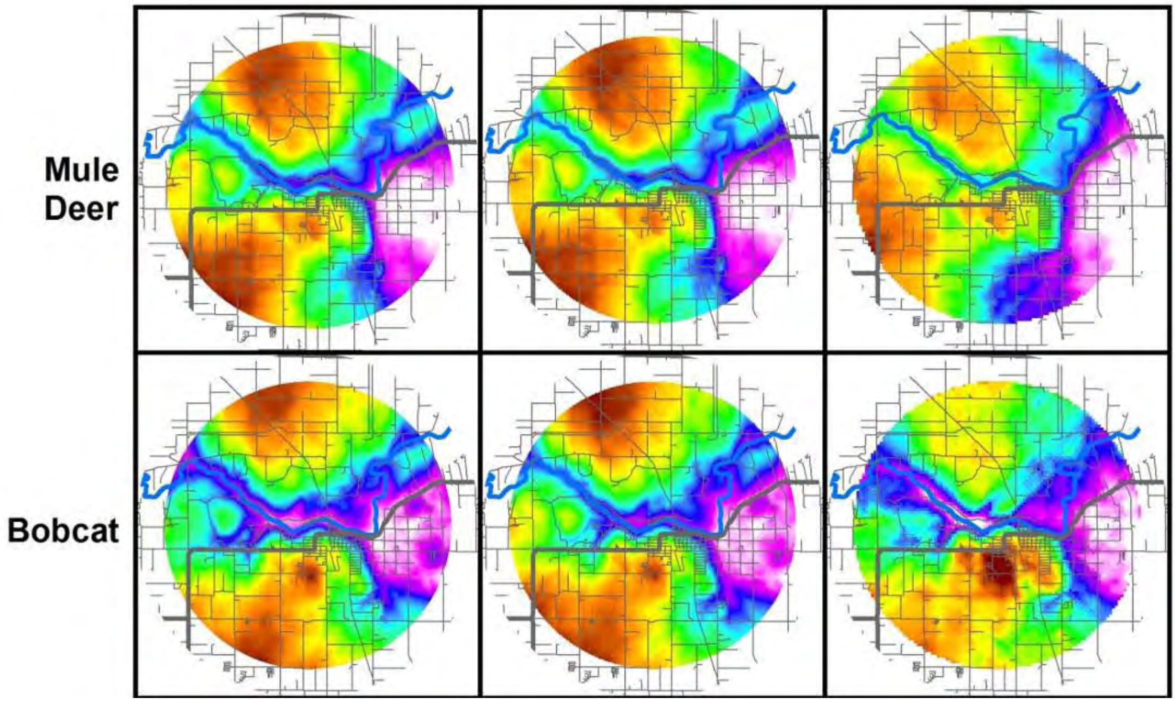
Extensive connectivity refers to wildlife movement throughout landscapes at rates and distributions that suit their needs. This can be contrasted with minimal connectivity that might be provided by “wildlife corridors” planned for developed environments, or even sometimes undeveloped environments. In reality, many landscapes provide some degree of movement through areas with intermediate levels of development. Expanding connectivity planning beyond “corridors” and “linkages” recognizes the ecological reality that animals move according to their needs more than according to our planning and that landscapes providing economic value are often managed for multiple purposes, including to maintain natural structure and function. A combination of traditional “linkage” planning and extensive connectivity planning may provide the opportunities that wildlife need to adapt to changing climatic, land-cover, and ecological conditions.

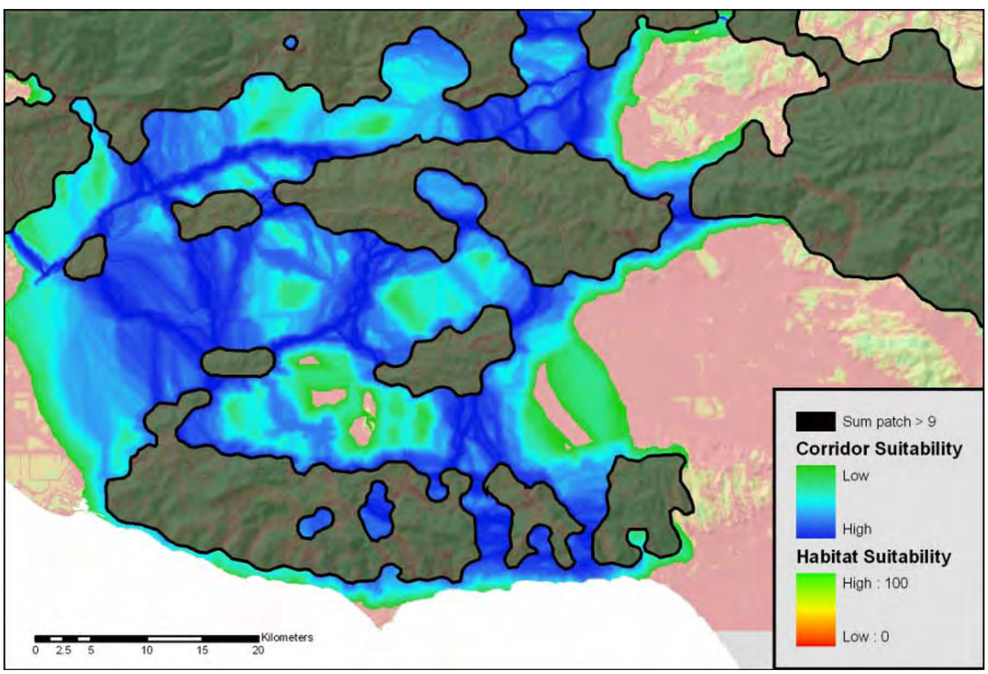
One ecological landscape component that can function as a linear wildlife corridor is riparian forest. Riparian forests naturally host a wide array of terrestrial and aquatic species. This ecological diversity is driven by the dynamic nature of geomorphic process, the altitudinal gradient inherent in streams and rivers, and the connection with upland areas beyond the edge of the riparian zone (Naiman et al. 1993). Wider intact riparian corridors generally provide habitat for more species than do narrow or degraded corridors. Lees and Peres (2008) found wide corridors in Brazil’s Atlantic forest to have nearly the full assemblage of native species while narrower corridors were generally lacking the full assemblage. Similarly, Spackman and Hughes (1995) in a study in Vermont found that while there was no one minimum width for all species, riparian corridors of up to about 550 feet in width as a minimum provided habitat for 90% of bird species. Not only do riparian corridors provide habitat for a wide variety of species, they also provide landscape connectivity for many of those species. Machtans et al. (1996) found riparian strips to enhance connectivity for juvenile forest birds and to maintain connectivity for adults in Alberta, Canada. Forest specialist bird species were found to use riparian corridors but not fencerows in Costa Rica (Gillies and St. Clair 2008). In Sonoma County, California, Hilty and Merelender (2004) found an 11-fold increase in mammalian predators in riparian corridors compared with adjacent vineyards, with more species found moving through wide corridors. They conclude that wide, well-vegetated riparian corridors may be necessary to maintain populations of predators in impacted landscapes. Insects were also found to use riparian corridors (Nicholls et al. 2001). Riparian corridors tend to be more ecologically effective if they are continuous rather than fragmented. Tremblay and St. Clair (2009) found a 50% decrease in forest bird movement in Alberta, Canada, when there were gaps of about 150 feet in the forest canopy. That being said, even discrete riparian patches can provide resting locations for migrating birds (Skagen et al. 1998). Intra-corridor patterns are important as well, and should be considered by conservation and land use planners and managers for maximizing use by animals. Individual species require different ecological components and natural history needs should be evaluated, especially for species with limited movement, such as reptiles and amphibians (Burbrink et al. 1998).

2.2 Modeling Connectivity and Corridors

Accurate analysis of connectivity should follow on from the theory or definition of connectivity, as well as the needs of the wildlife and natural processes in question. This raises the question of "connectivity for whom?" which applies both in terms of the natural systems being addressed and the planning process being served. The vast majority of connectivity analyses are directed, explicitly or not, to medium-large mammals, primarily because of a combination of data availability, species-specific knowledge, and bias toward certain taxonomic groups. Currently-available spatial data will tend to be more accurate at coarse grains and not suitable for the needs of smaller animals; we know the most about the behavior and movement of larger mammals; and there is generally more public support for the needs of large mammals. However, connectivity assessments that are based in understanding of landscape intactness and resilience that are conducted at multiple organismal scales, and that cover all taxa, are more likely to contribute to biodiversity conservation. Examples of connectivity model outputs are shown in Figure A-2. Connectivity Analyses for Mule Deer and Bobcat in the San Joaquin Valley.

Figure A-2. Connectivity Analyses for Mule Deer and Bobcat in the San Joaquin Valley





There are many connectivity analysis approaches, but they fall into two main camps: 1) The majority of approaches partition landscapes into the dichotomous categories – core/corridor and not core/corridor. These approaches treat connectivity as an exercise in getting from reserve A to reserve B along one or more pathways (also called corridors or linkages; Beier et al., 2008). 2) A minority of approaches treat the landscape as a gradient of permeability or habitat suitability (Fischer et al., 2004; Shilling et al., 2002; Shilling and Girvetz, 2007), where movement is a possibility based on habitat quality, disturbance, and the needs of the taxa.

A dichotomous illustration of connectivity may suit the needs of planners to have available explicit separation of the landscapes into the minimum area that the organisms need and what they may not need (or need less). For the vast majority of animals, a dichotomous representation is unlikely to be very accurate because of a combination of information availability, knowledge of the species' needs, and the tendency of most animals to be opportunistic across varying time scales when it comes to foraging and dispersing. Treating landscapes as having a continuum of permeability results in a cost (or benefit) surface, which may better suit the needs of wildlife because it includes representation of all possible habitat conditions, without excluding seemingly less-optimal areas. This approach also deals with the recent critique of Hodgson et al. (2009) by recognizing connectivity/intactness as a landscape property closely tied to other measures of habitat extent and quality. At first glance, the connectivity-continuum may seem less suitable for planning, solely because continua are less popular in conservation planning than dichotomous, polygonal representations of wildlife needs. However, a cost surface can be summarized to polygons fairly easily, allowing representation of both the continuum of connectivity and partitioning of dichotomous conditions. Another way to think about it is that corridors are all the places that wildlife use to move and collectively they define connectivity.

3.0 Need for Connectivity

Connectivity is needed for a variety of ecological needs of plants and animals. The first is for daily foraging movement, where animals move around landscapes to feed on short time-frames. Wildlife may need to move gradually across a landscape as they forage, or they may restrict their movements within a territory or home range. If roads or other development are present, certain species may defer movement near or across the developed areas. Others may move anyway and come into conflict with traffic, residential areas, and agricultural practices. A second need for connectivity is for seasonal movement or migration. The best local example of this is migration of deer herds from summer to winter habitat and back. In El Dorado County, this movement is primarily in an east-west direction, following elevational gradients. In some areas and for some deer herds, this movement follows roughly the same paths (e.g., drainages) every year, which could then be called migration corridors. If barriers form near or across seasonal migration routes and alternative routes, then migration may be hampered or even ended altogether, which could result in a loss of the migrating population. A third need for movement is for inter-generational dispersal, or juvenile and propagule dispersal. Many wildlife species have a reproductive strategy of dispersing juvenile animals to new areas to establish home ranges, take advantage of abandoned habitat, and to maintain population size. Juveniles are actively excluded or naturally choose to move out of adult home ranges. They will also have less experience with human disturbances than adults may have. Barriers to dispersal, or excessive loss of individual juveniles during dispersal (e.g., from wildlife-vehicle collisions), can result in reduction or elimination of populations and subpopulations. The fourth need for connectivity is for adaptation to changing climatic conditions. Vegetation and habitat conditions have changed over geological time (e.g., since recent ice ages) and over the last century (i.e., upward movement of trees species in response to warming). Changing climatic conditions (e.g., temperature and moisture) and vegetation conditions will result in the need for species to gradually or rapidly change their position on the landscape. State and federal government agencies have described connectivity as an important attribute of landscapes to facilitate adaptation by biodiversity to the climate change we are experiencing right now (e.g., California Climate Change Adaptation Strategy: http://www.climatechange.ca.gov/adaptation/; U.S. Environmental Protection Agency: http://www.epa.gov/climatechange/effects/adaptation.html).

4.0 Genetic and Population Effects of Fragmentation

Transportation infrastructure is a major cause of genetic discontinuity in wildlife, and its effect on animal dispersal and movement has been documented in many studies (Kuehn et al., 2007; Corlatti et al., 2009). Anthropogenic infrastructure may lead to habitat loss and fragmentation, decrease in gene flow, increase in genetic drift and loss of genetic diversity (Marsh et al., 2008). This section describes some of these effects, which are some of the most significant among impacts to wildlife from transportation infrastructure and land-use. Appendix B – Glossary of Terms will be useful for this section as it contains definitions of the technical terms used.

4.1 Introduction to Landscape Genetics

To study the general effects of artificial landscape features (e.g., highways) on population genetic structure, a new discipline, landscape genetics, has recently been developed. Landscape genetics integrates studies of landscape patterns and population genetics, and detects the correlation between genetic differentiation and landscape features. First described in the landmark paper by Manel et al. (2003), this field has flourished, evidenced by an increasing number of published papers on this topic (Holderegger & Wagner, 2006). The study of landscape genetics is best described as evaluating the effect of individual roads and/or road networks on the genetic structure of surrounding wildlife populations, and thereby provides guidance for minimizing detrimental ecological impacts on wildlife through designing mitigation actions and infrastructure.

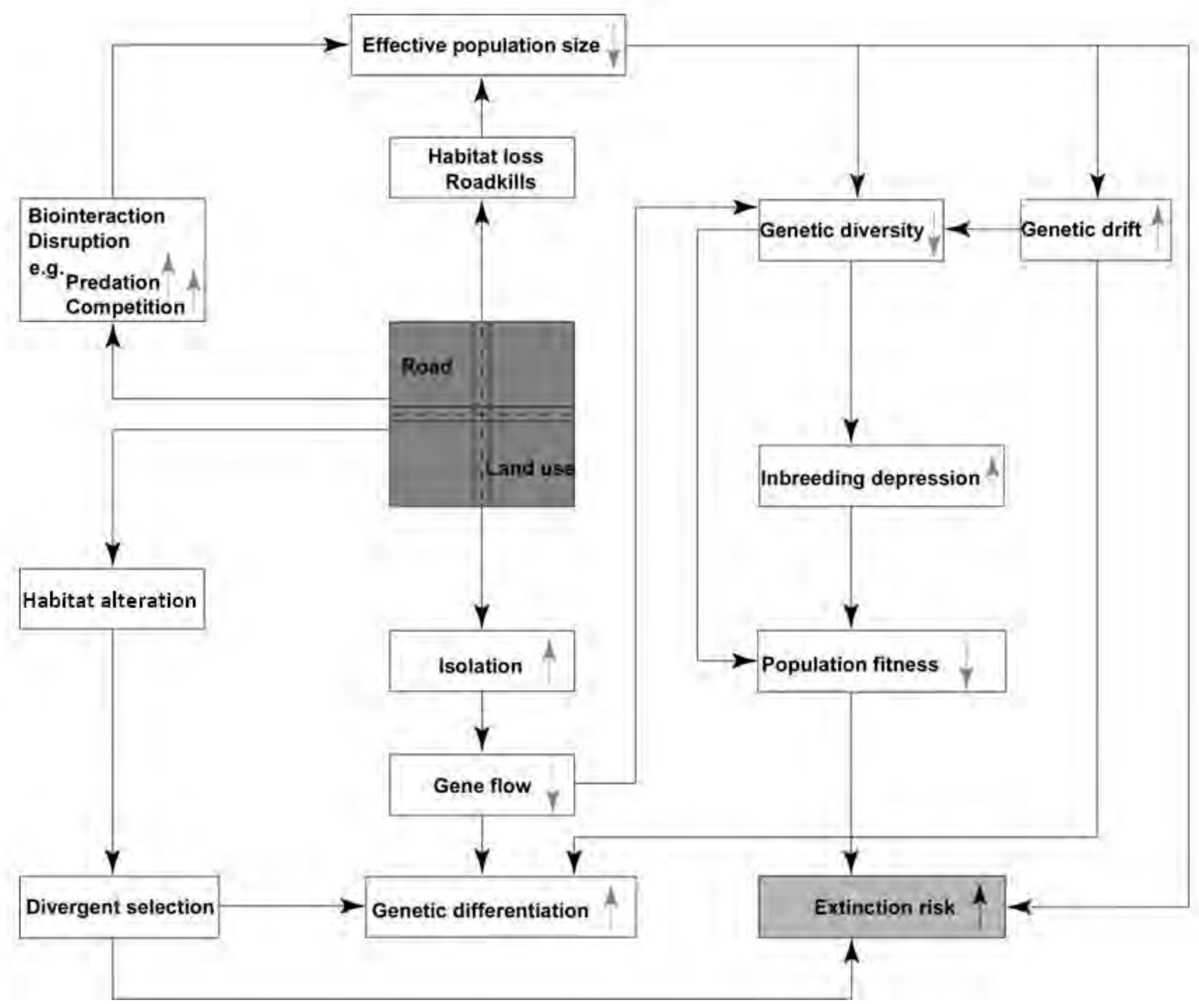
Population genetic structure is generally used to depict population subdivision based on genetics studies. Ideally, no genetic structure should be detected in a single mendelian population because every individual is hypothesized to move freely without any physical, genetic, or social preference and to mate randomly (Hamilton, 2009, p.105). However, this does not hold true for actual populations because of complex restrictions and preferences. (e.g., the mating chance of two individuals often depends on their location) (Hamilton, 2009, p.105). In fact, many factors may affect the mating opportunity of two individuals chosen randomly, such as geological and landscape barrier, and mating preference. Under this circumstance, selection and genetic drift may cause a population to be differentiated into subpopulations, which have the potential to move on different evolutionary trajectories.

4.2 Impacts of Roads and Highway Networks

Roads/highways can affect genetic structure by directly changing several key population genetic parameters, such as effective population size, gene flow, genetic drift and selection (as shown in Figure A-3. Diagram of Main Effects of Road and/or Land Use on Population Genetics). First, the road/highway construction may cause habitat loss while the traffic may cause animal-vehicle collisions, both of which can obviously result in decrease of effective population size. Second, road and highways may lead to habitat fragmentation, turning a previously continuous population into many smaller and isolated subpopulations, which may subsequently reduce genetic diversity and contribute to genetic differentiation. Third, roads and highways may also cause habitat alteration, like noise and chemical pollution (Spellerberg, 1998).

Figure A-3. Diagram of Main Effects of Road and/or Land Use on Population Genetics

The altered habitat may create a different selection pressure on the organisms, which may lead them to evolve adaptively.



The most common genetic consequence of roads and traffic is through habitat fragmentation, which is defined as splitting of contiguous areas into smaller and increasingly isolated patches (Fahrig, 2003). All roads may serve as barriers (animal-vehicle collision and road avoidance) to animal movements and hence break apart habitats of wildlife, causing formation of smaller and partially isolated subpopulations (Forman & Alexander, 1998). This may seriously restrict gene flow among those subpopulations. Furthermore, small isolated subpopulations tend to suffer from strong independent genetic drift and increasing inbreeding, which makes them prone to disease and loss of adaptive genetic diversity. As a consequence, the isolated populations are more vulnerable to stochastic extinction events due to decreased genetic diversity (Frankham et al., 2002) and lack of available rescue effect from immigration or recolonization (Soulé, 1991).

Several studies have reported decreases in genetic diversity in populations isolated by road barriers. For example, in southern California, the desert bighorn sheep (*Ovis canadensis nelsoni*) shows as much as 15% decrease of nuclear genetic diversity in populations that have been completely isolated by road networks for over 40 years (Epps et al., 2005). Similarly, compared to non-fragmented populations, populations of agile frog (*Rana dalmatina*) fragmented by highways exhibit significantly lower allelic richness (Lesbarrères et al., 2006). Moreover, a study on Jerusalem cricket (*Stenopelmatus* '*mahogani*') shows a positive correlation between its genetic diversity and its current habitat patch size caused by urbanization (including road/highways) (Vandergast et al., 2007).

In addition to its effect on genetic diversity, another genetic consequence of road or highway barriers is to cause population differentiation, and the empirical evidence for this is ubiquitous (reviewed in Corlatti et al., 2009). This is not surprising due to the limited gene flow that will occur among isolated populations and possibly strong genetic drift in individual small, isolated populations. Increased genetic divergence among populations divided by road barrier has been reported in many varied taxa such as Jerusalem cricket (*Stenopelmatus* '*mahogani*') (Vandergast et al., 2007), ground beetle (*Carabus violaceus*) (Keller & Largiader, 2003), red-backed salamanders (*Plethodon cinereus*) (Marsh et al., 2008), frog (*Rana temporaria*) (Reh & Seitz, 1990), agile frog (*Rana dalmatina*) (Lesbarrères et al., 2006), roe deer (*Capreolus capreolus*) (Kuehn et al., 2007), bank vole (*Clethrionomys glareolus*) (Gerlach & Musolf, 2000) and desert bighorn sheep (*Ovis canadensis nelsoni*) (Epps et al., 2005). Indeed, there are few ground-dwelling taxonomic groups that do not become genetically isolated by roads and highways.

4.3 Individual Road or Highway Effects

It is possible that individual roads and highways are sufficient to form effective barriers for animal dispersal and movement, causing population subdivision, decrease in gene flow, and consequently genetic differentiation. An individual roadway's influence on the genetic differentiation of its surrounding wildlife may depend on intrinsic features of the road/highway itself, such as its age, width, and traffic volume. Roads and highways of varied features may have different effects. For instance, among six paved roads studied in Virginia and West Virginia, USA, the red-backed salamanders (*Plethodon cinereus*) populations divided by the interstate highway showed significantly greater genetic distance than those on the same side of the highway, while populations across other smaller roads were no more genetically distinct than those on the same side of the road. This result suggests that migration across the large roads is rare compared to that of the small roads (Marsh et al., 2008). Similarly, Gerlach and Musolf (2000) found that a recently constructed highway (~25 years old) contributed to a significant population subdivision of bank vole (*Clethrionomys glareolus*), while other road barriers including an old railway (~50 years old) and a rural road (~25 years old) did not. Even in the case of large, highly mobile species like bobcats and coyotes, there were obvious genetic differences between subpopulations on either side of the Ventura Freeway near Los Angeles (Riley et al., 2006). In this seven-year-long study, the researchers directly tracked the movement of individuals using radio-telemetry, and found higher isolation effects of the highway than that for secondary roads (about three times higher for bobcat and 11 times higher for coyote, respectively). Moreover, the genetic data further showed that the highway led to a clear genetic differentiation between populations of the two species on either side of the highway, and that the secondary road contributed to the bobcat's genetic differentiation between populations on either side of the road.

4.4 Genetic Effects of Non-Transportation Land-Uses

In addition to roads and highways, other forms of anthropogenic activities, like urbanization and agricultural land use, can also have negative effects on the genetic structure of surrounding wildlife populations, mostly by causing habitat fragmentation. For example, urban fragmented populations of common frogs (*Rana temporari*) present higher genetic differentiation and lower levels of genetic diversity when compared to rural common frog populations, which have relatively large continuous habitat (Hitchings & Beebee, 1997). Investigators in the same study also observed higher levels of mortality and developmental abnormality within the urban common frog populations than within the rural populations, suggesting that there was some inbreeding depression in the urban populations, partially due to decreased genetic diversity (Hitchings & Beebee, 1997). Similarly, the eastern red-backed salamander (*Plethodon cinereus*), a common species, was severely affected by habitat fragmentation due to land use (Noël et al., 2007): four populations sampled from mosaic forested habitats (caused by the urbanization) differentiated significantly and presented low levels of genetic diversity, whereas four populations located in the continuous habitat were genetically homogeneous and exhibited relatively high levels of genetic diversity. Even for a highly mobile bird, the golden-cheeked warbler (*Dendroica chrysoparia*), the isolation caused by agricultural lands clearly caused one population to diverge from other sampling populations (Lindsay et al., 2008).

5.0 Threats to Connectivity and Permeability

5.1 Land Use

In the INRMP planning region, approximately 4.3% of the total area has been converted to human-dominated land cover types (Figure A-4. Land Conversion in the INRMP Planning Area) (calculated by CalVeg dataset). These areas are largely concentrated along the Highway 50 transportation corridor running east-west through the central portion of the region. There are other scattered pockets of developed areas both north and south of this more-developed area. This overall footprint of development in the western County may constitute a threat to continued ecological functioning of the natural ecosystems, especially potential impacts to rare or highly localized biota.

Another threat is from the pattern of development, which could lead to potential loss of north-south and east-west connectivity across the planning region. Terrestrial animals attempting to move across this area are currently restricted to relatively narrow gaps between existing areas of human development. With future urban growth likely along the Highway 50 transportation corridor, landscape connectivity is likely to be further reduced through this area. If development occurs in other portions of the study area, additional patterns of connectivity (e.g., along the elevational gradient) could be threatened as well.

5.2 Transportation Networks

Another human impact on landscape connectivity, many times associated with conversion of natural habitat to human-dominated land cover, comes from transportation corridors (e.g., roads, and rail; Figure A-5. Transportation Corridor Impacts to Landscape Connectivity). As of 2000, there were approximately 3.8 million miles of roads in the United States, occupying roughly 1% of the land surface (National Research Council 1997).

Effects associated with these roads include habitat loss, direct mortality, air and water pollution, and noise (Forman 2000). The linear nature of transportation corridors can also act as a barrier to wildlife movement across the landscape. Highways and other major roads linking areas of human development can serve as nearly complete barriers to movement by many terrestrial species and other ecosystem flows (Epps et al. 2005, Li et al. 2010). In some cases, individuals will not attempt to cross roads because of the disturbance associated with them, leading to functional habitat loss such as was found with woodland caribou in Canada (Dyer et al. 2002). When attempts are made to cross roads, mortality can become a serious issue. Attempts to reduce mortality through actions such as fence construction can inversely lead to an increased barrier effect (Jaeger and Fahrig 2004). Even small roads can lead to reduced movement resulting in genetic impacts on some species (Clark et al. 2010). Linear features of human disturbance, such as roads or powerlines, can serve as barriers to species that require interior forest, even if no traffic is present.

Figure A-4. Land Conversion in the INRMP Planning Area

Black areas are human dominated land cover types (urban, agriculture, and barren), green is natural vegetation, and blue is water.

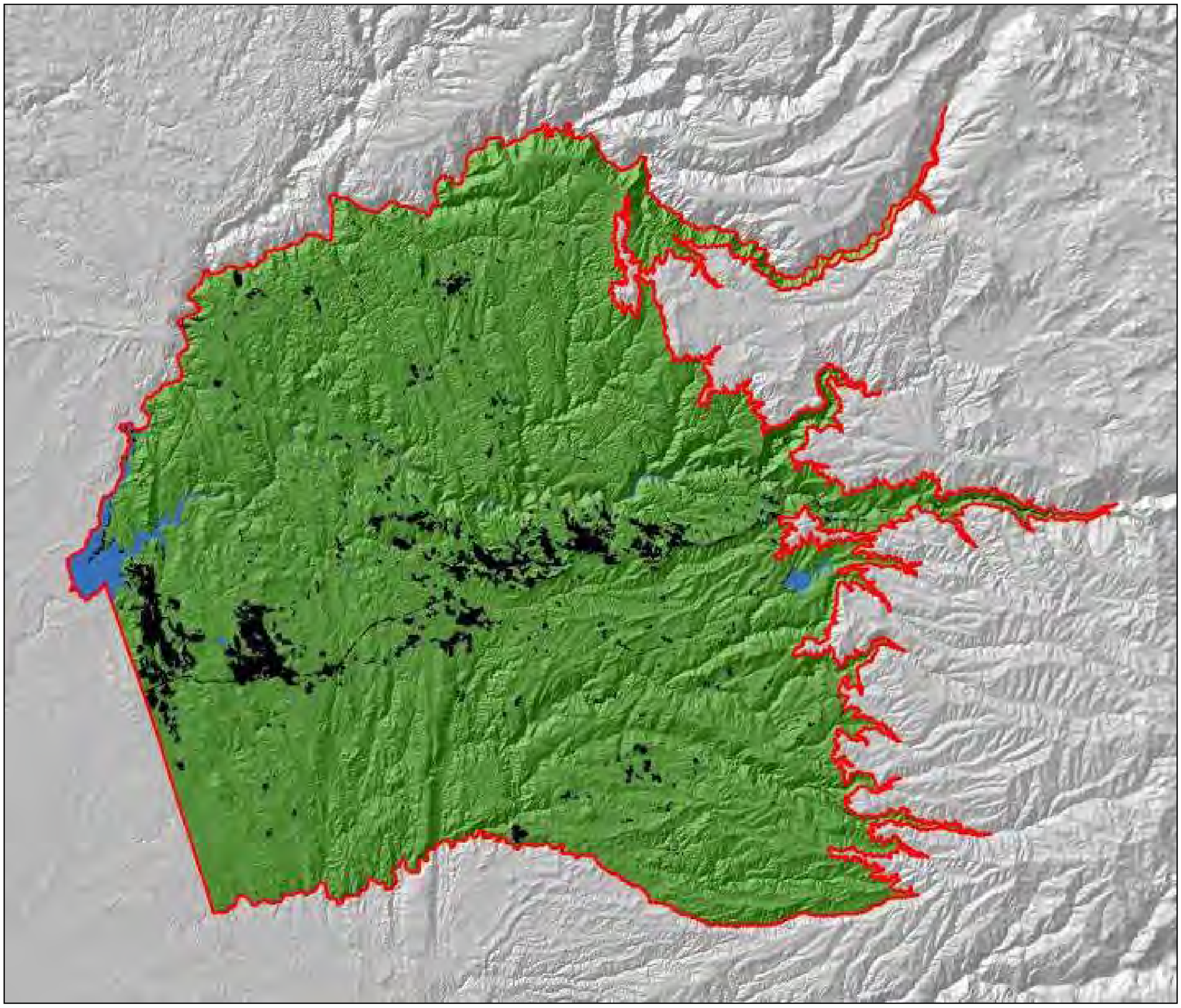
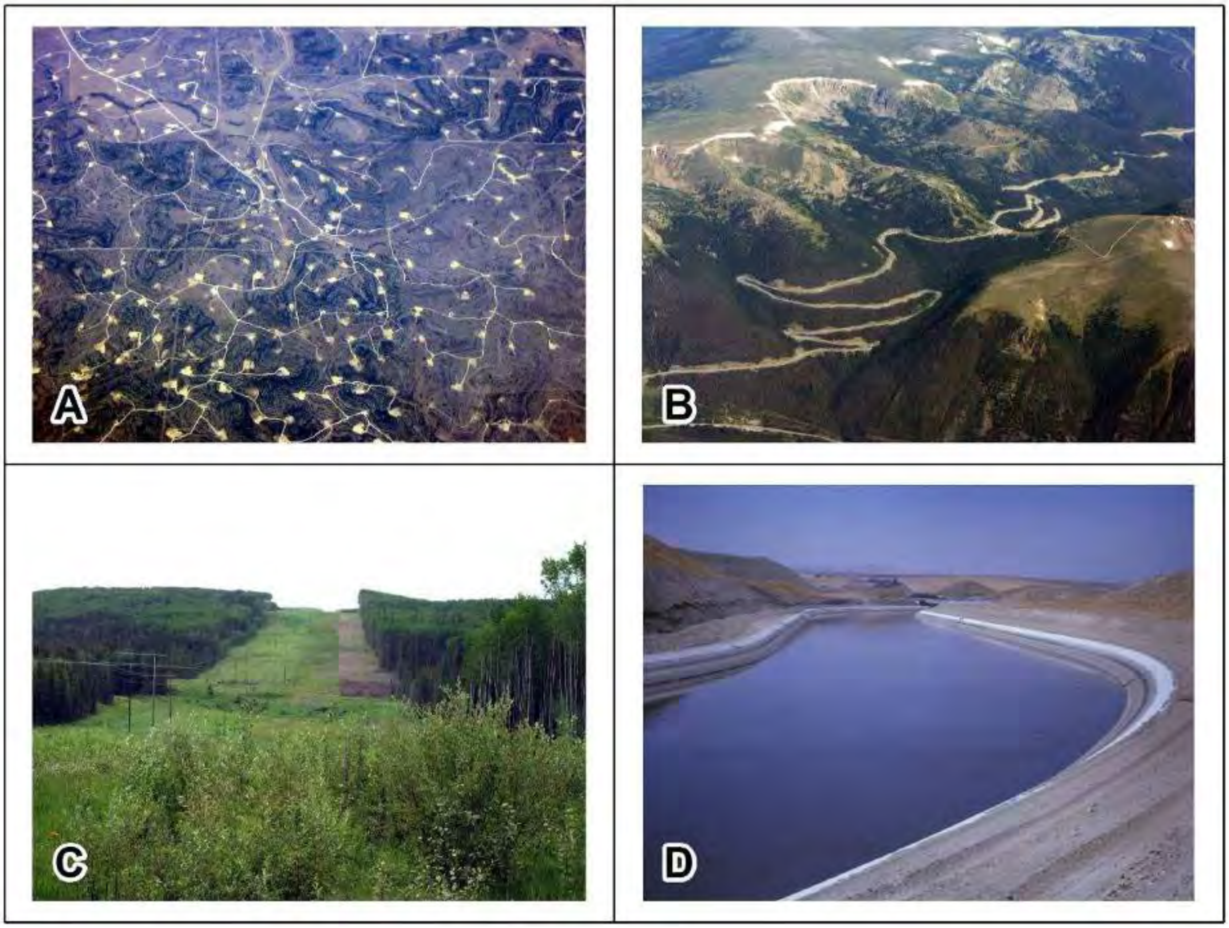


Figure A-5. Transportation Corridor Impacts to Landscape Connectivity

Caused by:

A) Dense road networks, rural Texas
B) Single major roads bisecting otherwise large habitat patches, U.S. Highway 40 over Berthoud Pass, CO
C) Transmission and pipeline corridors, boreal forest of Alberta, Canada
D) Water conveyance infrastructure, Delta – Mendota Canal in the Central Valley of California



* Photos P. Huber, except D (U.S. Bureau of Reclamation)

There are approximately 3,265 miles of roads within the INRMP planning area (Figure A-6. Roads in the INRMP Planning Area), or an average of 1.5mile/mile² across the region. While many of these are small rural or residential roads that could potentially allow many species to cross them relatively freely, there are some major roads in the study area that could very likely act as substantial barriers to many species. U.S. Highway 50 and State Highway 49, both major roads with a large volume of car and truck traffic, serve to effectively partition the planning area into four roughly equal-sized portions. These highways likely reduce potential animal movement both north-south (for species tracking a single ecosystem type) and east-west (for species conducting seasonal movement across elevations or that are in the process of adapting to climate change). In addition to these highways, there are other local roads that experience a large amount of daily traffic, further reducing areas of unimpeded movement within the four quadrants delineated by major highways.

5.3 Climate Change

Patches of currently intact habitat exhibiting high connectivity might still be at risk even if not threatened by human disturbance. Future climate change may lead to loss of connectivity between and among habitat patches (e.g., Figure A-7. Rising Winter Temperatures Have Enabled Pine Beetles to Increase Their Effects Across Much of Western North America). As the temperature in a given region changes, plant species associated with that temperature will need to move to track those changes.

In some cases they will be able to keep pace, but in others they will not be able to follow the requisite climate shifts. This will be especially true for those species that specialize in a narrow temperature range which will require long distance dispersal events to track the changes (Trakhtenbrot et al. 2005, Loiselle et al. 2010). These events will not occur if there is no potential connectivity along the temperature gradient, leading to possible local extinction of some species. Williams et al. (2005) identified corridors that could be used to facilitate dispersal of species of Proteaceae in the Cape Floristic Region of South Africa. The existence of protected corridors consisting of intact habitat will potentially enable these plant species (and associated animal species as well) track the shifting climate regime. When future climate change is combined with habitat fragmentation, the ability of species to track the changes might be reduced or eliminated as well, leading to increased extinction risk (Pearson and Dawson 2005). Climate change can also potentially have negative ecological effects in addition to shifting climate envelopes that could impact landscape connectivity (Figure A-7).

Figure A-6. Roads in the INRMP Planning Area

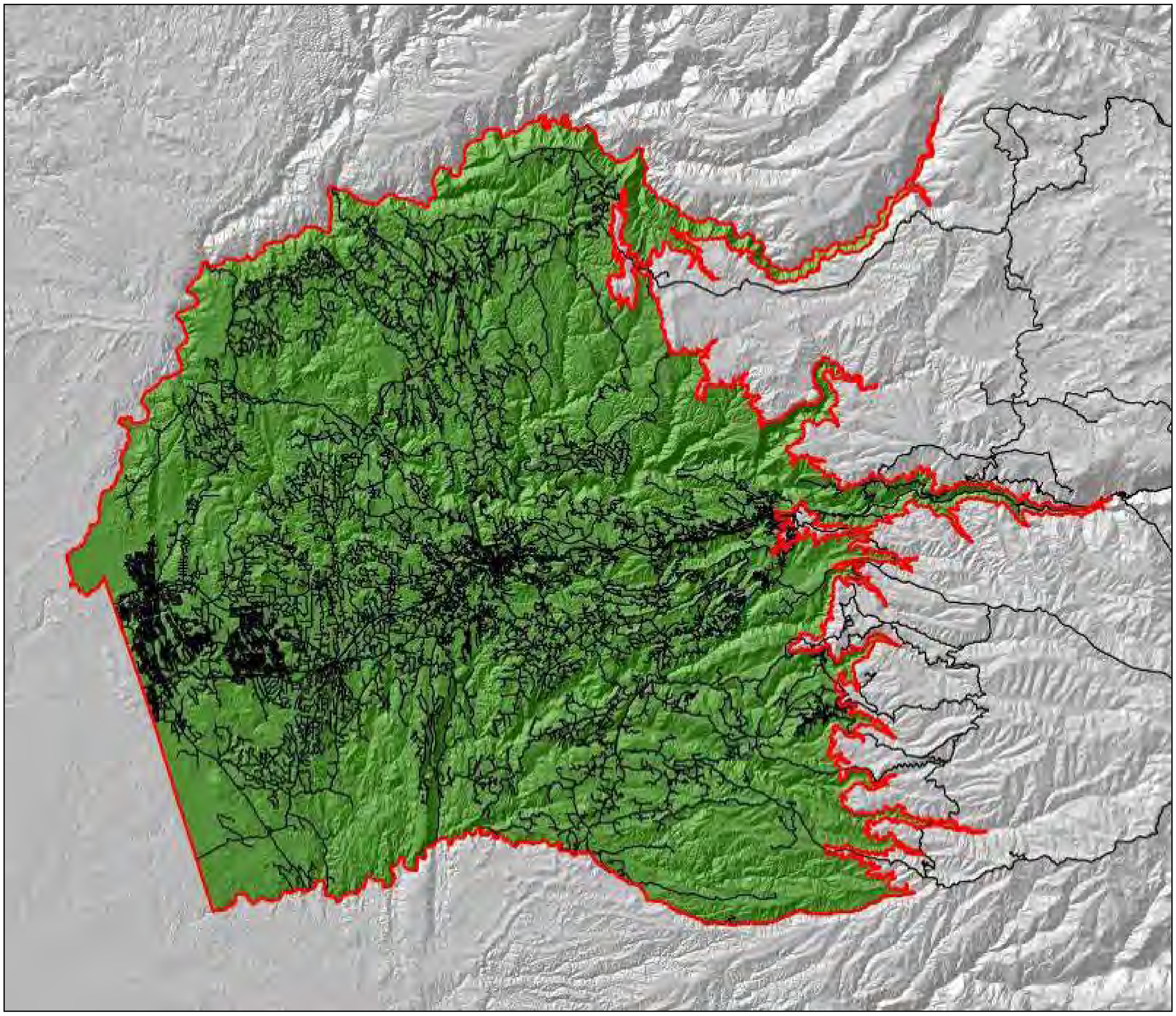


Figure A-7. Rising Winter Temperatures Have Enabled Pine Beetles to Increase Their Effects Across Much of Western North America

In Jackson County, Colorado, effects of climate change such as seen here can potentially impact forest and other connectivity in the coming decades.

Climate change models are used by international, federal, state, and private resource, transportation, land-use, and regulatory bodies for planning and analytical purposes. These models show that temperatures in the INRMP planning area are likely to rise over the coming decades (Figure A-8. Climate Change Projections Showing a Potential 3°-4° F Rise in Temperatures in the INRMP Planning Area by 2050). While the magnitude of the temperature rise is uncertain, average models show a perhaps 3°-4° F rise in temperatures by 2050 or so. For resident species to successfully adapt to this rise in temperatures, they will need to disperse uphill, i.e., from west to east. If a species is unable to shift its range quickly enough to follow the temperature gradient, either because of low dispersal ability, habitat fragmentation due to land conversion, or barriers to movement such as State Highway 49, then that species is likely to experience population reduction and potential extirpation from the County. Species with less ability to move and naturally occurring as discrete, isolated populations (e.g., serpentine plant species or wetland amphibians) will likely face the greatest pressures due to climate change.

Connectivity planning as a component of climate change adaptation has become an important conservation consideration over the past several years. It is the general scientific consensus that species will need to shift their ranges to track a changing climate, or even in the event of a prolonged drought, which are known to occur in Mediterranean climates like that in California. A number of approaches to this complex topic have been included in analysis efforts. A study undertaken in South Africa (Williams et al. 2005) used a sequence of climate models through time, species-specific habitat models, and known dispersal capabilities to identify grid cells that could serve as future habitat. Beier et al. (2008) use landscape "facets", or combinations of topographic elements, as potential dispersal corridors for species under a changing climate. Carroll et al. (2010) used a combination of models (MAXENT and ZONATION) to identify areas of climatic and topographic heterogeneity within potential future home ranges that could serve as refugia for northern spotted owls in the U.S. Pacific Northwest. These and other efforts seek to identify areas for conservation management that will most benefit species' adaptation to climate change.

The most likely need for planning for connectivity in the face of climate change is conservation or restoration of potential movement between lower and higher elevations, i.e., west-east direction, and movement north-south. Within this general theme, topographic and home range analyses should be undertaken to assess the ability of the County landscape to provide pathways of movement and potential climatic refugia. The American and Cosumnes River canyons could potentially provide local topographic heterogeneity within regional topographic features that could enable some species to move west-east. Higher elevation east-west trending ridgetops could also potentially serve as movement pathways. South-north movement would be facilitated by providing habitat connectivity in that orientation and mitigating barriers.

Figure A-8. Climate Change Projections Showing a Potential 3°-4° F Rise in Temperatures in the INRMP Planning Area by 2050

The black circle denotes the general location of the INRMP planning area. These projections are based on an ensemble average General Circulation Model under the Medium A1B emission scenario. The map was produced by Climate Wizard, an online tool developed by The Nature Conservancy (http://www.climatewizard.org/).

Appendix B
Glossary of Terms

Adaptive genetic diversity – Refers to genetic variations that have an effect on individual fitness.

Allelic richness – The number of alleles in a sampling population, one of the basic measures of genetic diversity. An allele is one of two or more forms of the DNA sequence of a particular gene.

Bayesian assignment – Bayesian clustering approach that uses multilocus genotypes to infer population structure and assign individuals to populations. Bayesian statistics use prior information, current data, and expert opinion to calculate probabilities of occurrence, in this case of individual assignment of animals to populations within a species.

Canonical correspondence analysis – An analysis method that correlates genetic diversity to related environmental factors, such as habitat fragmentation, and that can be used to identify environmental factors that contribute significantly to variations in genetic diversity.

Evolutionary trajectory – Refers to the evolutionary direction and process in which a given group of organisms experiences.

Effective population size – The number of individuals that can contribute genes equally to the next generation. The effective population size is usually smaller than the actual size of the population. The effective population size can be predicted by the formula $N_e = 4N_mN_f/(N_m + N_f)$, where N_m is the number of males and N_f is the number of females.

Fst values – The measure of genetic differentiation among populations developed by Sewall Wright. Fst is the proportion of the total genetic variance contained in a subpopulation relative to the total genetic variance. High Fst implies a considerable degree of differentiation among populations.

Gene Flow – The transfer of alleles of genes from one population to another through temporary or permanent migration of individuals or groups of individuals.

Genetic drift – The change in the relative frequency in which a gene allele occurs in a population due to random sampling and chance. The alleles in offspring are a random sample of those in the parents, and chance has a role in determining whether a given individual survives and reproduces. The effect of genetic drift is larger in small populations, and smaller in large populations.

Genetic divergence – The process in which two or more populations of an ancestral species accumulate independent genetic changes (mutations) through time. Ultimately, two separated populations could become two different species.

Genetic diversity – Any measure of the genetic variation at neutral or adaptive gene loci of a population or a species; in other words, how diverse are the populations.

Genetic structure – Refers to the extent to which such populations are genetically differentiated. It is quantified as the distribution of genetic variation within and among populations.

Genetic differentiation – The accumulation of differences in allelic frequencies between completely or partially isolated populations due to evolutionary forces such as selection or genetic drift.

Genetic marker/molecular marker – A gene or DNA sequence with a known location on a chromosome that can be used to identify individuals or species. It can be described as a variation (which may arise due to mutation or alteration in the genomic loci) that can be observed. Many genetic markers (e.g., mitochondrial DNA ormicrosatellites) with different features are used in population genetics and phylogeny according to their variability, selective/neutral characteristics, etc.

Genotype – The genetic constitution of an individual, e.g., the specific allele makeup of the individual.

Geographical information systems – Geographical information systems (GIS) can be used in landscape genetics to visualize spatial genetic patterns (e.g., boundaries) and also to generate hypotheses about the cause of genetic boundaries, because GIS enables landscape variables to be overlaid onto genetic data.

Geographical population – A group of individuals of the same species occupying a particular geographic area.

Heritage modes – Refers to genetic markers which have a specific inheritance system, such as paternal, maternal, and bi-parental inheritance. For example, in human beings, the mitochondrial DNA markers are only inherited by the mother, while the Y-chromosome markers are restricted to the father.

Hybrid – The offspring resulting from cross-breeding of different plants or animals taxa or populations.

Inbreeding – The reproduction from the mating of two genetically related parents, which can increase the chances of offspring being affected by recessive or deleterious traits. This generally leads to a decreased fitness of a population, which is called inbreeding depression.

Isolated subpopulations – A part or subdivision of a previously continuous population due to some barrier (usually geographical barriers).

Locus – The specific location of a gene on a chromosome

Mendelian population – A community of (diploid) sexually interbreeding organisms in which each individual has equal access to every other.

Mantel's test – An analysis method used to measure the association between genetic distance and an environmental variable, such as forest cover or temperature.

Microsatellite – The repeating sequences of 1-6 base pairs of DNA. The microsatellites are typically neutral and are extensively used as molecular markers in population genetics.

Multi-locus – Many different gene loci or gene locations.

Mutation rate – The chance of a mutation occurring in an organism or gene in each generation.

Nuclear genetic diversity – Refers to the genetic diversity of a gene located in the cell nucleus of a eukaryote. The term is used to distinguish nuclear genetic diversity from the mitochondrial genetic diversity, or in case of plants, also the chloroplast.

Population differentiation – Genetic differentiation among populations, the accumulation of differences in allelic frequencies between populations due to evolutionary forces such as selection or genetic drift.

Population genetic analysis – Usually refers to the analyses of genetic data using statistical tools and principles developed in the population genetic field.

Population subdivision – A large, continuous, original population is divided into many geographically isolated small populations due to barriers to gene flow**.**

Population structure – Usually refers to the genetic structure, that is the extent to which such populations are genetically differentiated. It is quantified as the distribution of genetic variation within and among populations.

Re-colonization – A second or renewed colonization from those surrounding populations after local extinction of a population from the habitat under research.

Selection – Usually refers to natural selection, which is the process by which certain heritable traits—those that make it more likely for an organism to survive and successfully reproduce—become more common in a population over successive generations. It is a key mechanism of evolution.

Selection pressure – Those factors that influence the direction of natural selection.

Sex-biased dispersal – The phenomenon that individuals of one sex stay or return to their natal site (or group) to breed, while individuals of the other sex are prone to disperse.

Spatial genetic pattern – The spatial features of genetic differentiation of the sampling populations over geographical scale.

Stochastic extinction events – Extinctions resulting from catastrophic natural and anthropogenic disasters such as fires, floods, or changes in water chemistry.

Testing correlation between two maps – An analysis method primarily used by Piazza *et al.* (Piazza *et al.*, Genetics and the origin of European languages. *Proc. Natl. Acad. Sci. U. S. A.* **92** (1995), pp. 5836–5840.), who found a significant correlation between gene frequency gradients in humans and archaeological dates of the first Neolithic European farmers, using a modified Pearson's correlation coefficient according to spatial data.

Appendix C
Potential Highway 50 Wildlife Crossings

Appendix C
Potential Highway 50 Wildlife Crossings

List of Figures **Page #**

The following potential crossings were identified from field and aerial photos (Google Earth) and characterized. Characterizations included crossing type, measured dimensions, exact location, and environmental context. The following pages provide this information in the form of a table and pictures for each potential crossing. Not all culverts and street under-crossings were assessed. Street under-crossings that were surrounded by concentrated residential and/or commercial development at either end were not assessed. Small steeply-angled culverts for drainage of slopes were generally not included. This is especially true of Highway 50 infrastructure east of Pollock Pines, where there are frequent small (12-24”) culverts draining slopes above the roads to slopes below.

Figure C-1. Lower Foothills Potential Crossings

Figure C-2. Lower-Mid Foothills Potential Crossings

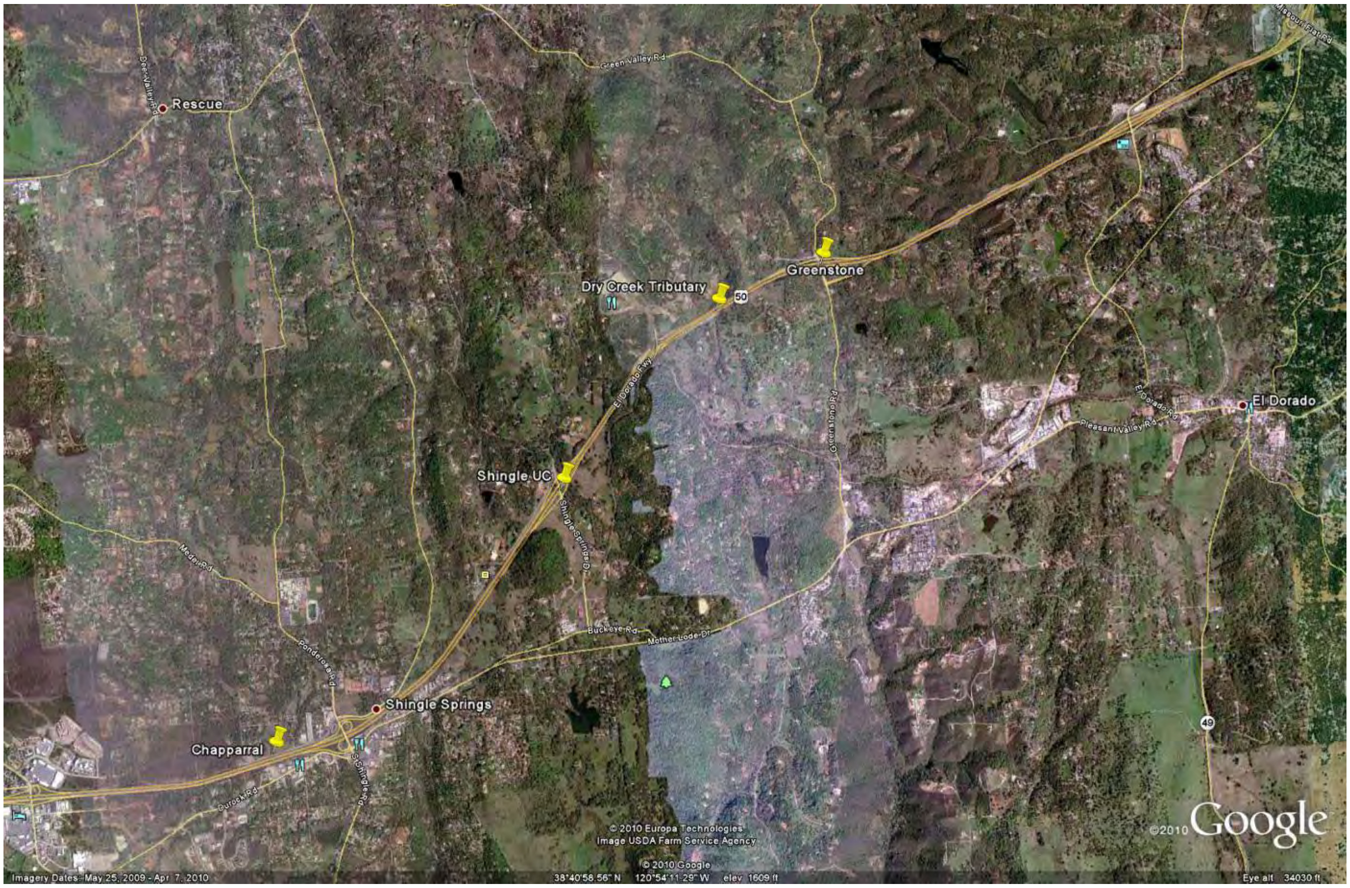


Figure C-3. Mid-Foothills Potential Crossings

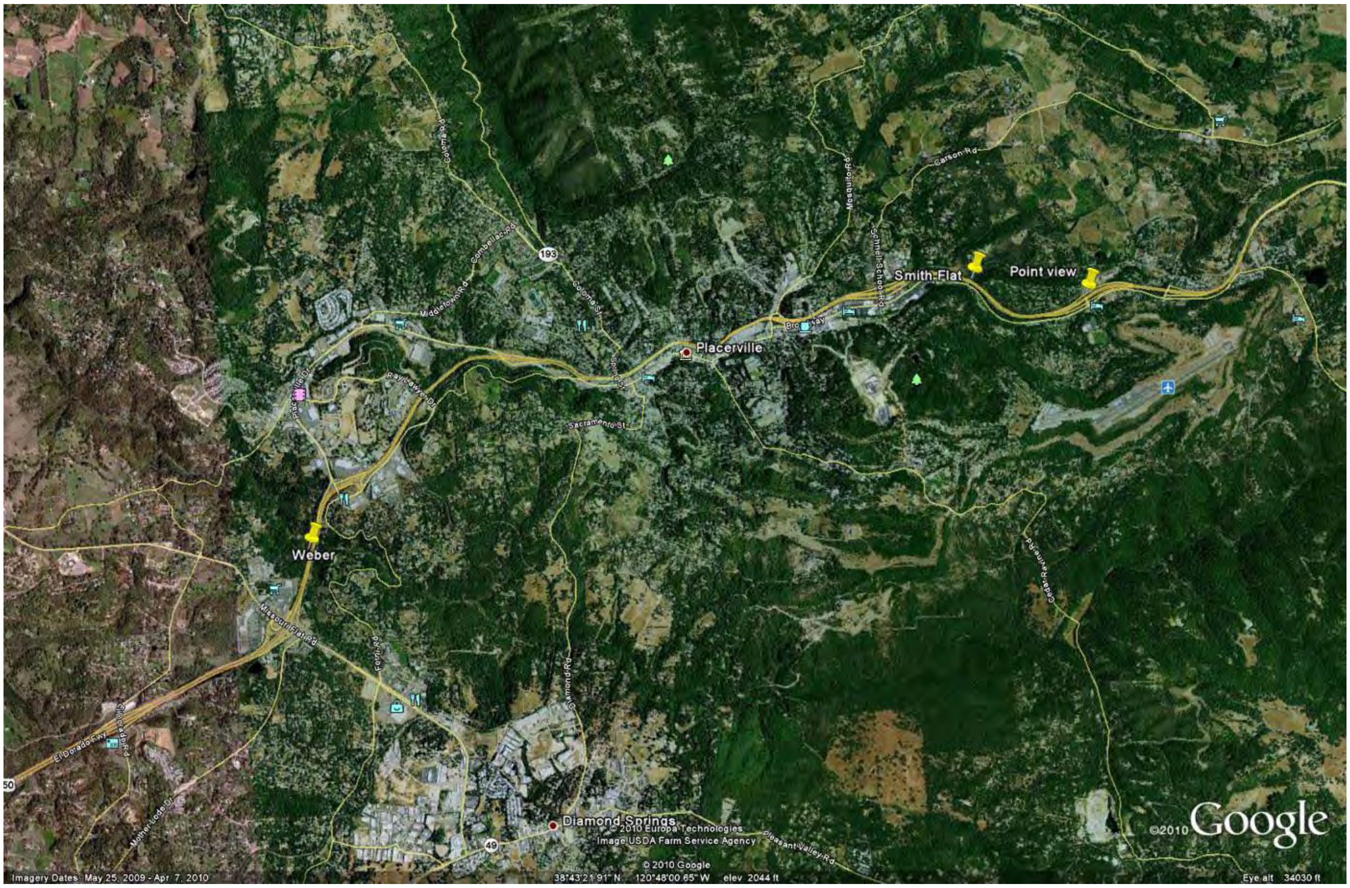


Figure C-4. Upper Foothills Potential Crossings

Figure C-5. Upper Foothills Potential Crossings (cont.)

1.0 Dunwood Corrugated Culvert Pipe

Crossing Type			
	Straight-sided metal pipe		
	Corrugated culvert pipe	X	X
	Concrete box culvert		
	Bridge UC		
	Other		
Crossing Dimensions			
	Height (ft)		
	Width (ft)		
	Diameter (ft)	3	3
	Length (ft)	215	215
	Openness Ratio	0.042	0.042
Crossing Bottom			
	Metal	X	X
	Concrete		
	Dirt		
	Asphalt		
	Vegetation		
	Stream-bed		
Opening Immediate Surroundings			
N side	Natural vegetation	X	X
	Dirt/gravel		
	Concrete		
	Asphalt street		
S side	Natural vegetation	X	X
	Dirt/gravel		
	Concrete		
	Asphalt street		
Location			
	Lat	38°38'58.06"N	38°38'58.06"N
	Long	121° 4'47.75"W	121° 4'47.75"W
Landscape Context			
	Within 50 m, North side	blue oak savanna	
	Within 50 m, South side	riparian zone	
	Within 200 m, North side	blue oak savanna	
	Within 200 m, South side	suburban dev	
	Within 1000 m, North side	suburban dev	
	Within 1000 m, South side	suburban dev	

Dunwood Corrugated Culvert Pipe

North Side: Large blue oak savanna grassland (highly degraded) with small stream drainage devoid of trees or other natural cover and surrounded by suburban development.

Westward landscape view toward culvert

Westward closer view toward culvert

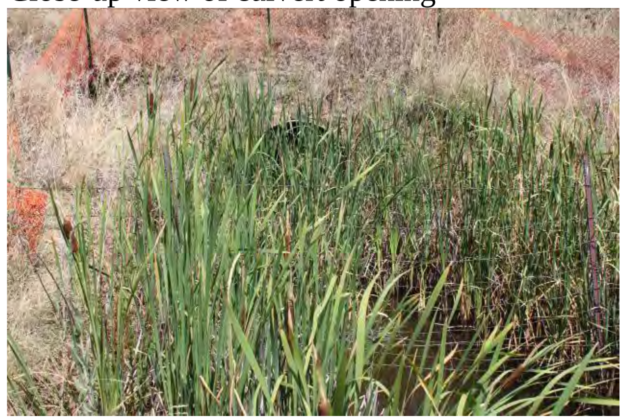
Westward medium view toward culvert

Dunwood Corrugated Culvert Pipe

South Side: Narrow strip of natural vegetation (~85 meters wide) parallels hwy, and culvert empties into a riparian drainage with plenty of natural cover (Salix spp., blue oak, etc.), which then passes South through a second corrugated culvert (3-foot diameter) under suburban roadway. Both culverts are hanging culverts and have water running through bottoms presently. One under highway has barbed wire fence hanging 4 feet in front of it and across streambed. Both culverts are surrounded by rocky talus edges. Stream which culverts drain into exhibits varied amphibian life.

Westward medium view toward culvert

Close-up view of culvert opening



2.0 Finders Concrete Box Culvert

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	X
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	6
	Width (ft)	7
	Diameter (ft)	
	Length (ft)	380
	Openness Ratio	0.111
Crossing Bottom		
	Metal	
	Concrete	X
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°39'6.43"N
	Long	121° 4'33.88"W
Landscape Context		
	Within 50 m, North side	riparian zone/blue oak savanna
	Within 50 m, South side	riparian zone/commercial dev
	Within 200 m, North side	suburban dev
	Within 200 m, South side	riparian zone/commercial dev
	Within 1000 m, North side	suburban dev
	Within 1000 m, South side	riparian zone/commercial dev

Finders Concrete Box Culvert

South Side: Natural riparian zone with mature willows drains through large flood plain, travelling through several road culverts after draining from under the hwy. This large riparian zone (225 meters wide x 860 meters long) is surrounded to the West by suburban development and to the East with a large parking lot and commercial development. Property appears to be currently being prepped for development.

Landscape view of riparian near opening

Medium view of opening

Finders Concrete Box Culvert

North side: Relatively intact riparian zone with mature willow and oaks meanders into suburban development.

Close-up view of opening

3.0 Nugget Concrete Box Culvert

Crossing Type			
	Straight-sided metal pipe		
	Corrugated culvert pipe	x(ellipse)	
	Concrete box culvert	2X*	
	Bridge UC		
	Other		
Crossing Dimensions			
	Height (ft)	6	4.5
	Width (ft)	4	6
	Diameter (ft)		
	Length (ft)	216	216
	Openness Ratio	0.111	0.125
Crossing Bottom			
	Metal		X
	Concrete	X	
	Dirt		
	Asphalt		
	Vegetation		
	Stream-bed		
Opening Immediate Surroundings			
N side	Natural vegetation	X	X
	Dirt/gravel		
	Concrete		
	Asphalt street		
S side	Natural vegetation	X	X
	Dirt/gravel		
	Concrete		
	Asphalt street		
Location			
	Lat	38°39'13.80"N	38°39'13.80"N
	Long	121° 4'0.95"W	121° 4'0.95"W
Landscape Context			
	Within 50 m, North side	Riparian zone	
	Within 50 m, South side	Riparian Zone/commercial dev	
	Within 200 m, North side	suburban dev/commercial dev	
	Within 200 m, South side	Riparian Zone/commercial dev	
	Within 1000 m, North side	suburban dev	
	Within 1000 m, South side	suburban dev	
*Two or more culverts side by side			

Nugget Concrete Box Culvert

North Side: Highway culvert (2 side-by-side concrete box culverts) connects to narrow (20 meters wide) riparian corridor, heavily invaded by Himalayan blackberry with lots of cover by Salix spp. This narrow corridor is bordered on East by golf course and West by suburban hard-scaping (shopping center parking lot).

Landscape view of opening

Close-up view of opening

Nugget Concrete Box Culvert

South Side: Culvert drains into strip of riparian vegetation (44 meters wide/129 meters long) which extends South into another culvert (parking lot road), which drains into another riparian strip (54 meters/184 meters). Both strips surrounded by parking lot (shopping center). Drainage of first culvert heavily invaded by Himalayan blackberry preventing access to culvert. Both drainages have ample cover from Salix spp. Both culverts submerged (6 inches) with stream.

Westward close-up view highway culvert

Westward close-up view second culvert

Eastward medium view highway culvert

Landscape view second culvert

4.0 Joerger Concrete Box Culvert

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	2x*
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	5
	Width (ft)	2
	Diameter (ft)	
	Length (ft)	208
	Openness Ratio	0.048
Crossing Bottom		
	Metal	
	Concrete	X
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°39'23.86"N
	Long	121° 3'29.82"W
Landscape Context		
	Within 50 m, North side	riparian zone
	Within 50 m, South side	riparian zone
	Within 200 m, North side	blue oak savanna
	Within 200 m, South side	blue oak savanna (power sta to SW)
	Within 1000 m, North side	riparian zone/suburban dev
	Within 1000 m, South side	blue oak woodland/suburban dev
*Two or more culverts side by side		

Joerger Concrete Box Culvert

North Side: Natural riparian corridor with myriad native plant species surrounded by blue oak woodland and savanna to North and West, though suburban development begins to North at 218 meters and high speed road parallels corridor from 12 to 150 meters to East.

Medium view of vicinity of culvert opening

Close-up view of culvert opening (behind tree)

Joerger Concrete Box Culvert

South Side: 2 side-by-side box culverts, completely submerged open into natural riparian corridor with plenty of native herb species, willow species, evidence of beavers (dams, pools). Myriad amphibian/bird diversity. Power station and barbed wire fence (77 meters to Southwest). High speed road 122 meters to East.

Medium view of riparian context of opening

Close-up view of opening

5.0 Silva Valley Parkway Bridge Under-Crossing

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	15
	Width (ft)	45
	Diameter (ft)	
	Length (ft)	135
	Openness Ratio	5.000
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	X
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
S side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	x
Location		
	Lat	38°39'26.03"N
	Long	121° 3'25.02"W
Landscape Context		
	Within 50 m, North side	blue oak woodland/suburban dev
	Within 50 m, South side	blue oak woodland/suburban dev
	Within 200 m, North side	blue oak woodland/suburban dev
	Within 200 m, South side	blue oak woodland/suburban dev
	Within 1000 m, North side	blue oak woodland/suburban dev
	Within 1000 m, South side	blue oak woodland/suburban dev

<u>Silva Valley Parkway Bridge Under-Crossing</u>
North/South Side: High velocity two-lane rural roads runs through this under-crossing with 45 degree naturally vegetated sides (grass/weeds).

View through under-pass

6.0 Tong Road Concrete Box Culvert

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	3X*
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	8
	Width (ft)	7.5
	Diameter (ft)	
	Length (ft)	336
	Openness Ratio	0.179
Crossing Bottom		
	Metal	
	Concrete	X
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°39'31.49"N
	Long	121° 3'10.83"W
Landscape Context		
	Within 50 m, North side	riparian zone/blue oak woodland
	Within 50 m, South side	riparian zone/blue oak woodland
	Within 200 m, North side	blue oak woodland
	Within 200 m, South side	blue oak woodland
	Within 1000 m, North side	blue oak woodland/suburban dev
	Within 1000 m, South side	blue oak woodland/suburban dev
*Two or more culverts side by side		

<u>Tong Road Concrete Box Culvert</u>
South Side: Private road, so only brief access. More relatively intact riparian vegetation and blue oak woodland (no pictures).

<u>Tong Road Concrete Box Culvert</u>
North Side: Healthy blue oak woodland and riparian corridor with mature oak, willow trees and native perennial vegetation. 3 side-by-side box culverts each submerged (6 inches), with no ledge for dry passage. No light or view to other side of box culvert, however, due to curve in shape.

View of riparian near opening

Close-up view of opening

7.0 Bass Lake Road Under-Crossing

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	15.33
	Width (ft)	38
	Diameter (ft)	
	Length (ft)	120
	Openness Ratio	4.855
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	X
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
S side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	x
Location		
	Lat	38°39'19.20"N
	Long	121° 1'47.38"W
Landscape Context		
	Within 50 m, North side	hwy on/off-ramps
	Within 50 m, South side	hwy on/off-ramps
	Within 200 m, North side	Rd/blue oak savanna
	Within 200 m, South side	Rd/blue oak savanna
	Within 1000 m, North side	rural development/blue oak savanna
	Within 1000 m, South side	rural development/blue oak Woodland

Bass Lake Road Under-Crossing

Moderate velocity two-lane road, any wildlife would have to cross two lanes of traffic in order to use underpass, though there appears to be fairly contiguous grassland/blue oak savanna to North though fragmented, and blue oak woodland to South. Both sides of under-crossing show scattered rural and exurban development with barbed wire fencing and private roads.

8.0 Faith Lane Corrugated Culvert Pipe

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	X
	Concrete box culvert	
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	
	Width (ft)	
	Diameter (ft)	4.4
	Length (ft)	185
	Openness Ratio	0.105
Crossing Bottom		
	Metal	X
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°39'19.95"N
	Long	121° 0'49.56"W
Landscape Context		
	Within 50 m, North side	riparian zone/blue oak savanna
	Within 50 m, South side	riparian zone/blue oak savanna
	Within 200 m, North side	blue oak savanna/suburban dev
	Within 200 m, South side	blu oak woodland/suburban dev
	Within 1000 m, North side	blue oak savanna/suburban dev
	Within 1000 m, South side	blue oak woodland

<u>Faith Lane Corrugated Culvert Pipe</u>
North Side: Narrow riparian corridor alongside highway. Access to culvert restricted by extraordinarily thick willow grove in front of culvert.

Medium view of riparian near opening

Close-up view from above of opening

<u>Faith Lane Corrugated Culvert Pipe</u>
South Side: culverts empty into woody riparian corridor with mature oaks alongside of suburban neighborhood. Access to South side of culverts restricted by sturdy barbed wire fence and Himalayan blackberry running parallel to drainage.

Close-up view of openings

9.0 Cambridge Road Concrete Box Culvert (1)

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	X
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	7
	Width (ft)	10
	Diameter (ft)	
	Length (ft)	265
	Openness Ratio	0.264
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	X
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°39'26.92"N
	Long	120°59'45.08"W
Landscape Context		
	Within 50 m, North side	riparian zone/blue oak woodland
	Within 50 m, South side	narrow riparian zone/commercial dev
	Within 200 m, North side	riparian zone/blue oak woodland
	Within 200 m, South side	blue oak woodland/rural dev
	Within 1000 m, North side	suburban dev
	Within 1000 m, South side	blue oak woodland/rural dev

Cambridge Road Concrete Box Culvert (1)
South Side: narrow riparian zone surrounded by commercial development, and then further South blue oak woodland patches in rural development matrix.

Cambridge Road Concrete Box Culvert (1)
North Side: Healthy riparian zone with mature oaks and willow spp, huge beaver dam and pool surrounded by heavily invaded grassland (Centaurea sp., etc.). Property currently for sale and surrounded by suburban development.

Medium view near openings

Close-up view of opening

10.0 Cambridge Road Concrete Box Culvert (2)

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	X (ARCH)
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	14
	Width (ft)	14.66
	Diameter (ft)	
	Length (ft)	210
	Openness Ratio	0.977
Crossing Bottom		
	Metal	
	Concrete	X
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°39'27.92"N
	Long	120°59'29.38"W
Landscape Context		
	Within 50 m, North side	riparian zone/blue oak woodland
	Within 50 m, South side	riparian zone/blue oak woodland
	Within 200 m, North side	blue oak woodland
	Within 200 m, South side	rural dev/blue oak woodland
	Within 1000 m, North side	suburban matrix/riparian zone
	Within 1000 m, South side	rural dev/riparian zone

Cambridge Road Concrete Box Culvert (2)
South Side: empties into a narrow riparian zone rimmed by private rural properties (fencing, no pictures).

Cambridge Road Concrete Box Culvert (2)
North Side: Healthy riparian zone with mature valley oaks, blue oaks, willow, California grape. Stream shows ample amphibian life and small (5 inch) fish, edges of stream have in parts heavy invasion by Himalayan blackberry, but also exhibit native perennials. Culvert is large arch concrete culvert with good visibility and light from end to end. Though the stream runs down the length of the culvert there are ledges on either side of the culvert to allow dry passage. North side property currently for sale.

Riparian near culvert opening

Close-up view of culvert opening

11.0 Chaparral Corrugated Culvert Pipe and Concrete Box Culvert

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	X (diam)
	Concrete box culvert	X (h & w)
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	4
	Width (ft)	6
	Diameter (ft)	4.5
	Length (ft)	330
	Openness Ratio	0.073
Crossing Bottom		
	Metal	x(pipe)
	Concrete	x(box)
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	x
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	x
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	
	Long	
Landscape Context		
	Within 50 m, North side	
	Within 50 m, South side	
	Within 200 m, North side	
	Within 200 m, South side	
	Within 1000 m, North side	
	Within 1000 m, South side	

Chaparral Corrugated Culvert Pipe and Concrete Box Culvert

North Side: A concrete box culvert next to a pipe culvert drain a natural riparian corridor with mature oaks and willows. Riparian zone is invaded by Himalayan blackberry and surrounded by patches of degraded blue oak savanna and less degraded blue oak woodland which are fragmented by a suburban matrix.

Close-up view of opening

Chaparral Corrugated Culvert Pipe and Concrete Box Culvert

South Side: very narrow riparian corridor surrounded by commercial development (no pictures).

12.0 Shingle Springs Road Bridge Under-Crossing

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	25
	Width (ft)	78
	Diameter (ft)	
	Length (ft)	184
	Openness Ratio	10.598
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	X
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
S side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
Location		
	Lat	38°40'48.44"N
	Long	120°54'53.47"W
Landscape Context		
	Within 50 m, North side	Hwy off/on ramp
	Within 50 m, South side	Hwy off/on ramp
	Within 200 m, North side	Roads/blue oak woodland
	Within 200 m, South side	Roads/blue oak woodland
	Within 1000 m, North side	blue oak woodland/rural dev
	Within 1000 m, South side	blue oak woodland/rural dev

Shingle Springs Road Bridge Under-Crossing

Shingle Springs Drive is a high velocity thoroughfare that cuts through patches of blue oak woodland and savanna in a rural development matrix. Wildlife would have to cross on/off ramps and frontage roads before even gaining access to the under-crossing.

North Side

South Side

13.0 Dry Creek Tributary at Red Hawk Pipe Culvert

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	X
	Concrete box culvert	
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	11
	Width (ft)	11
	Diameter (ft)	11
	Length (ft)	302
	Openness Ratio	0.401
Crossing Bottom		
	Metal	X
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°41'34.71"N
	Long	120°53'53.96"W
Landscape Context		
	Within 50 m, North side	riparian zone/blue oak savanna
	Within 50 m, South side	riparian zone/blue oak savanna
	Within 200 m, North side	blue oak woodland/rural dev
	Within 200 m, South side	blue oak woodland
	Within 1000 m, North side	blue oak woodland/rural dev
	Within 1000 m, South side	blue oak woodland/rural dev

<u>Dry Creek Tributary at Red Hawk Pipe Culvert</u>
North side: This very large corrugated metal pipe empties into an artificial pond surrounded by riparian vegetation and dense Himalayan blackberry bushes. Houses are within view of the opening.

Inside culvert looking North

<u>Dry Creek Tributary at Red Hawk Pipe Culvert</u>
South side: This end of the pipe is surrounded by an open grass/savannah landscape. The very small stream was running in September.

Looking North toward culvert

Inside culvert looking South

14.0 Greenstone Road Bridge Under-Crossing

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	15.5
	Width (ft)	38
	Diameter (ft)	
	Length (ft)	140
	Openness Ratio	4.207
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	X
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
S side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
Location		
	Lat	38°41'45.22"N
	Long	120°53'15.85"W
Landscape Context		
	Within 50 m, North side	Hwy off/on ramp
	Within 50 m, South side	Hwy off/on ramp
	Within 200 m, North side	blue oak woodland/rural dev
	Within 200 m, South side	blue oak woodland/rural dev
	Within 1000 m, North side	blue oak woodland/rural dev
	Within 1000 m, South side	blue oak woodland/rural dev

Greenstone Road Bridge Under-Crossing

Though Greenstone Road itself is a high velocity road there is a riparian corridor paralleling the road approximately 24 meters to the West of the road, which might serve as a potential corridor for wildlife.

North Side

South Side

15.0 Weber Creek Bridge Under-Crossing

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	x
	Other	
Crossing Dimensions		
	Height (ft)	
	Width (ft)	
	Diameter (ft)	
	Length (ft)	
	Openness Ratio	
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	X
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°43'0.66"N
	Long	120°50'12.86"W
Landscape Context		
	Within 50 m, North side	blue oak woodland
	Within 50 m, South side	blue oak woodland
	Within 200 m, North side	blue oak woodland/rural dev
	Within 200 m, South side	blue oak woodland/rural dev
	Within 1000 m, North side	blue oak woodland/rural dev/suburb dev
	Within 1000 m, South side	blue oak woodland/rural dev

Weber Creek Bridge Under-Crossing
Limited access, detailed analysis and photographs not possible.

Aerial view (Google Earth)

16.0 Smith Flat Road Bridge Under-Crossing

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	82
	Width (ft)	100
	Diameter (ft)	
	Length (ft)	106
	Openness Ratio	77.358
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	X
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
S side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
Location		
	Lat	38°44'0.45"N
	Long	120°46'14.36"W
Landscape Context		
	Within 50 m, North side	lower montane forest/chapparal/rural dev
	Within 50 m, South side	lower montane forest/chapparal/rural dev
	Within 200 m, North side	lower montane forest/chapparal/rural dev
	Within 200 m, South side	lower montane forest/chapparal/rural dev
	Within 1000 m, North side	lower montane forest/chapparal/rural dev
	Within 1000 m, South side	lower montane forest/chapparal/rural dev

Smith Flat Road Bridge Under-Crossing

A particularly tall and wide highway under-crossing, Smith Flat occurs at the intersection of blue oak and foothill pine dominated woodland, chaparral, and lower montane ponderosa pine forest. There appear to be large patches of habitat on either side of the crossing, but they are interspersed within a matrix of rural development limiting wildlife movement.

17.0 Point View Drive Bridge Under-Crossing

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	20
	Width (ft)	68
	Diameter (ft)	
	Length (ft)	92
	Openness Ratio	14.783
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	X
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
S side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
Location		
	Lat	38°43'53.52"N
	Long	120°45'36.10"W
Landscape Context		
	Within 50 m, North side	lower montane forest/rural dev
	Within 50 m, South side	lower montane forest/rural dev
	Within 200 m, North side	lower montane forest/rural dev
	Within 200 m, South side	lower montane forest/rural dev
	Within 1000 m, North side	lower montane forest/rural dev
	Within 1000 m, South side	lower montane forest/rural dev

Point View Drive Bridge Under-Crossing

This highway under-crossing has flat banks on either side of the roadway, but there are on and off ramps on either side of the underpass, as well as various roadways and parking lots which would seem to limit wildlife movement.

18.0 Carson Road Bridge Under-Crossing

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	15.33
	Width (ft)	45
	Diameter (ft)	
	Length (ft)	85
	Openness Ratio	8.116
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	X
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
S side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
Location		
	Lat	38°44'16.88"N
	Long	120°39'55.96"W
Landscape Context		
	Within 50 m, North side	Lower montane forest/agriculture-orchards/rural dev
	Within 50 m, South side	Lower montane forest/agriculture-orchards/rural dev
	Within 200 m, North side	Lower montane forest/agriculture-orchards/rural dev
	Within 200 m, South side	lower montane forest/ rural dev
	Within 1000 m, North side	Lower montane forest/agriculture-orchards/rural dev
	Within 1000 m, South side	lower montane forest/ rural dev

Carson Road Bridge Under-Crossing

A high velocity under-crossing with narrow banks on either side of the roadway under the underpass at 40 degree inclines. The surrounding area is a matrix of lower montane woodland, agriculture (primarily orchards), and rural development. There is more rural development to the North side of the highway than the South, which shows continuity with a larger forest patch.

North Side:

South Side:

19.0 Snows Road Bridge Under-Crossing

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	15
	Width (ft)	45
	Diameter (ft)	
	Length (ft)	85
	Openness Ratio	7.941
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	X
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
S side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
Location		
	Lat	38°44'4.07"N
	Long	120°40'33.16"W
Landscape Context		
	Within 50 m, North side	lower montane forest/agriculture-orchards
	Within 50 m, South side	lower montane forest/agriculture-orchards
	Within 200 m, North side	lower montane forest/agriculture-orchards
	Within 200 m, South side	lower montane forest/agriculture-orchards/rural dev
	Within 1000 m, North side	lower montane forest/agriculture-orchards/rural dev
	Within 1000 m, South side	lower montane forest/agriculture-orchards/rural dev

Snows Road Bridge Under-Crossing

Snows Under-Crossing has flat banks on either side of the roadway and on the North side there is a fence between the roadway and the natural vegetation bank. The under-crossing is located where rural development and agriculture (orchards) fragment lower montane forest.

20.0 Ridgeway Road Bridge Under-Crossing

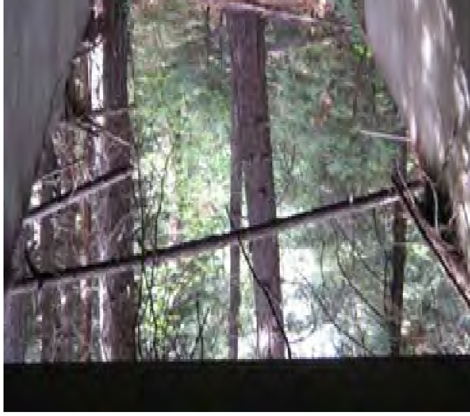
Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	25
	Width (ft)	41
	Diameter (ft)	
	Length (ft)	90
	Openness Ratio	11.389
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	X
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
S side	Natural vegetation	
	Dirt/gravel	
	Concrete	
	Asphalt street	X
Location		
	Lat	38°44'52.72"N
	Long	120°37'1.77"W
Landscape Context		
	Within 50 m, North side	rural dev/lower montane forest
	Within 50 m, South side	lower montane forest
	Within 200 m, North side	rural dev/lower montane forest
	Within 200 m, South side	lower montane forest
	Within 1000 m, North side	rural dev/lower montane forest
	Within 1000 m, South side	lower montane forest

<u>Ridgeway Road Bridge Under-Crossing</u>

Ridgeway Under-Crossing has steep banks (45 degrees) and hosts a high velocity roadway. There are on and off ramps and roads on either side of the under-crossing which could pose risks for crossing wildlife. To the South of the under-crossing is a large patch of lower montane forest, but to the North is a matrix of rural development within forest.

21.0 Pacific House Concrete Box Culvert

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	X
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	9
	Width (ft)	8
	Diameter (ft)	
	Length (ft)	115
	Openness Ratio	0.626
Crossing Bottom		
	Metal	
	Concrete	X
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°45'35.18"N
	Long	120°30'58.45"W
Landscape Context		
	Within 50 m, North side	lower montane forest
	Within 50 m, South side	lower montane forest
	Within 200 m, North side	rural dev/lower montane forest
	Within 200 m, South side	rural dev/lower montane forest
	Within 1000 m, North side	lower montane forest
	Within 1000 m, South side	lower montane forest



-filled bottom and no water. North side is open access and adjacent t. Residences within 200 m of opening. South side is open, with ıd blackberry growth nearby. Single residence within 200 m.

South end opening

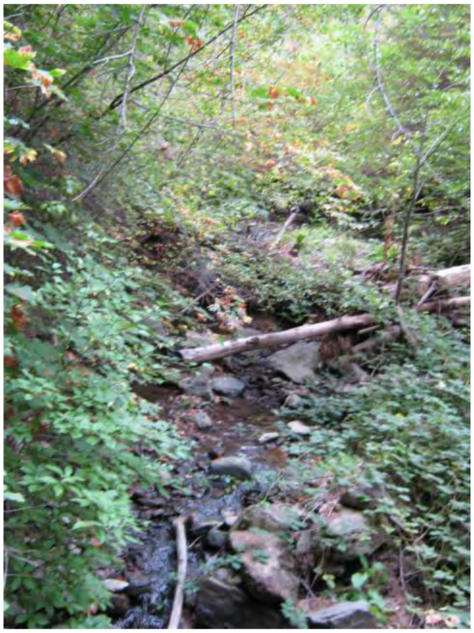
22.0 Ogilby Canyon Concrete Box Culvert

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	X
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	10
	Width (ft)	8
	Diameter (ft)	
	Length (ft)	170
	Openness Ratio	0.471
Crossing Bottom		
	Metal	
	Concrete	X
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°45'55.22"N
	Long	120°30'51.39"W
Landscape Context		
	Within 50 m, North side	lower montane forest
	Within 50 m, South side	lower montane forest
	Within 200 m, North side	lower montane forest
	Within 200 m, South side	lower montane forest
	Within 1000 m, North side	lower montane forest
	Within 1000 m, South side	lower montane forest

Ogilby Canyon Concrete Box Culvert

North side of the opening is surrounded by natural conifer forest, near American River riparian. South end of tunnel, vegetation is relatively dense riparian cover with perennial stream running in September. Tunnel bottom is concrete, slippery with algae and unlikely to be traversed by deer.

View to South from tunnel entrance



Looking into Southern entrance (Northern end visible as point of light)

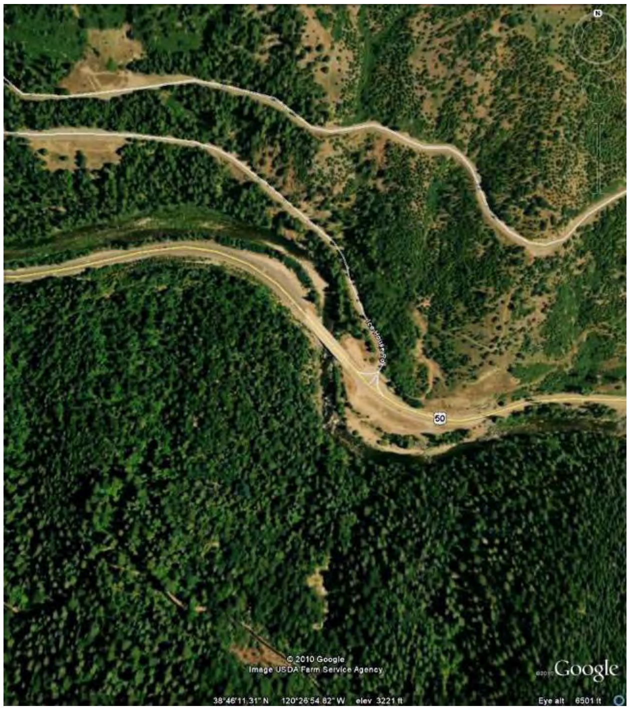
23.0 Riverton Bridge (South Fork American River)

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	31
	Width (ft)	185
	Diameter (ft)	
	Length (ft)	73
	Openness Ratio	78.562
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	X
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°46'12.31"N
	Long	120°23'53.98"W
Landscape Context		
	Within 50 m, North side	lower montane forest
	Within 50 m, South side	lower montane forest
	Within 200 m, North side	lower montane forest
	Within 200 m, South side	lower montane forest
	Within 1000 m, North side	lower montane forest
	Within 1000 m, South side	lower montane forest

<u>Riverton Bridge (South Fork American River)</u>

River and narrow riparian corridor pass under highway bridge. There are opportunities to move under the bridge, though this is probably limited in high flows and for wildlife species that are averse to relatively open riparian zones and rocky side-slopes.

Aerial View



Looking N under bridge

24.0 South Fork American River Bridge Under-Crossing East #1

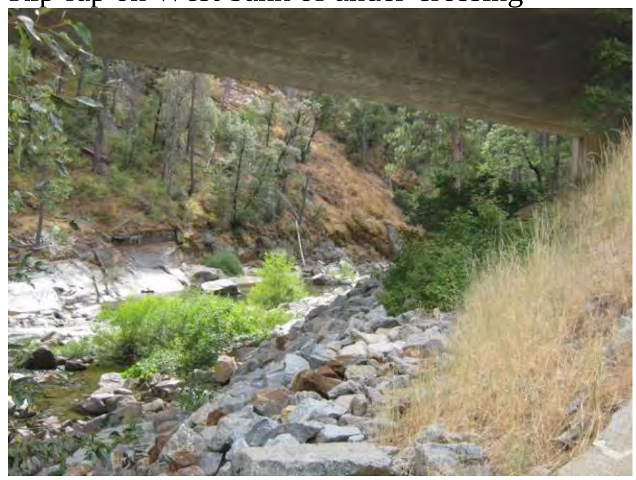
Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	30
	Width (ft)	250
	Diameter (ft)	
	Length (ft)	58
	Openness Ratio	129.310
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	X
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°46'00.83"N
	Long	120°22'16.78"W
Landscape Context		
	Within 50 m, North side	lower montane forest
	Within 50 m, South side	lower montane forest
	Within 200 m, North side	lower montane forest
	Within 200 m, South side	lower montane forest
	Within 1000 m, North side	lower montane forest
	Within 1000 m, South side	lower montane forest

South Fork American River Bridge Under-Crossing East #1

Large riparian under-crossing with access from both sides of bridge. Rip-rapping on both banks limits easy footing, though there are benches at summer and winter river levels where movement would be possible.

View under bridge from North

Rip-rap on West bank of under-crossing



25.0 South Fork American River Bridge Under Crossing East #2

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	
	Concrete box culvert	
	Bridge UC	X
	Other	
Crossing Dimensions		
	Height (ft)	30
	Width (ft)	430
	Diameter (ft)	
	Length (ft)	58
	Openness Ratio	222.414
Crossing Bottom		
	Metal	
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	X
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°46'02.76"N
	Long	120°22'26.44"W
Landscape Context		
	Within 50 m, North side	lower montane forest
	Within 50 m, South side	lower montane forest
	Within 200 m, North side	lower montane forest
	Within 200 m, South side	lower montane forest
	Within 1000 m, North side	lower montane forest
	Within 1000 m, South side	lower montane forest

South Fork American River Bridge Under Crossing East #2

Large riparian under-crossing with access from both sides of bridge. Rip-rapping on both sides limits easy footing, though there are benches at summer and winter river levels where movement would be possible on the East side and possibly on the West side.

View under bridge looking West

View North under bridge and adjacent vegetation

26.0 White Hall 1 Corrugated Culvert Pipe

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	3X*
	Concrete box culvert	
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	
	Width (ft)	
	Diameter (ft)	4
	Length (ft)	65
	Openness Ratio	0.246
Crossing Bottom		
	Metal	X
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°46'29.93"N
	Long	120°25'0.19"W
Landscape Context		
	Within 50 m, North side	lower montane forest
	Within 50 m, South side	lower montane forest
	Within 200 m, North side	lower montane forest
	Within 200 m, South side	lower montane forest
	Within 1000 m, North side	lower montane forest
	Within 1000 m, South side	lower montane forest
*Two or more culverts side by side		

White Hall 1 Corrugated Culvert Pipe

North Side: drainage appears to have good vegetative cover and provide a potential riparian corridor, though there is some invasion by Himalayan Blackberry.

Landscape view from North side

Close-up view North side

South side of the culvert pipes slope down steeply from roadway to river, which would limit wildlife access dramatically.

27.0 White Hall 2 Corrugated Culvert Pipe

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	2X*
	Concrete box culvert	
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	
	Width (ft)	
	Diameter (ft)	3
	Length (ft)	90
	Openness Ratio	0.100
Crossing Bottom		
	Metal	X
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°46'25.97"N
	Long	120°23'34.62"W
Landscape Context		
	Within 50 m, North side	lower montane forest
	Within 50 m, South side	lower montane forest
	Within 200 m, North side	lower montane forest
	Within 200 m, South side	lower montane forest
	Within 1000 m, North side	lower montane forest
	Within 1000 m, South side	lower montane forest
*Two or more culverts side by side		

White Hall 2 Corrugated Culvert Pipe

The two side-by-side culverts appear to drain a rather steep drainage without much vegetative cover larger than the sporadic shrub. Additionally, both culverts are hanging culverts on the south side, perching in the air above the American River, into which they drain. This would definitely limit successful wildlife use of the culverts.

Landscape view of opening (behind green sign)

South side of culvert

North side of culvert

28.0 White Hall 3 Corrugated Culvert Pipe

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	2X*
	Concrete box culvert	
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	
	Width (ft)	
	Diameter (ft)	3
	Length (ft)	57
	Openness Ratio	0.158
Crossing Bottom		
	Metal	X
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°46'26.45"N
	Long	120°25'36.64"W
Landscape Context		
	Within 50 m, North side	lower montane forest
	Within 50 m, South side	lower montane forest
	Within 200 m, North side	lower montane forest
	Within 200 m, South side	lower montane forest
	Within 1000 m, North side	lower montane forest
	Within 1000 m, South side	lower montane forest
*Two or more culverts side by side		

<u>White Hall 3 Corrugated Culvert Pipe</u>

North Side: a rather narrow, but still covered with mature riparian vegetation, stream drainage. As the culverts are rather small, they would maybe be only appropriate for small mammals and herps/amphibians. Some sort of short netting or fencing may be necessary to prevent wildlife from attempting to cross the road in that case.

Medium view of opening from North side

Close-up view of opening

29.0 Kyburz West Corrugated Culvert Pipe

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	X
	Concrete box culvert	
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	
	Width (ft)	
	Diameter (ft)	2
	Length (ft)	53
	Openness Ratio	0.075
Crossing Bottom		
	Metal	X
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°46'0.68"N
	Long	120°21'19.73"W
Landscape Context		
	Within 50 m, North side	lower montane forest
	Within 50 m, South side	lower montane forest
	Within 200 m, North side	lower montane forest
	Within 200 m, South side	lower montane forest
	Within 1000 m, North side	lower montane forest
	Within 1000 m, South side	lower montane forest

Kyburz West Corrugated Culvert Pipe

Drainage with ample mature riparian vegetation and cover, culvert is quite small and would probably only facilitate small wildlife movement.

Close-up view of opening on North side

Medium view of landscape on North side

30.0 Kyburz East Corrugated Culvert Pipe

Crossing Type		
	Straight-sided metal pipe	
	Corrugated culvert pipe	X
	Concrete box culvert	
	Bridge UC	
	Other	
Crossing Dimensions		
	Height (ft)	
	Width (ft)	
	Diameter (ft)	2
	Length (ft)	53
	Openness Ratio	0.075
Crossing Bottom		
	Metal	X
	Concrete	
	Dirt	
	Asphalt	
	Vegetation	
	Stream-bed	
Opening Immediate Surroundings		
N side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
S side	Natural vegetation	X
	Dirt/gravel	
	Concrete	
	Asphalt street	
Location		
	Lat	38°46'0.47"N
	Long	120°21'19.11"W
Landscape Context		
	Within 50 m, North side	lower montane forest
	Within 50 m, South side	lower montane forest
	Within 200 m, North side	lower montane forest
	Within 200 m, South side	lower montane forest
	Within 1000 m, North side	lower montane forest
	Within 1000 m, South side	lower montane forest

Kyburz East Corrugated Culvert Pipe

Drainage with ample mature riparian vegetation and cover, culvert is quite small and would probably only facilitate small wildlife movement.

Close-up view of opening on North side

Appendix D
Crossing Structure Alternatives by Species

CROSSING STRUCTURE TYPE AND SIZE - *ALTERNATIVES BY SPECIES**

CROSSING STRUCTURE	ROUND CULVERT	CONCRETE BOX CULVERT	MULTI-PLATE STEEL ARCH	OPEN-SPAN BRIDGE, BRIDGE EXTENSION	OVERPASS	FENCING
Large Carnivores						
Black Bear	10'+	10'h+ x 20'w+	10'h+ x 20'w+	10'h+ x 20'w+	75'w+	8' page wire
Grizzly Bear		12'h+ x 32'w+	12'h+ x 23'w+	12'h+ x 50'w+	150'w	8' page wire
Mountain Lion	10'+	10'h+ x 20'w+	10'h+ x 20'w+	10'h+ x 20'w+	75'w+	8' page wire
Wolf		12'h+ x 32'w+	12'h+ x 23'w+	12'h+ x 50'w+	150'w	8' page wire
Jaguar (research needed)	10'+	10'h+ x 20'w+	10'h+ x 20'w+	10'h+ x 20'w+	75'w+	8' page wire
Mid-Sized Carnivores						
Bobcat	48"+	48"h+ x 48"w+	*structures for larger animals will be adequate for smaller animals.			4' wire mesh
Coyote	48"+	48"h+ x 48"w+	*structures for larger animals will be adequate for smaller animals.			4' wire mesh
Lynx (research needed)	10'+	10'h+ x 20'w+	10'h+ x 20'w+	10'h+ x 20'w+	75'w+	4' wire mesh
Ocelot (research needed)	10'+	10'h+ x 20'w+	10'h+ x 20'w+	10'h+ x 20'w+	75'w+	4' wire mesh
Wolverine (research needed)	10'+	10'h+ x 20'w+	10'h+ x 20'w+	10'h+ x 20'w+	75'w+	4' wire mesh
Small Carnivores	36"+	36"+	*structures for larger animals will be adequate for smaller animals.			4"x 2" page wire, small mesh
Ungulates						
Deer	10'+	10'h+ x 20'w+	10'h+ x 20'w+	10'h+ x 20'w+	75'w+	8' page wire
Elk	12'+	12'h+ x 32'w+	12'h+ x 23'w+	12'h+ x 20'w+	75'w+	8' page wire

PASSAGE SUITABILITY FOR SPECIES
- =not adequate
- =adequate
- =best

**Information in this table was established from current studies, including recommendations from biologists and engineers with extensive wildlife crossing experience. The table is a general guide to designing and choosing appropriate structures for many target species. Other factors, such as terrain, engineering feasibility, cost, and site-specific conditions are always a consideration. The table is meant only as a broad guideline to assist in the selection of wildlife crossings.*

Safe Passages program in 2007 (http://www.carnivoresafepassage.org/)

Appendix E
Vertebrate Species Affected by Transportation and Land-Use Fragmentation

Data generated using the California Wildlife Habitat Relationships System (CWHR) Supported by the California Interagency Wildlife Task Group and Maintained by the California Department of Fish and Game Database Version 8.2 (2008)
Date generated: 8/16/2010
* Habitats are grouped roughly by elevation. Some species may appear in more than one group.
CWHR Suitability Index was chosen as "High" for Reproduction, Cover and Feeding to exclude marginal species

	CWHR Habitat Type Designation*:	
Group 1: Annual Grassland, Barren Land, Chamise/Redshank Chaparral, Mixed Chapparal,Lacustrine,Valley Oak Woodland, Wet Meadow	Group 2: Blue Oak/Foothill Pine, Blue Oak Woodland, Montane Chaparral, Montane Hardwood, Montane Riparian, Ponderosa Pine	Group 3: Closed Cone Pine/Cypress, Douglas Fir, Montane Hardwood Conifer, Sierran Mixed Conifer
CALIFORNIA TIGER SALAMANDER	CALIFORNIA TIGER SALAMANDER	LONG-TOED SALAMANDER
LONG-TOED SALAMANDER	CALIFORNIA NEWT	CALIFORNIA SLENDER SALAMANDER
CALIFORNIA NEWT	COMMON ENSATINA	HELL HOLLOW SLENDER SALAMANDER
CALIFORNIA SLENDER SALAMANDER	CALIFORNIA SLENDER SALAMANDER	CALIFORNIA RED-LEGGED FROG
ARBOREAL SALAMANDER	ARBOREAL SALAMANDER	BLACK-CROWNED NIGHT HERON
WESTERN SPADEFOOT	PACIFIC CHORUS FROG	TURKEY VULTURE
WESTERN TOAD	HELL HOLLOW SLENDER SALAMANDER	OSPREY
YOSEMITE TOAD	SIERRA NEVADA YELLOW-LEGGED FROG	BALD EAGLE
PACIFIC CHORUS FROG	GREAT BLUE HERON	SHARP-SHINNED HAWK
BULLFROG	GREAT EGRET	COOPER'S HAWK
HELL HOLLOW SLENDER SALAMANDER	BLACK-CROWNED NIGHT HERON	NORTHERN GOSHAWK
SIERRA NEVADA YELLOW-LEGGED FROG	WOOD DUCK	RED-TAILED HAWK
PIED-BILLED GREBE	COMMON MERGANSER	GOLDEN EAGLE
EARED GREBE	TURKEY VULTURE	AMERICAN KESTREL
WESTERN GREBE	OSPREY	PEREGRINE FALCON
AMERICAN WHITE PELICAN	WHITE-TAILED KITE	PRAIRIE FALCON
DOUBLE-CRESTED CORMORANT	BALD EAGLE	SOOTY GROUSE
GREAT BLUE HERON	SHARP-SHINNED HAWK	WILD TURKEY
GREAT EGRET	COOPER'S HAWK	MOUNTAIN QUAIL
SNOWY EGRET	NORTHERN GOSHAWK	BAND-TAILED PIGEON
CATTLE EGRET	RED-SHOULDERED HAWK	MOURNING DOVE
GREEN HERON	RED-TAILED HAWK	BARN OWL
BLACK-CROWNED NIGHT HERON	ROUGH-LEGGED HAWK	FLAMMULATED OWL
TUNDRA SWAN	GOLDEN EAGLE	WESTERN SCREECH OWL
GREATER WHITE-FRONTED GOOSE	AMERICAN KESTREL	GREAT HORNED OWL
SNOW GOOSE	MERLIN	NORTHERN PYGMY OWL
CANADA GOOSE	PEREGRINE FALCON	SPOTTED OWL
WOOD DUCK	PRAIRIE FALCON	NORTHERN SAW-WHET OWL
GREEN-WINGED TEAL	WILD TURKEY	COMMON NIGHTHAWK
MALLARD	CALIFORNIA QUAIL	BLACK SWIFT
NORTHERN PINTAIL	MOUNTAIN QUAIL	VAUX'S SWIFT
CINNAMON TEAL	BAND-TAILED PIGEON	WHITE-THROATED SWIFT
NORTHERN SHOVELER	MOURNING DOVE	CALLIOPE HUMMINGBIRD
GADWALL	GREATER ROADRUNNER	RUFOUS HUMMINGBIRD
EURASIAN WIGEON	BARN OWL	LEWIS' S WOODPECKER
AMERICAN WIGEON	FLAMMULATED OWL	ACORN WOODPECKER
CANVASBACK	WESTERN SCREECH OWL	RED-BREASTED SAPSUCKER
REDHEAD	GREAT HORNED OWL	WILLIAMSON'S SAPSUCKER
RING-NECKED DUCK	NORTHERN PYGMY OWL	NUTTALL'S WOODPECKER
LESSER SCAUP	BURROWING OWL	HAIRY WOODPECKER
COMMON GOLDENEYE	SPOTTED OWL	WHITE-HEADED WOODPECKER
BUFFLEHEAD	LONG-EARED OWL	NORTHERN FLICKER
HOODED MERGANSER	NORTHERN SAW-WHET OWL	PILEATED WOODPECKER
COMMON MERGANSER	LESSER NIGHTHAWK	OLIVE-SIDED FLYCATCHER
RUDDY DUCK	COMMON NIGHTHAWK	WESTERN WOOD-PEWEE
TURKEY VULTURE	COMMON POORWILL	HAMMOND'S FLYCATCHER
OSPREY	BLACK SWIFT	DUSKY FLYCATCHER
WHITE-TAILED KITE	WHITE-THROATED SWIFT	PACIFIC-SLOPE FLYCATCHER
BALD EAGLE	BLACK-CHINNED HUMMINGBIRD	ASH-THROATED FLYCATCHER
NORTHERN HARRIER	ANNA'S HUMMINGBIRD	WESTERN KINGBIRD
SHARP-SHINNED HAWK	CALLIOPE HUMMINGBIRD	PURPLE MARTIN

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Group 1: Annual Grassland, Barren Land, Chamise/Redshank Chaparral, Mixed Chapparal,Lacustrine,Valley Oak Woodland, Wet Meadow	Group 2: Blue Oak/Foothill Pine, Blue Oak Woodland, Montane Chaparral, Montane Hardwood, Montane Riparian, Ponderosa Pine	Group 3: Closed Cone Pine/Cypress, Douglas Fir, Montane Hardwood Conifer, Sierran Mixed Conifer
COOPER'S HAWK	RUFOUS HUMMINGBIRD	VIOLET-GREEN SWALLOW
RED-SHOULDERED HAWK	BELTED KINGFISHER	NORTHERN ROUGH-WINGED SWALLOW
RED-TAILED HAWK	LEWIS' S WOODPECKER	BARN SWALLOW
ROUGH-LEGGED HAWK	ACORN WOODPECKER	STELLER'S JAY
GOLDEN EAGLE	RED-BREASTED SAPSUCKER	COMMON RAVEN
AMERICAN KESTREL	WILLIAMSON'S SAPSUCKER	MOUNTAIN CHICKADEE
MERLIN	NUTTALL'S WOODPECKER	CHESTNUT-BACKED CHICKADEE
PEREGRINE FALCON	DOWNY WOODPECKER	OAK TITMOUSE
PRAIRIE FALCON	HAIRY WOODPECKER	RED-BREASTED NUTHATCH
RING-NECKED PHEASANT	WHITE-HEADED WOODPECKER	WHITE-BREASTED NUTHATCH
WILD TURKEY	NORTHERN FLICKER	PYGMY NUTHATCH
CALIFORNIA QUAIL	PILEATED WOODPECKER	BROWN CREEPER
VIRGINIA RAIL	WESTERN WOOD-PEWEE	ROCK WREN
SORA	WILLOW FLYCATCHER	WINTER WREN
COMMON MOORHEN	HAMMOND'S FLYCATCHER	GOLDEN-CROWNED KINGLET
AMERICAN COOT	DUSKY FLYCATCHER	RUBY-CROWNED KINGLET
BLACK-BELLIED PLOVER	PACIFIC-SLOPE FLYCATCHER	WESTERN BLUEBIRD
SNOWY PLOVER	BLACK PHOEBE	TOWNSEND'S SOLITAIRE
SEMIPALMATED PLOVER	SAY'S PHOEBE	HERMIT THRUSH
KILLDEER	ASH-THROATED FLYCATCHER	AMERICAN ROBIN
BLACK-NECKED STILT	WESTERN KINGBIRD	VARIED THRUSH
AMERICAN AVOCET	HORNED LARK	WRENTIT
GREATER YELLOWLEGS	PURPLE MARTIN	CASSIN'S VIREO
LESSER YELLOWLEGS	TREE SWALLOW	HUTTON'S VIREO
WILLET	VIOLET-GREEN SWALLOW	WARBLING VIREO
SPOTTED SANDPIPER	NORTHERN ROUGH-WINGED SWALLOW	ORANGE-CROWNED WARBLER
WHIMBREL	BANK SWALLOW	NASHVILLE WARBLER
LONG-BILLED CURLEW	CLIFF SWALLOW	YELLOW WARBLER
MARBLED GODWIT	BARN SWALLOW	YELLOW-RUMPED WARBLER
RUDDY TURNSTONE	STELLER'S JAY	BLACK-THROATED GRAY WARBLER
WESTERN SANDPIPER	WESTERN SCRUB-JAY	TOWNSEND'S WARBLER
LEAST SANDPIPER	BLACK-BILLED MAGPIE	HERMIT WARBLER
DUNLIN	YELLOW-BILLED MAGPIE	WILSON'S WARBLER
SHORT-BILLED DOWITCHER	AMERICAN CROW	WESTERN TANAGER
LONG-BILLED DOWITCHER	COMMON RAVEN	BLACK-HEADED GROSBEAK
WILSON'S SNIPE	MOUNTAIN CHICKADEE	GREEN-TAILED TOWHEE
WILSON'S PHALAROPE	OAK TITMOUSE	CALIFORNIA TOWHEE
BONAPARTE'S GULL	BUSHTIT	CHIPPING SPARROW
RING-BILLED GULL	RED-BREASTED NUTHATCH	FOX SPARROW
CALIFORNIA GULL	WHITE-BREASTED NUTHATCH	GOLDEN-CROWNED SPARROW
HERRING GULL	PYGMY NUTHATCH	WHITE-CROWNED SPARROW
CASPIAN TERN	BROWN CREEPER	DARK-EYED JUNCO
COMMON TERN	ROCK WREN	WESTERN MEADOWLARK
FORSTER'S TERN	CANYON WREN	BULLOCK'S ORIOLE
ROCK PIGEON	BEWICK'S WREN	PURPLE FINCH
BAND-TAILED PIGEON	HOUSE WREN	CASSIN'S FINCH
MOURNING DOVE	WINTER WREN	RED CROSSBILL
GREATER ROADRUNNER	AMERICAN DIPPER	PINE SISKIN
BARN OWL	GOLDEN-CROWNED KINGLET	EVENING GROSBEAK
WESTERN SCREECH OWL	RUBY-CROWNED KINGLET	PLUMBEOUS VIREO
GREAT HORNED OWL	BLUE-GRAY GNATCATCHER	HARRIS'S SPARROW
NORTHERN PYGMY OWL	WESTERN BLUEBIRD	TROWBRIDGE'S SHREW
BURROWING OWL	MOUNTAIN BLUEBIRD	LONG-EARED MYOTIS
LONG-EARED OWL	TOWNSEND'S SOLITAIRE	LONG-LEGGED MYOTIS
SHORT-EARED OWL	SWAINSON'S THRUSH	SILVER-HAIRED BAT
NORTHERN SAW-WHET OWL	HERMIT THRUSH	BIG BROWN BAT
LESSER NIGHTHAWK	AMERICAN ROBIN	HOARY BAT
COMMON NIGHTHAWK	VARIED THRUSH	BRUSH RABBIT

	CWHR Habitat Type Designation*:	
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COMMON POORWILL	WRENTIT	SNOWSHOE HARE
BLACK SWIFT	NORTHERN MOCKINGBIRD	MOUNTAIN BEAVER
VAUX'S SWIFT	CEDAR WAXWING	YELLOW-PINE CHIPMUNK
WHITE-THROATED SWIFT	PHAINOPEPLA	ALLEN'S CHIPMUNK
BLACK-CHINNED HUMMINGBIRD	LOGGERHEAD SHRIKE	LONG-EARED CHIPMUNK
ANNA'S HUMMINGBIRD	EUROPEAN STARLING	CALIFORNIA GROUND SQUIRREL
CALLIOPE HUMMINGBIRD	CASSIN'S VIREO	GOLDEN-MANTLED GROUND SQUIRREL
RUFOUS HUMMINGBIRD	HUTTON'S VIREO	WESTERN GRAY SQUIRREL
BELTED KINGFISHER	WARBLING VIREO	DOUGLAS' SQUIRREL
LEWIS' S WOODPECKER	ORANGE-CROWNED WARBLER	NORTHERN FLYING SQUIRREL
ACORN WOODPECKER	NASHVILLE WARBLER	BOTTA'S POCKET GOPHER
RED-BREASTED SAPSUCKER	YELLOW WARBLER	DEER MOUSE
WILLIAMSON'S SAPSUCKER	YELLOW-RUMPED WARBLER	BRUSH MOUSE
NUTTALL'S WOODPECKER	BLACK-THROATED GRAY WARBLER	PINYON MOUSE
DOWNY WOODPECKER	TOWNSEND'S WARBLER	DUSKY-FOOTED WOODRAT
HAIRY WOODPECKER	HERMIT WARBLER	BUSHY-TAILED WOODRAT
NORTHERN FLICKER	MACGILLIVRAY'S WARBLER	HEATHER VOLE
WESTERN WOOD-PEWEE	COMMON YELLOWTHROAT	COMMON PORCUPINE
WILLOW FLYCATCHER	WILSON'S WARBLER	COYOTE
HAMMOND'S FLYCATCHER	WESTERN TANAGER	GRAY FOX
PACIFIC-SLOPE FLYCATCHER	BLACK-HEADED GROSBEAK	BLACK BEAR
BLACK PHOEBE	LAZULI BUNTING	RINGTAIL
SAY'S PHOEBE	GREEN-TAILED TOWHEE	RACCOON
ASH-THROATED FLYCATCHER	SPOTTED TOWHEE	AMERICAN MARTEN
WESTERN KINGBIRD	CALIFORNIA TOWHEE	FISHER
HORNED LARK	CHIPPING SPARROW	ERMINE
PURPLE MARTIN	BREWER'S SPARROW	LONG-TAILED WEASEL
TREE SWALLOW	BLACK-CHINNED SPARROW	AMERICAN BADGER
VIOLET-GREEN SWALLOW	LARK SPARROW	WESTERN SPOTTED SKUNK
NORTHERN ROUGH-WINGED SWALLOW	SAGE SPARROW	STRIPED SKUNK
BANK SWALLOW	SAVANNAH SPARROW	MOUNTAIN LION
CLIFF SWALLOW	FOX SPARROW	BOBCAT
BARN SWALLOW	SONG SPARROW	MULE DEER
STELLER'S JAY	LINCOLN'S SPARROW	LARGE-EARED WOODRAT
WESTERN SCRUB-JAY	GOLDEN-CROWNED SPARROW	WESTERN FENCE LIZARD
BLACK-BILLED MAGPIE	WHITE-CROWNED SPARROW	WESTERN SKINK
YELLOW-BILLED MAGPIE	DARK-EYED JUNCO	NORTHERN ALLIGATOR LIZARD
AMERICAN CROW	WESTERN MEADOWLARK	RUBBER BOA
COMMON RAVEN	BROWN-HEADED COWBIRD	GOPHER SNAKE
MOUNTAIN CHICKADEE	BULLOCK'S ORIOLE	WESTERN TERRESTRIAL GARTER SNAKE
CHESTNUT-BACKED CHICKADEE	PURPLE FINCH	WESTERN RATTLESNAKE
OAK TITMOUSE	HOUSE FINCH	Total Number of Species:150
BUSHTIT	RED CROSSBILL	
WHITE-BREASTED NUTHATCH	PINE SISKIN	
PYGMY NUTHATCH	LESSER GOLDFINCH	
BROWN CREEPER	LAWRENCE'S GOLDFINCH	
ROCK WREN	PLUMBEOUS VIREO	
CANYON WREN	VAGRANT SHREW	
BEWICK'S WREN	DUSKY SHREW	
HOUSE WREN	ORNATE SHREW	
WINTER WREN	WATER SHREW	
AMERICAN DIPPER	TROWBRIDGE'S SHREW	
RUBY-CROWNED KINGLET	BROAD-FOOTED MOLE	
BLUE-GRAY GNATCATCHER	YUMA MYOTIS	
WESTERN BLUEBIRD	LONG-EARED MYOTIS	
MOUNTAIN BLUEBIRD	FRINGED MYOTIS	
HERMIT THRUSH	LONG-LEGGED MYOTIS	
AMERICAN ROBIN	SILVER-HAIRED BAT	
VARIED THRUSH	BIG BROWN BAT	

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WRENTIT	HOARY BAT	
NORTHERN MOCKINGBIRD	PALLID BAT	
CALIFORNIA THRASHER	WESTERN MASTIFF BAT	
AMERICAN PIPIT	BRUSH RABBIT	
CEDAR WAXWING	DESERT COTTONTAIL	
PHAINOPEPLA	SNOWSHOE HARE	
NORTHERN SHRIKE	BLACK-TAILED JACKRABBIT	
LOGGERHEAD SHRIKE	MOUNTAIN BEAVER	
EUROPEAN STARLING	YELLOW-PINE CHIPMUNK	
CASSIN'S VIREO	ALLEN'S CHIPMUNK	
HUTTON'S VIREO	LONG-EARED CHIPMUNK	
WARBLING VIREO	CALIFORNIA GROUND SQUIRREL	
ORANGE-CROWNED WARBLER	GOLDEN-MANTLED GROUND SQUIRREL	
NASHVILLE WARBLER	WESTERN GRAY SQUIRREL	
YELLOW WARBLER	DOUGLAS' SQUIRREL	
YELLOW-RUMPED WARBLER	NORTHERN FLYING SQUIRREL	
BLACK-THROATED GRAY WARBLER	BOTTA'S POCKET GOPHER	
TOWNSEND'S WARBLER	MOUNTAIN POCKET GOPHER	
HERMIT WARBLER	CALIFORNIA POCKET MOUSE	
COMMON YELLOWTHROAT	AMERICAN BEAVER	
WILSON'S WARBLER	WESTERN HARVEST MOUSE	
WESTERN TANAGER	DEER MOUSE	
BLACK-HEADED GROSBEAK	BRUSH MOUSE	
BLUE GROSBEAK	PINYON MOUSE	
LAZULI BUNTING	DUSKY-FOOTED WOODRAT	
SPOTTED TOWHEE	BUSHY-TAILED WOODRAT	
CALIFORNIA TOWHEE	CALIFORNIA VOLE	
RUFOUS-CROWNED SPARROW	LONG-TAILED VOLE	
CHIPPING SPARROW	COMMON MUSKRAT	
BLACK-CHINNED SPARROW	BLACK RAT	
VESPER SPARROW	NORWAY RAT	
LARK SPARROW	HOUSE MOUSE	
SAGE SPARROW	WESTERN JUMPING MOUSE	
SAVANNAH SPARROW	COMMON PORCUPINE	
GRASSHOPPER SPARROW	COYOTE	
FOX SPARROW	GRAY FOX	
SONG SPARROW	BLACK BEAR	
LINCOLN'S SPARROW	RINGTAIL	
GOLDEN-CROWNED SPARROW	RACCOON	
WHITE-CROWNED SPARROW	AMERICAN MARTEN	
DARK-EYED JUNCO	FISHER	
RED-WINGED BLACKBIRD	ERMINE	
TRICOLORED BLACKBIRD	LONG-TAILED WEASEL	
WESTERN MEADOWLARK	AMERICAN MINK	
YELLOW-HEADED BLACKBIRD	AMERICAN BADGER	
BREWER'S BLACKBIRD	WESTERN SPOTTED SKUNK	
BROWN-HEADED COWBIRD	STRIPED SKUNK	
BULLOCK'S ORIOLE	MOUNTAIN LION	
GRAY-CROWNED ROSY-FINCH	BOBCAT	
PURPLE FINCH	MULE DEER	
HOUSE FINCH	LARGE-EARED WOODRAT	
PINE SISKIN	WESTERN POND TURTLE	
LESSER GOLDFINCH	WESTERN FENCE LIZARD	
LAWRENCE'S GOLDFINCH	SAGEBRUSH LIZARD	
AMERICAN GOLDFINCH	WESTERN SKINK	
HOUSE SPARROW	GILBERT'S SKINK	
CLARK'S GREBE	SOUTHERN ALLIGATOR LIZARD	
JUNIPER TITMOUSE	NORTHERN ALLIGATOR LIZARD	
PLUMBEOUS VIREO	RUBBER BOA	
BAIRD'S SANDPIPER	RINGNECK SNAKE	
PECTORAL SANDPIPER	SHARPTAIL SNAKE	

	CWHR Habitat Type Designation*:	
Group 1: Annual Grassland, Barren Land, Chamise/Redshank Chaparral, Mixed Chapparal,Lacustrine,Valley Oak Woodland, Wet Meadow	Group 2: Blue Oak/Foothill Pine, Blue Oak Woodland, Montane Chaparral, Montane Hardwood, Montane Riparian, Ponderosa Pine	Group 3: Closed Cone Pine/Cypress, Douglas Fir, Montane Hardwood Conifer, Sierran Mixed Conifer
RED-NECKED PHALAROPE	RACER	
HARRIS'S SPARROW	GOPHER SNAKE	
VIRGINIA OPOSSUM	CALIFORNIA MOUNTAIN KINGSNAKE	
VAGRANT SHREW	WESTERN TERRESTRIAL GARTER SNAKE	
BROAD-FOOTED MOLE	WESTERN AQUATIC GARTER SNAKE	
LITTLE BROWN BAT	WESTERN RATTLESNAKE	
YUMA MYOTIS	Total Number of Species:235	
FRINGED MYOTIS		
LONG-LEGGED MYOTIS		
CALIFORNIA MYOTIS		
WESTERN SMALL-FOOTED MYOTIS		
WESTERN PIPISTRELLE		
BIG BROWN BAT		
HOARY BAT		
PALLID BAT		
BRAZILIAN FREE-TAILED BAT		
WESTERN MASTIFF BAT		
AMERICAN PIKA		
BRUSH RABBIT		
DESERT COTTONTAIL		
BLACK-TAILED JACKRABBIT		
MOUNTAIN BEAVER		
YELLOW-PINE CHIPMUNK		
LONG-EARED CHIPMUNK		
YELLOW-BELLIED MARMOT		
BELDING'S GROUND SQUIRREL		
CALIFORNIA GROUND SQUIRREL		
GOLDEN-MANTLED GROUND SQUIRREL		
WESTERN GRAY SQUIRREL		
NORTHERN FLYING SQUIRREL		
BOTTA'S POCKET GOPHER		
NORTHERN POCKET GOPHER		
MOUNTAIN POCKET GOPHER		
CALIFORNIA POCKET MOUSE		
HEERMANN'S KANGAROO RAT		
CALIFORNIA KANGAROO RAT		
AMERICAN BEAVER		
WESTERN HARVEST MOUSE		
DEER MOUSE		
BRUSH MOUSE		
PINYON MOUSE		
DUSKY-FOOTED WOODRAT		
BUSHY-TAILED WOODRAT		
MONTANE VOLE		
CALIFORNIA VOLE		
LONG-TAILED VOLE		
COMMON MUSKRAT		
BLACK RAT		
NORWAY RAT		
HOUSE MOUSE		
WESTERN JUMPING MOUSE		
COMMON PORCUPINE		
COYOTE		
RED FOX		
GRAY FOX		
BLACK BEAR		
RINGTAIL		
RACCOON		
AMERICAN MARTEN		

CWHR Habitat Type Designation*:		
Group 1: Annual Grassland, Barren Land, Chamise/Redshank Chaparral, Mixed Chapparal,Lacustrine,Valley Oak Woodland, Wet Meadow	Group 2: Blue Oak/Foothill Pine, Blue Oak Woodland, Montane Chaparral, Montane Hardwood, Montane Riparian, Ponderosa Pine	Group 3: Closed Cone Pine/Cypress, Douglas Fir, Montane Hardwood Conifer, Sierran Mixed Conifer
ERMINE		
LONG-TAILED WEASEL		
AMERICAN MINK		
AMERICAN BADGER		
WESTERN SPOTTED SKUNK		
STRIPED SKUNK		
NORTHERN RIVER OTTER		
MOUNTAIN LION		
BOBCAT		
MULE DEER		
LARGE-EARED WOODRAT		
WESTERN POND TURTLE		
WESTERN FENCE LIZARD		
COAST HORNED LIZARD		
WESTERN SKINK		
GILBERT'S SKINK		
SOUTHERN ALLIGATOR LIZARD		
RINGNECK SNAKE		
SHARPTAIL SNAKE		
RACER		
STRIPED RACER		
GOPHER SNAKE		
COMMON KINGSNAKE		
CALIFORNIA MOUNTAIN KINGSNAKE		
COMMON GARTER SNAKE		
WESTERN TERRESTRIAL GARTER SNAKE		
WESTERN AQUATIC GARTER SNAKE		
WESTERN RATTLESNAKE		
Total Number of Species:316		

Appendix F
Potential Approaches to Address Connectivity in the INRMP (Phase II)

Appendix F
Potential Approaches to Address Connectivity in the INRMP (Phase II)

List of Figures

Potential Approaches to Address Connectivity in the INRMP (Phase II)

The inventory and monitoring components of the final INRMP are planned to be regularly updated over time. The purpose of the updates will be to track development effects on wildlife habitat. In order to preserve habitat, it is important to consider connectivity. Connectivity can be measured by a variety of scientific approaches, which are described below.

1.0 Wildlife Movement

The best way to measure connectivity on a landscape is to look at the distribution and movement of the organisms of concern. Depending on the size and type of organisms, there are several common ways to measure their occurrence and distribution. Each method provides data for part of the overall story of individual or groups of species. By combining several methods, accurate assessments of wildlife movement, population well-being, and species occurrence are possible. The following sections describe potential approaches that the County can use to better understand and/or monitor changes in connectivity in the INRMP study area.

1.1 Tracking

Wildlife leave tracks in soft substrate when they move. Two common methods for capturing tracks are track counts and trackplates. Measuring track counts is accomplished by placing a substrate (e.g., sand) across an opening (e.g., in front of a culvert opening) or alongside a road and periodically photographing new tracks of animals crossing the area. Track plates are metal plates covered in a dark powder, such as printer ink powder, and placed in front of contact paper and bait. Animals trying to get the bait cross the ink and the contact paper, and leave their tracks behind for identification. These methods allow for species identification and possibly relative abundance.

1.2 Wildlife Cameras

Motion-triggered cameras placed at locations where wildlife movement is constrained (e.g., crossing under roadway) are a cost-effective way of recording multiple animal passages. The main constraint on this method is having a confined area or bait station so that animals are close enough to photograph. A digital camera with a built-in motion detector is fastened to a tree or infrastructure facing the constrained movement area. Batteries and data cards are replaced periodically. This method allows for species identification, and sometimes individual identification.

1.3 GPS and Radio-Collars and Devices

This relatively labor-intensive method provides the most accurate information about wildlife distribution, home range size, and movement patterns. Tracking devices, including collars, are attached to individual animals. Radio collars are less expensive, but require technical staff to locate animals using antennae. GPS collars are more expensive, but can be set to drop off automatically, allowing recovery of the device and the corresponding data. A variant on this is GPS collars with satellite communication that allow for real-time tracking of animals.

1.4 Genetic Testing

There are several ways to collect genetic data from animals. One is to place a device capable of catching hairs from a passing animal (e.g., the I-80 U.C. Davis project uses a gun-cleaning brush at the entrance of track plates). These devices can be placed across culvert opening, or at the entrance to baited enclosures. Another method is to trap live animals and take a blood or other tissue sample for testing. In either case, not much material is needed to identify and differentiate among wildlife species and among populations of the same species.

1.5 County Public Health – Animal Services Data

By keeping track of roadkill information, one can get a general idea of where animals are trying to cross. The County's Animal Services Department keeps records of reported roadkill and publishes a Dead Animals Activities List, which describes the kinds of animals that have been picked up and the names of the roads but does not give exact locations. The list is based on archived reports that can be researched to determine species-specific problem areas.

2.0 Genetic Fragmentation

As described above, road and highway construction and use can affect surrounding wildlife through population differentiation and genetic isolation. The first step in testing the genetic effects of roads and highways on wildlife populations is to evaluate the genetic structure (including genetic divergence and diversity) of a given taxon, and then correlate it to the road/highway (network) barriers.

To detect effects of roads and highways on the genetic structure, it is necessary to collect enough samples from individuals of different geographical populations from appropriate landscape and taxonomic groups, and then choose suitable genetic markers for population structure analysis (Manel et al., 2003; Holderegger & Wagner, 2006). Based on the collected genetic data, a variety of genetic analyses and statistical analyses are performed to determine the spatial genetic pattern and its correlation with roads, highways, and other land uses (see Manel et al., 2003 for more detailed information).

Three steps are necessary before assessment of population divergence and genetic diversity: 1) Choose an appropriate road, highway, or combination of infrastructure. As mentioned above, many features of roads and highways, like traffic volume and road-way size and age, may affect wildlife crossing and the timing for genetic divergence. For a given road or highway, its features should be carefully evaluated before studying its effect on spatial genetic patterns. 2) Choose an appropriate taxon. Different organisms have varied movement abilities, life history traits and effective population size. Those species characterized by weak movement ability, rapid life cycle and small effective population size are more likely to respond to artificial disturbance with population differentiation and decreases in genetic diversity, while other organisms may need longer time or be less affected. 3) Choose appropriate molecular markers. Different molecular markers also present different heritage modes, mutation rates and effective population sizes, which may be reflected in the resulting genetic structure (Latta, 2006). Generally, highly variable molecular markers (e.g., microsatellites) may be more suitable than conservative (less-variable) markers (Gerlach & Musolf, 2000).

To test the effect of roads on genetic differentiation, sampling methods should be specifically designed according to features of the studied organisms and road/highway. However, there are some general rules. Control and replication should always be conducted for experiments. Sampling sites should be scattered on both sides of the road, and for each side, several sampling sites should be included. As general guidance, 15-30 independent replicates of each treatment (e.g., near road and far from roads) are needed (Karban & Huntzinger, 2006, p. 43). Notably, it is necessary to collect both female and male individuals in each sampling site because of possible sex-biased dispersal, which is a wide-spread pattern in vertebrate organisms (Prugnolle & de Meeus, 2002).

Once genetic data are obtained, a variety of population genetic analysis and statistical analysis can be performed to determine spatial genetic pattern and its correlation with roads and highways. For analyzing spatial genetic pattern, as Manel et al., (2003) summarized, there are usually two sets of six approaches. The first set of approaches is to assess genetic differentiation (Fst values) among populations over large geographic area when geographical populations are known in advance. The other set of approaches is to assess spatial genetic patterns at an individual level without defining geographical populations in advance. Among the latter set, the Bayesian assignment, which is implemented in STRUCTURE software version 2.3.3 (http://pritch.bsd.uchicago.edu/structure.html; Pritchard et al., 2000; Falush et al., 2003; Falush et al., 2007), is widely used to test the effect of roads and highways on genetic structure. With the Bayesian assignment, all individuals are firstly clustered into different assumed genetic populations based on multilocus genotype data, and then all individuals of unknown origin are assigned to those assumed populations with varied probability. The number of assigned populations informs the population structure. The probability for an individual to be clustered in those assigned populations indicates its possible single origin or mixed origins (hybrid). After identifying population differentiation, some other statistical tests can be used to detect the correlation between population differentiation and road barriers. For this, Manel et al. have listed four different approaches, including Mantel's test, canonical correspondence analysis, geographical information systems and testing correlation between two maps (Manel et al., 2003).

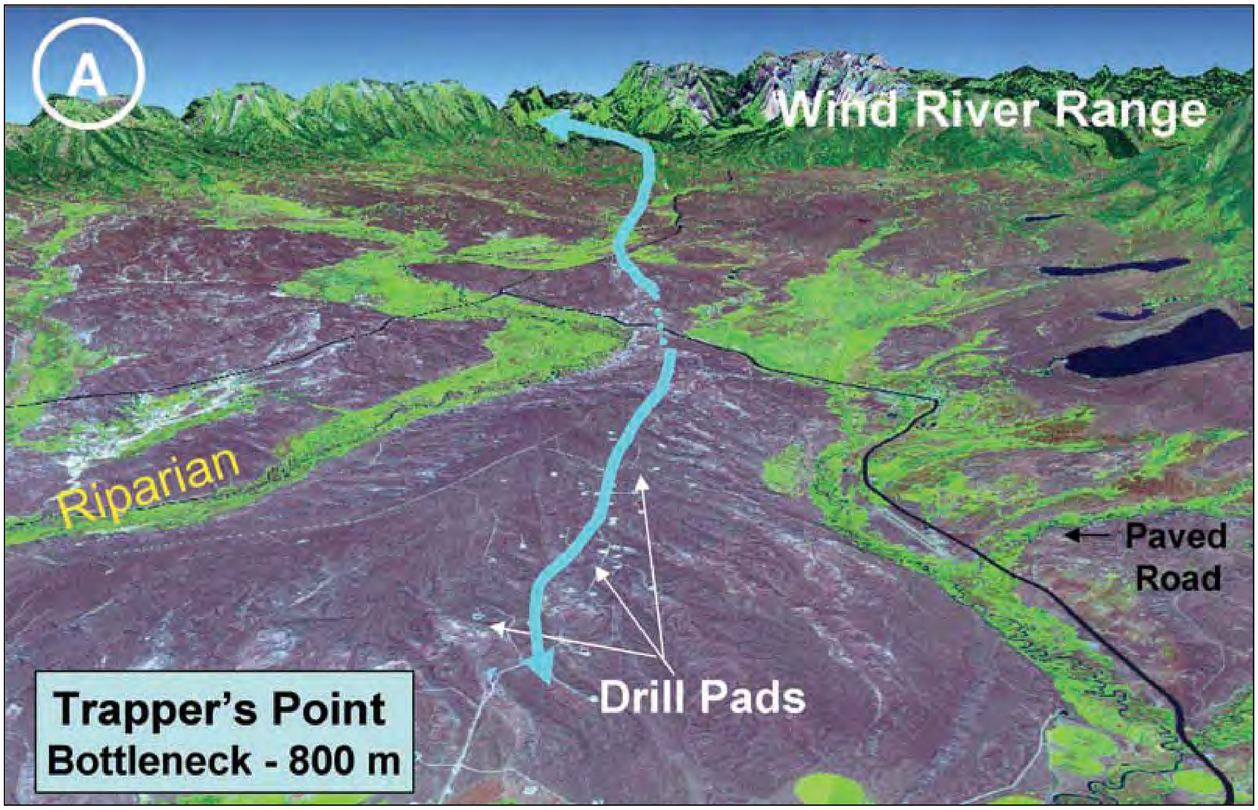
3.0 Connectivity Modeling

3.1 Expert Knowledge and Empirical Data

Perhaps the simplest method of corridor identification is through utilization of expert knowledge derived from time spent observing animals in the field (Noss and Daly 2006). Biologists that have first-hand experience witnessing animal use of particular areas for movement can delineate these or similar areas on a map. An example of this approach might be the identification of a seasonal migration route for a particular species (Figure F-1. Pronghorn Migration Corridor; Berger 2006). Another approach might be a study examining the use patterns of potential corridors by an animal species (Sieving et al. 2000). Still another means of gathering field data on animal movement could be through radio- or GPS-collar tracking of individual animals (Beier 1993). This approach allows for spatially explicit movement data to be incorporated into a connectivity analysis.

Figure F-1. Pronghorn Migration Corridor

The pronghorn migration corridor is shown below in blue was identified by biologists in western Wyoming. Also shown is a movement bottleneck and human development (from Berger 2006).



These expert/empirically-derived corridors can be incorporated into a conservation planning process in a variety of ways. Some planning benefits to this sort of approach include a low cost (assuming the field work is already complete), and easily explained methodology, and an ability to finish the work quickly. Drawbacks include restricting the planning products to known movement corridors, assuming they exist, and the usually ad hoc nature of ecological knowledge within a given planning region. Many times a more systematic approach is preferable.

3.2 Least Cost Modeling

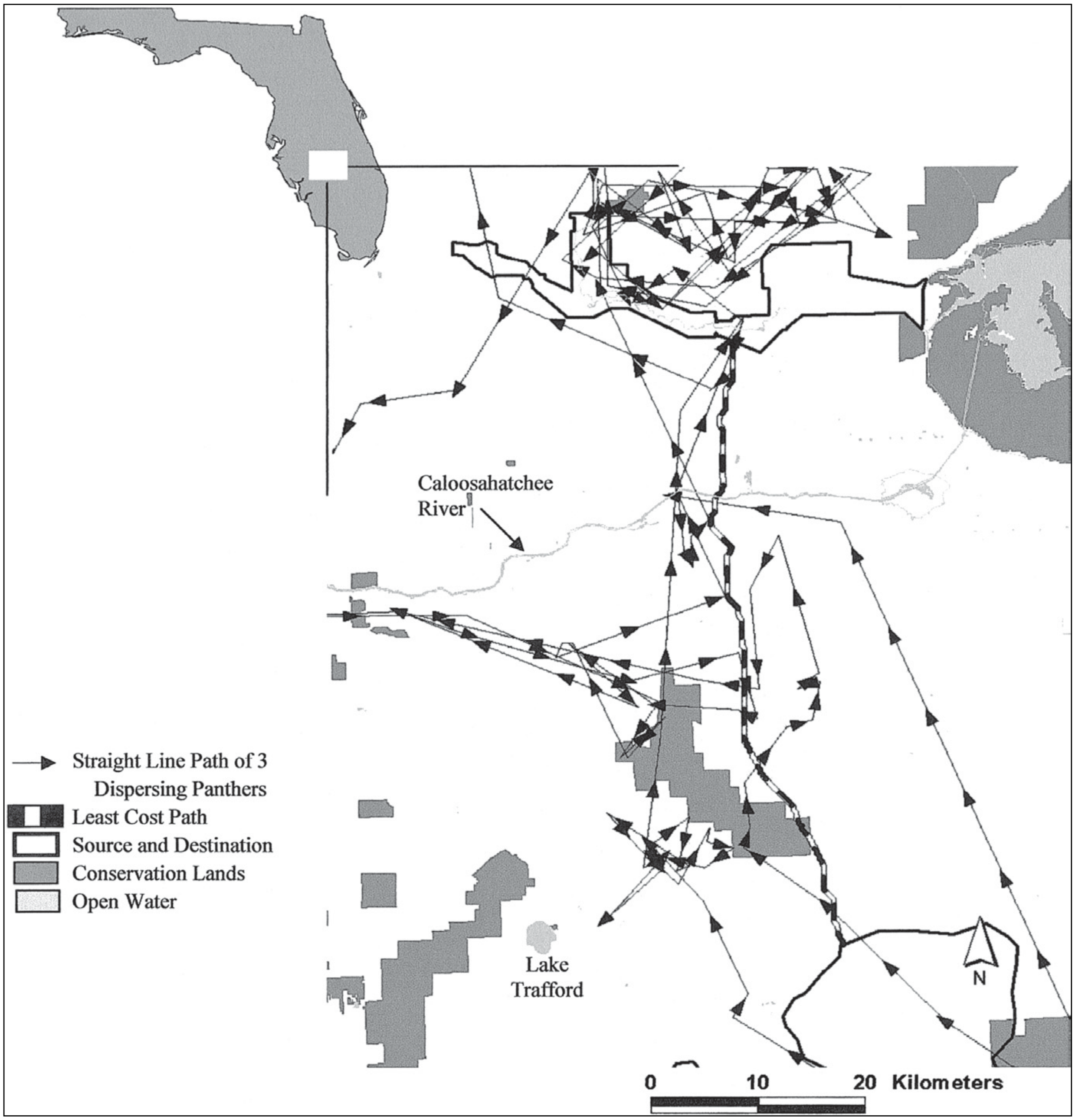
A commonly used method of connectivity analysis is "least cost modeling" (Theobald 2006). This technique uses a "cost surface" to calculate the path of least resistance between designated endpoints. The term "cost" in this context does not refer to economic cost but rather to the ecological cost (or "resistance") exacted on an individual animal trying to move across a landscape. The cost surface should ideally incorporate landscape variables that influence the movement patterns of an individual of a particular species, as identified through field studies. Typical variables include land cover, slope, barriers to movement, etc. In practice, however, relatively little is known about how individual species move across a landscape, so habitat suitability is commonly used as a proxy for this movement information. Endpoints used in least cost modeling are often known populations of the species being modeled, existing reserves between which animal movement is important, seasonal habitats on either end of a migration route, etc. Using the cost surface and the endpoints, “cost distance” is calculated for every raster cell in the analysis area (Theobald 2006). Cost distance is the cumulative cost from that particular cell to an endpoint as calculated by taking the least costly route. Finally, the route following the low cost raster cells is identified.

The simplest type of least cost modeling results in a least cost “path” between the endpoints (Meegan and Maehr 2002, Kautz et al. 2006, Schwartz et al. 2009). This path is a single line passing through the low cost raster cells. While the path is not necessarily a straight line (and usually is not, except in very homogenous landscapes), it does not have width and describes one single potential route between endpoints (Figure F-2. Least Cost Path for Florida Panther). A single path might enable conceptual clarity; however, for most animal movement, individuals will not follow one single route.

A least cost modeling technique that probably better captures the patterns of potential movement between endpoints involves identification of a “corridor” (Singleton et al. 2002, Theobald 2006, Beier et al. 2008, Huber et al. 2010a). Least cost corridor modeling does not identify one single “best” path but rather a gradation of connectivity values between endpoints. Typically, a connectivity value threshold is used to identify a discrete corridor. This corridor may have variable width and can potentially consist of several strands. The advantages of using corridor modeling as opposed to path modeling include a better representation of potential movement as well as the potential for greater flexibility in a management context (for example, if there are multiple strands, it might be preferable from a management standpoint to manage one particular strand for connectivity purposes).

Figure F-2. Least Cost Path for Florida Panther

Least cost path for the Florida panther and actual movement routes taken by radio-collared panthers are shown below (from Meegan and Maehr 2002).



There are several limitations inherent in both least cost path and modeling, however. The required endpoint designation implies a prior knowledge of source and destination locations of individuals being modeled. Least cost path and corridor analyses are not designed to capture uncertainty that often is inherent in human knowledge of source and destination in animal movement. Further, path and corridor analyses are generally meant to capture discrete locations of animal movement. When incorporated into a management context, these movement models can lead to a binary vision of the landscape: namely areas that are used by animals for movement and those that are not. This concept of landscape use can belie the gradient of use found in many places. The variably-developed landscape within which areas of higher connectivity are embedded can often play a role in animal movement and resource use that is neglected in many connectivity analyses.

There have recently been efforts made to address these modeling limitations. For example, Huber et al. (2010b) used a series of overlapping least cost corridor analyses to estimate landscape connectivity for several focal species in a portion of the San Joaquin Valley, California (Figure F-3. Least Cost Surface as Calculated for Bobcat). This method calculated connectivity between numerous combinations of study area perimeter segments in order to create a full two-dimensional least cost "surface" and to avoid assumptions concerning endpoint designation. However, because multiple analyses are being conducted, the computation time increases accordingly.

3.3 Circuit Theory

A relatively new method developed for assessing landscape connectivity is "circuit theory" (McRae and Beier 2007, McRae et al. 2008). This technique, adapted from electrical circuit theory, simultaneously accounts for multiple sources and destinations while identifying those areas that might serve as "pinch points", i.e., narrower critical habitat connections. This method results in a two-dimensional connectivity surface for the entire study area (Figure F-4. Sample Results from a Circuit Theory Analysis). An important feature of this method for connectivity planning is the identification of key linkage points, through which many individuals would be forced to travel when traversing a landscape. This can aid in the prioritization of connectivity planning activities.

Similar to least cost analysis, a circuit theory-based connectivity analysis requires the creation of a cost surface. Then "current" is summed between two or more source patches. Barriers, which do not allow any movement, can be included in the analysis in addition to the cost surface. Overall, the analytic process is generally equivalent in computation time to least cost analysis.

Figure F-3. Least Cost Surface as Calculated for Bobcat

Areas of high modeled connectivity are shown in pink and white, while areas of low connectivity are shown in orange and brown. Gray lines are roads, and the blue line is a river (from Huber et al. 2010).

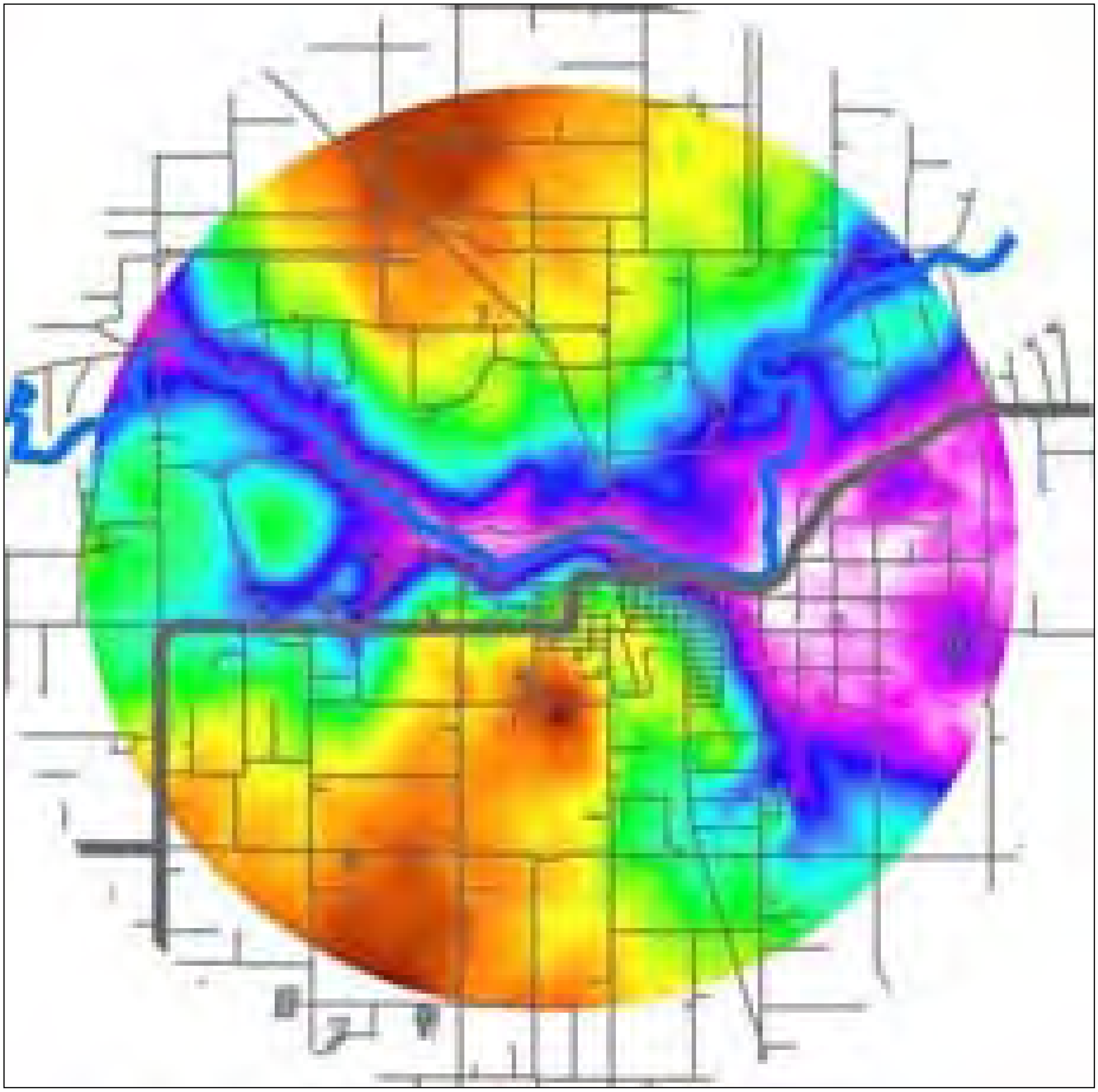
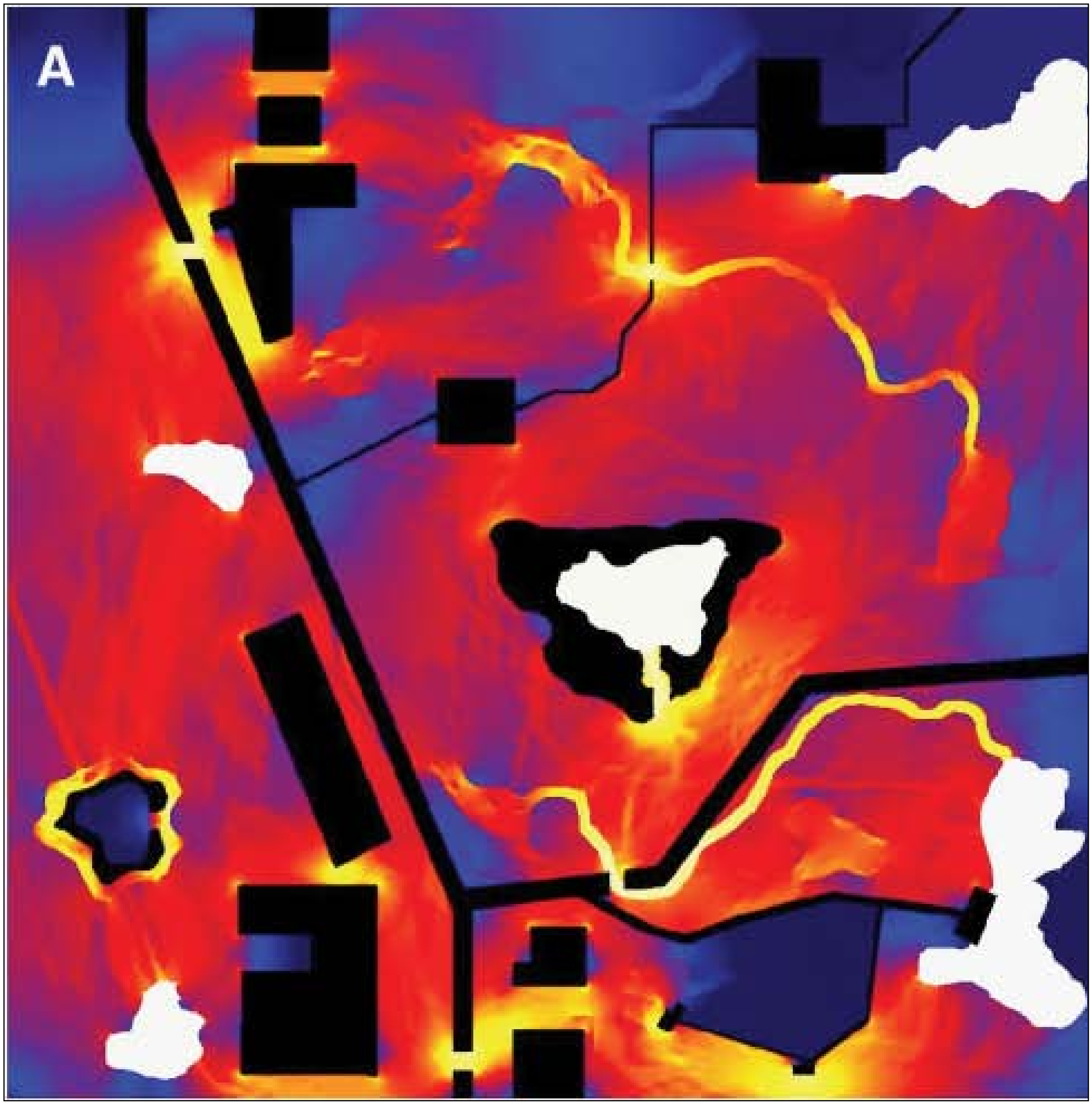


Figure F-4. Sample Results From a Circuit Theory Analysis

Shown below are source patches (white), barriers (black), and “summed current” (dark → bright, with bright showing cells with lowest cumulative cost). From McRae et al. 2008.



3.4 Spatially Explicit Population Models

While least cost and circuit-based connectivity analyses focus on the static landscape scale, spatially explicit population models (SEPM) attempt to approximate movement patterns by predicting what individual animals will actually do within a landscape context (Noss and Daly 2006). SEPM offer the advantage over other methods of incorporation of factors such as population dynamics and species-specific behavioral patterns into the model. There is also the potential to include dynamic landscape processes in the analysis. Models such as PATCH (Schumaker 1998) and HexSim (Figure F-5. Modeled Tule Elk Herd Expansion from Potential Reintroduction Site; Schumaker 2010) have been used to model potential wolf reintroduction (Carroll et al. 2003) and important conservation areas in the Greater Yellowstone Ecosystem (Noss et al. 2002).

SEPM allow planners to evaluate the demographic consequences of various land use scenarios on species within a study area. This can provide greater insight into functional connectivity than do static models, such as least cost models. The major drawback of this approach however is the greatly increased complexity and uncertainty inherent in the computational process (Noss and Daly 2006). Many input parameters are required, many of which are not known for most species (especially movement data). The complexity of SEPM also generally requires a much longer processing time than do static models.

3.5 Graph Models

Graph theory is concerned with potential flow through an entire network and how the individual components influence this flow. Graphs are landscape representations composed of nodes and links. These refer respectively to habitat patches and actual or potential connectivity (Urban et al. 2009). Link length can be determined by Euclidean distance between patches, but cost distance (see above) is often used in graph analysis instead. While graph modeling is not used to identify the actual reserve network, it can be used to identify key linkages within the network, which, if lost, could have widespread ramifications to future ecological function of the rest of the network. As such, it is a useful modeling tool for understanding the effects of network perturbation. One example of use of graph models in conservation planning is a study by Urban and Keitt (2001) where the authors identified a “minimum spanning tree” (Figure F-6. Graph Model Showing the Minimum Spanning Tree for Mexican Spotted Owl Habitat Patches in the Southwestern U.S.) that could serve a minimum viable population of Mexican spotted owls in the southwestern U.S. Graph models are probably best used in conjunction with other connectivity modeling techniques.

Figure F-5. Modeled Tule Elk Herd Expansion from Potential Reintroduction Site

Red indicates areas of higher likely elk occupancy. Results from studies such as these can be used to evaluate landscape connectivity. From an unpublished study, Huber et al.

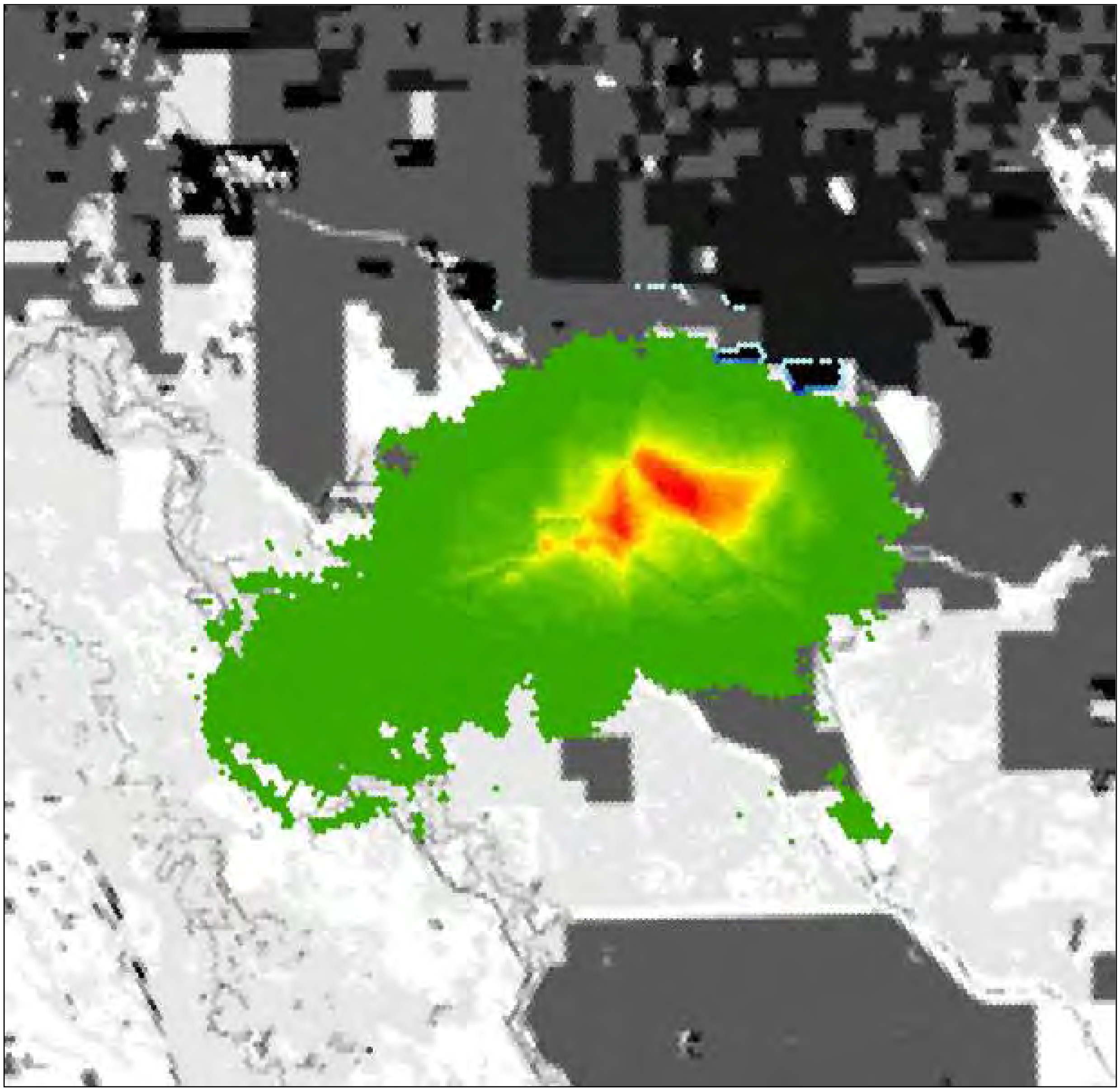
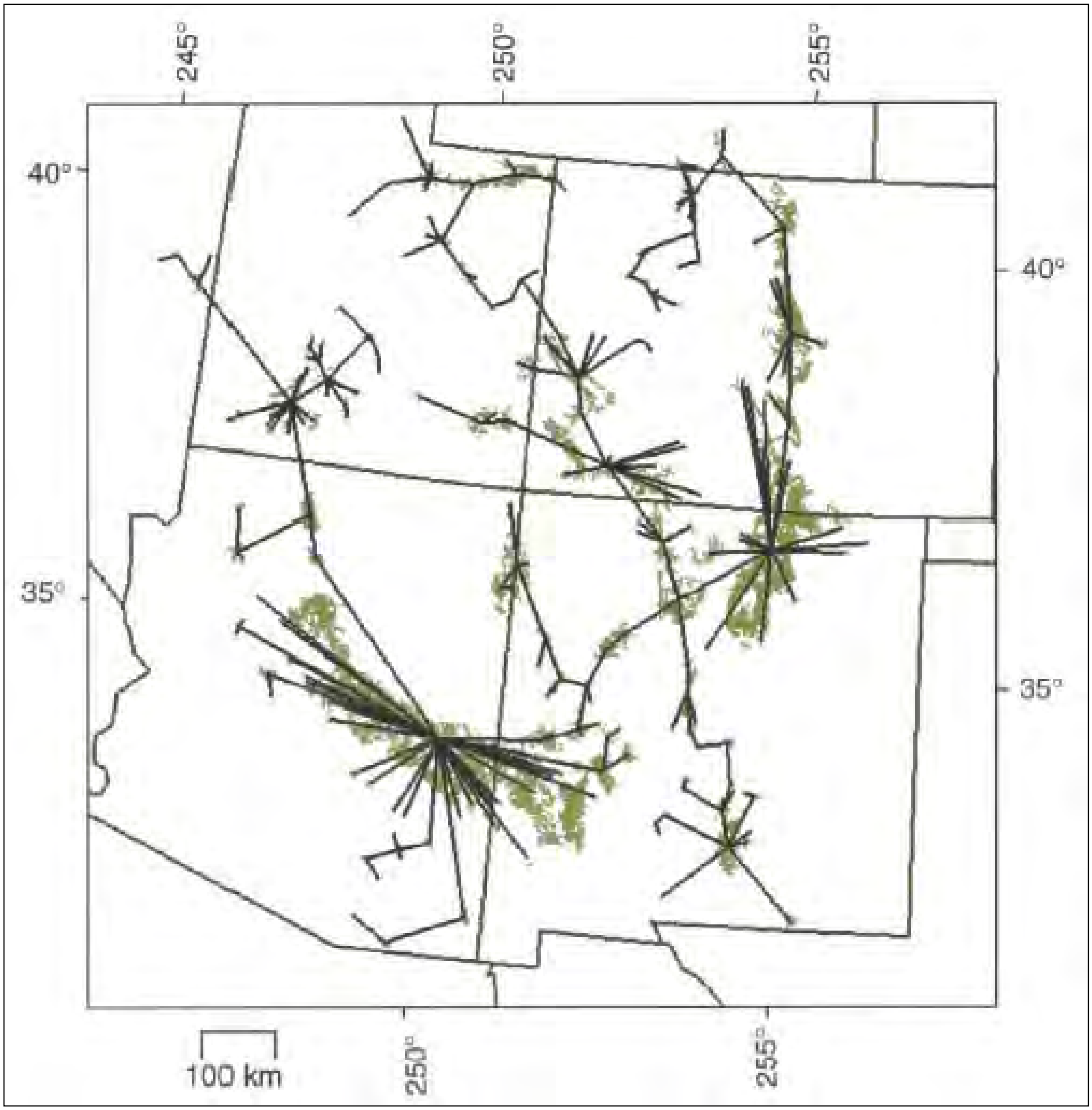


Figure F-6. Graph Model Showing the Minimum Spanning Tree for Mexican Spotted Owl Habitat Patches in the Southwestern U.S.

Potential habitat is shown in green, lines are links of the tree (Urban and Keitt 2001).



ATTACHMENT 2

TO COMMENTS OF CSNC ET AL.
AUGUST 15, 2016

El Dorado County

Integrated Natural Resources Management Plan

Phase I

- Revised Draft -

Overall Approach for Preparing INRMP (Phase II)

February 7, 2011

Prepared for
El Dorado County
Development Services Department
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Sierra Ecosystem Associates

11-0330.B.1

Table of Contents

List of Appendices

1. Goal of INRMP

To mitigate impacts (direct, indirect and cumulative) on biological resources that result from land use decisions associated with implementing the 2004 General Plan (GP) to the extent economically, technically, and practically feasible. The INRMP shall also serve to fulfill project level CEQA requirements for cumulative impacts from habitat loss and fragmentation.

2. Purpose of INRMP

GP Policy 7.4.2.8 states that the purpose of the INRMP is to identify important habitat in the County and to establish a program for effective habitat preservation and management. Policy 7.4.2.8 was adopted as mitigation for impacts 5.12-1, 5.12-2, 5.12-3 and 5.12-4 identified in the GP EIR. The EIR determined that these impacts would remain classified as Significant and Unavoidable even with the implementation of Policy 7.4.2.8.

3. INRMP Objectives

a. Guide the type, location, extent, and management of mitigation that will be considered for impacts to biological resources during project-level CEQA review development applications (ministerial and discretionary actions), consistent with Policy 7.4.2.8:
   - For minimal impacts to biological resources, establish feasible/practical on-site or off-site mitigation requirements (impact example – in-fill development in oak woodland habitat)
   - For less than significant adverse impacts to biological resources, establish feasible/practical on-site or off-site mitigation requirements commensurate with the level of impact, or create options for the developer to mitigate off-site (impact example – subdivision development within important habitat as identified in the County's Habitat Inventory, which will be further refined and more site-specific when it is finalized as part of the INRMP)
   - For potentially significant and significant unavoidable adverse impacts to biological resources, establish a combination of mandatory on-site (where feasible and practical) and offsite mitigation with monitoring/reporting requirements and a graduated fee program that is commensurate with the level of on-site mitigation (lower fees for more on site mitigation)

b. Guide the avoidance, minimization and compensation for cumulative impacts from development consistent with the 2004 GP, consistent with Policy 7.4.2.8:
   - Utilizing existing information including Phase I of the INRMP, determine methods to feasibly mitigate cumulative impacts identified in the GP EIR.
   - Determine the combination of land-use, land-management and transportation network measures that can feasibly mitigate cumulative impacts as identified in the GP EIR.
   - For projects with little contribution to cumulative impacts (e.g. clustered or urban in-fill projects), establish low fees or County ordinances and guidelines that promote conservation.
   - For projects with less than significant contribution to the cumulative impacts, establish appropriate site-development guidelines and provide options for developers to choose between compensatory mitigation or a moderate fee for off-site mitigation.
   - For potentially significant and significant unavoidable cumulative impacts, establish County ordinances and fees to protect irreplaceable resources and to monitor biological impacts and mitigation solution effectiveness.

c. Per Policy 7.4.2.8, identify and implement a habitat protection strategy that will: a) acquire, conserve, restore, and manage acquired important habitat, b) create incentives for the development and agriculture industries to avoid and minimize impacts to important biological resources, c) establish options for willing buyers and sellers of mitigation features, d) allow other land and resource management agencies and conservation organizations to coordinate with the County on land acquisitions and management of acquired lands, and e) monitor, report on, and adapt based on the effectiveness of the program.

4. INRMP Preparation

a. Meet requirements of GP EIR Impact Mitigation Measure 5.12-1,
b. Satisfy GP Policy 7.4.2.8 and Measure CO-M,
c. Utilize best available data and science,
d. Design plan so that it can be readily modified for updates determined by implementation of the 2004 GP,
e. Be compatible with existing state/federal regulations, and
f. Provide for administrative coordination between the various Agencies and Departments responsible for implementing the plan, consistent with other 2004 GP policies.

5. Approach Options

There are multiple approaches for developing the INRMP mitigation program strategy, but there are certain elements that are common to all approaches. The INRMP must contain certain elements that are required by the GP. The INRMP must also not conflict with other elements of the GP. The required and optional elements that could be employed to achieve the goals and objectives of Policy 7.4.2.8 are detailed below.

6. Examples of INRMP Elements Mandated by the GP

a. The INRMP content requirements of Policy 7.4.2.8 (i.e., Habitat Inventory, Habitat Protection Strategy, Mitigation Assistance Program, Habitat Acquisition Program, Habitat Management Program, Monitoring Program, Public Participation, and a Funding Program), the components of which are described in the November 18, 2010 INRMP Implementation Options Report (Appendix A),
b. The INRMP-related content requirements of Policy 7.4.2.2, which includes provisions for protecting certain wildlife migration corridors from degradation,
c. Implementation Measure CO-M Adaptive Management provision for the INRMP,
d. Ordinances, including riparian setbacks sufficient to protect wildlife use of riparian habitat and conformance of the Important Biological Corridor (Policy 7.4.2.9 and Implementation Measure CO-N) overlay to the INRMP mapping of important habitat and the program for effective habitat preservation and management,
e. Impact mitigation fees (required for offsite mitigation only): a) that are commensurate with the extent (i.e., acreage) and severity of direct impacts to biological resources, b) that account for indirect and cumulative impacts, and c) that include incentives, dis-incentives, and other provisions for protection of important habitats identified under Policy 7.4.2.8 (A), which together address the combined effects of projected land and transportation development,
f. CEQA compliance for the INRMP through appropriate environmental documentation, public review, and possibly a General Plan Amendment,

g. Plan administration for the various components of INRMP planning, implementation, monitoring, and evaluation. This would also include a description of how the plan would establish appropriate levels of human resources and funding strategies, and
h. Incorporation of OWMP and rare plant protection program.

7. Examples of Specific Components for Consideration

Habitat Inventory
- Update as new data becomes available

Habitat Protection Strategy
- Identify areas where new wildlife crossings would be beneficial.
- Establish zones of important habitat based on level of importance.
- Create ordinances for allowable types of fencing (fencing that is passable to wildlife) in areas of important habitat.
- Create ordinances to limit certain activities in rare habitat types or that limit activities which impact permeability in critical areas.

Mitigation Assistance
- Establish payment program for ecosystem services (i.e., offer payments to landowners for not developing certain lands).
- Establish voluntary measures to meet INRMP goals.

Habitat Acquisition
- Determine where to direct acquisition efforts (prioritize), e.g., vital wildlife crossing areas along Highway 50 and/or other roadways, large parcels of relatively undisturbed habitat, or habitats with relatively little representation in the County or elsewhere (rare habitat types).

Habitat Management
- Restore and enhance existing culverts or other potential major road crossing areas and/or areas of adjacent habitat to enhance wildlife movement and permeability.
- Restore habitats to facilitate species movement.
- Use fencing along Highway 50 to encourage animal movement through desired crossings.
- Encourage traffic calming and/or traffic signaling on roads that have high numbers of wildlife-vehicle collisions to protect wildlife and public safety.
- Encourage pest-control strategies that minimize herbicides, pesticides, and certain vegetation removal in areas of important habitat.
- Encourage fire prevention and fuel management activities that benefit wildlife movement and habitat enhancement (possibly coordinate with fuel management for biomass projects).

Monitoring Program
- Choose to focus required monitoring on specific species or habitat conditions.
- Measure the effectiveness of stewardship in reducing harm to wildlife and habitats.
- Monitor developing areas to measure impacts from land-use and transportation.

Public Participation
- Establish a method for promoting stewardship and educational outreach opportunities.
- Increase public participation, education, and awareness.

Funding
- Identify outside cooperators to work with and to provide funding, including State, Federal and private entities.

Appendix A
INRMP Implementation Options Report

TABLE OF CONTENTS

List of Tables

EXECUTIVE SUMMARY

This report is the fourth and final report of the El Dorado County (County) Integrated Natural Resources Management Plan (INRMP) Phase I study. The report presents optional strategies that could be employed in Phase II to develop the overall INRMP master plan and provides strategies for developing a Phase II scope of work. According to the County's General Plan, the INRMP shall define and describe actions to be taken to mitigate for impacts to wildlife and plants associated with development.

Impacts associated with development include those caused by land-conversion from natural to partially and fully-developed states, increased extent and/or capacity of the transportation system, and increases in both the developed footprint and degree of fragmentation within the study area. Mitigation for these impacts can occur in four ways: avoidance, minimization, restoration and compensation. Avoidance and minimization are usually the least expensive and easiest forms of mitigation and are least subject to challenge. Compensation is the most expensive, sometimes least effective, and most subject to challenge.

This report follows the outline of the INRMP components as currently defined by General Plan Policy 7.4.2.8. It *does not* provide options to the structure, but rather implementation options for each of the main components, or sub-sections, of Policy 7.4.2.8 as currently written. As defined by County General Plan Policy 7.4.2.8, the INRMP shall consist of eight sections as follows:

A. Habitat Inventory
B. Habitat Protection Strategy
C. Mitigation Assistance
D. Habitat Acquisition
E. Habitat Management
F. Monitoring
G. Public Participation
H. Funding

For each of the eight sections, the report provides an introduction, the General Plan context, a brief description of work completed to date in Phase I, a description of the defined Optional Approaches, and a summary matrix for each topic noting advantages and disadvantages of each option and relative costs.

Appendix A summarizes what other local jurisdictions are doing to address wildlife and plant mitigation needs. Appendix B provides conceptual examples of how the INRMP Implementation Options Report can be shaped as overall strategies for preparing the INRMP. Appendix C consists of a recommended strategy for developing a Phase II scope of work.

<u>INRMP Relationship to Pine Hill Preserve</u>

The Pine Hill Preserve is within the INRMP study area boundary and the INRMP will complement activities of the preserve, for example, by providing habitat connectivity to the preserve. While the Pine Hill Preserve was established to protect specific species, the INRMP is intended to focus on overall biodiversity and habitat protection for a variety of plants and wildlife within the study area (including special status species). As directed by General Plan Policy 7.4.2.8, all lands acquired under the INRMP will be added to the Ecological Preserve Overlay area.

INRMP Relationship to Oak Woodland Management Plan (OWMP)

The Oak Woodland Management Plan (OWMP) is associated with the INRMP but it was created with specific mitigation requirements as described in General Plan Policy 7.4.4.4 through a separate Objective in the General Plan. Other components of the INRMP (such as mitigation fee structure) could be based on policies already established by the OWMP, or new policies may be developed. Similarly, Priority Conservation Areas (PCAs) were identified for oak woodlands in the OWMP and could be developed for other important habitat types by utilizing methodologies similar to those established for the OWMP. Since mitigation for impacts to oak woodland habitat is dealt with in the OWMP, the INRMP will focus on mitigation for other important habitats. When considering the locations and prioritization of wildlife movement corridors and other conservation areas, the mapping work done for the OWMP will be considered. Ultimately, the OWMP will become part of the final INRMP.

1. HABITAT INVENTORY

1.1 Introduction

This part of the INRMP describes how important habitats in the INRMP study area are identified and mapped and how the amount of these habitats protected by County programs is tracked. The General Plan states that the Inventory is to be updated every three years and shall show the amount of important habitat (by habitat type) removed due to new development during that period.

The initial inventory has been completed (INRMP Phase I). The following section describes optional methods available to provide the required updates to the inventory and to identify the habitat areas that are protected, and habitat areas that have been removed.

1.2 General Plan Context

The following text is presented verbatim from Subsection A of Policy 7.4.2.8:

A. Habitat Inventory. This part of the INRMP shall inventory and map the following important habitats in El Dorado County:

1. *Habitats that support special status species;*
2. *Aquatic environments including streams, rivers, and lakes;*
3. *Wetland and riparian habitat;*
4. *Important habitat for migratory deer herds; and*
5. *Large expanses of native vegetation.*

The County should update the inventory every three years to identify the amount of important habitat protected, by habitat type, through County programs and the amount of important habitat removed because of new development during that period. The inventory and mapping effort shall be developed with the assistance of the Plant and Wildlife Technical Advisory Committee, CDFG, and USFWS. The inventory shall be maintained and updated by the County Planning Department and shall be publicly accessible.

1.3 Background Information

The initial INRMP Habitat Inventory was prepared by the County in March 2008. The Inventory and associated maps were updated in April 2010 as a part of the INRMP Phase I scope of work.

To update the existing Initial Inventory Map, the County gathered additional data, met with the Plant and Wildlife Technical Advisory Committee (PAWTAC) and the INRMP Stakeholders Advisory Committee (ISAC), and revised the map to show the best data that is currently available.

For graphic clarity, each of the five elements was displayed on separate maps. Although they are presented as separate maps, all of the information is part of the same Geographic Information

System (GIS) database, which will be important for Phase II analysis and preparation of the INRMP. The process used to create each of the five maps is described below.

1.3.1 Habitats that Support Special-Status Species

The original Initial Inventory Map prepared by the County used the California Natural Diversity Database (CNDDB) point data, U.S. Fish & Wildlife Service (USFWS) Critical Habitat, and the Pine Hill Preserve area to show special-status species. For the map update, the County utilized the most current versions of these same data sources as well as U. S. Forest Service (USFS), Natural Resource Conservation Service (NRCS), and several other data sources. This includes the recently proposed changes to the areas of Critical Habitat for the California red-legged frog (*Rana aurora draytoni*) (CRLF) in El Dorado County. It should be noted that the CNDDB is based on project-driven surveys and therefore the data it contains is incomplete.

1.3.2 Aquatic Environments including Lakes, Streams, and Rivers

The data source utilized to produce this map is the National Hydrography Dataset from the U.S. Geological Survey (USGS). This data includes a thorough inventory of intermittent and perennial streams, bodies of water, and man-made water conveyance structures (e.g., canals). It shows some ephemeral streams but the list of ephemeral water courses is not comprehensive.

1.3.3 Wetland and Riparian Habitats

The wetland and riparian habitat map update is based on the USFWS National Wetlands Inventory (NWI) database. The USFWS NWI database is derived from 7.5-minute USGS topographic data and aerial photo interpretation. Many seasonal wetlands are not included in this inventory due to the difficulty of mapping these features without extensive ground verification.

1.3.4 Important Habitat for Migratory Deer Herds

Information on migratory deer herds is very limited. The only existing source is the California Department of Fish & Game (CDFG) data produced in 1990 from reports prepared in the 1970s and 1980s. CDFG staff indicated that there have not been any recent updates, although significant land use changes have occurred since those maps were produced. These changes, including increases in human population and traffic, have likely affected the current distribution of migratory deer herds.

1.3.5 Large Expanses of Native Vegetation

A large expanse of native vegetation is dependent upon the vegetation type and the species utilizing the habitat provided by the vegetation type. Therefore, a large expanse of oak woodland is different in size than a large expanse of a vegetation type with relatively limited distribution such as serpentine chaparral. Similarly, a large expanse of native vegetation for a population of mule deer is larger than that required for a population of California horned-lizard. Phase I mapping of the large expanses of native vegetation focused on identifying all areas of vegetation that are relatively undisturbed. Phase II could consider species-specific habitat requirements to determine conservation strategies and potential mitigation.

To show large expanses of undisturbed areas, the County first mapped areas that have extensive land development and/or road networks. The remaining areas were then shown as large expanses of native vegetation using existing vegetation mapping data.

1.4 Optional Approaches

1.4.1 Existing Mapping Technique

The methodology for producing the mapping was accepted by the Board of Supervisors in June 2010. The first option employs this same methodology for future updates.

1.4.2 Identification of Priority Conservation Areas

This option could be employed to refine the Large Expanses of Native Vegetation map to identify habitat areas within the study area that are currently protected as well as habitat areas that should be protected as part of the INRMP. This strategy could be based on additional GIS Mapping to include land ownership, development agreements, zoning, connectivity analysis, Important Biological Corridors (IBCs), etc. Areas that are identified as priority conservation areas could suit the definition of “Important Habitat” as defined by General Plan Policy 7.4.1.6.

1.4.3 Additional Data Sources

This option supplements the first option and serves to update the initial inventory maps with new information as new data becomes available. General Plan Policy 7.4.2.8 requires updates every three years and these updates should consider new information. This could include utilization of the United States Army Corps of Engineers’ (USACE) forthcoming updates for aquatic environments and wetlands maps. It could also include incorporation of additional data obtained from field research and other activities performed in association with implementing the monitoring component of the INRMP.

1.4.4 Field Surveys for Habitats, Wildlife, and Plants

In order to refine existing mapping, biologists could perform targeted surveys of the study area to document the extent of important habitat types. This could involve various levels of effort from documenting potential habitat for a few particular species to a more intensive survey designed to capture numerous habitats and species. This effort would increase confidence in the current maps.

Table 1 Summary of Optional Approaches for Habitat Inventory

Option Type	Advantages	Disadvantages	Relative Cost
Existing Mapping	• Board-approved methodology • Database already exists	• Best available data is incomplete	Low
Identification of Priority Conservation Areas	• Eliminates areas that are unlikely candidates for acquisition • Utilizes methodology defined by OWMP	• Could reduce total acreage available that has been identified as important habitat • Reduces connectivity • Increases habitat fragmentation	Moderate
Additional Data Sources	• Utilizes new information as it becomes available	• Additional expense to create complet database	High
Field Surveys	• Gives greater confidence to mapping • Identifies locations of previously undefined habitats	• Requires a large effort.	High

2. HABITAT PROTECTION STRATEGY

2.1 Introduction

This section describes science-based strategies that can be used to support habitat protection. The strategies could be in the form of ordinances, direct payments, education and outreach or land acquisition. For example, riparian setbacks and Important Biological Corridors (IBCs) are strategic ordinances that protect important habitats and wildlife movement. Land-use regulations enforced through the planning process for land development are inexpensive conservation actions that local governments can take. Protection of habitat values could also be in the form of "payment for ecosystem services" (PES). For example, conservation payments to agricultural land owners to encourage best management practices can be offered. Habitat protection can also result from stewardship training and education programs that encourage habitat-protection behavior in targeted (e.g., riparian land-owners) or broad public audiences. Finally, the protection could be attained through acquisition of conservation easements or land in fee title. Any habitat protection strategy should consider using a combination of these options to achieve the goals of the INRMP. In all cases, an overall assessment and planning using optimization tools would be appropriate for both establishing an efficient habitat protection system and assessing effectiveness of the system.

2.2 General Plan Context

The following text is presented verbatim from Subsection B of Policy 7.4.2.8:

B. Habitat Protection Strategy: This component shall describe a strategy for protecting important habitats based on coordinated land acquisitions (see item D below) and management of acquired land. The goal of the strategy shall be to conserve and restore contiguous blocks of important habitat to offset the effects of increased habitat loss and fragmentation elsewhere in the county. The Habitat Protection Strategy should be updated at least once every five years based on the results of the habitat monitoring program (item F below)(Section 6 in this report). *Consideration of wildlife movement will be given by the County on all future 4- and 6-lane roadway construction projects. When feasible, natural undercrossings along proposed roadway alignments that could be utilized by terrestrial wildlife for movement will be preserved and enhanced.*

2.3 Background Information

Phase I of the INRMP included mapping large expanses of native vegetation and identifying potential wildlife corridors and areas where wildlife road crossings are needed or can be improved. This section describes specific strategies for protecting and enhancing these resources.

2.4 Optional Approaches

2.4.1 Local Ordinances and Land Use regulations

It is difficult to anticipate and expensive to pay for all of the disparate natural values that contribute to a functioning ecosystem and conservation of biodiversity. Contemporary municipal and county planning is often a balancing act among competing demands that include conservation of natural values and systems. The County could utilize land use regulations for activities such as subdivision design, zoning, and permitting to assist in conservation.

Ordinances can help implement conservation priorities without the expense of buying properties. For general ecosystem attributes like connectivity and habitat quality, ordinances are one way to protect what would be difficult to buy across all habitat types.

2.4.2 Important Biological Corridors (IBCs)

The IBC's, as currently defined by the County, were developed under the Environmentally Constrained General Plan Alternative. That alternative was not adopted in its entirety and therefore it is appropriate to reconsider the location of the IBCs in light of the mapping and connectivity studies that have now been prepared. To do so would require a General Plan Amendment. The IBC's also need to be correlated with the adopted Generl Plan.

2.4.3 Payment for Ecosystem Services

Wildlife habitat quality and wildlife movement are valuable ecosystem attributes. An argument can be made that if someone goes out of their way to provide these attributes through actions that are not otherwise required, then payment may be appropriate. Significant funding needs to be in place in order for this to be an effective option.

2.4.4 Stewardship & Education

Educating the public about local wildlife, habitats, and potential threats to wildlife can foster a sense of stewardship over local resources. Often, people need better access to information to balance the actions that could benefit conservation with their day to day activities. Fostering stewardship and education can assist in implementing the INRMP and can be encouraged by offering incentive-based tax credits for activities such as maintaining wildlife-friendly fencing or developing land in a way that is consistent with maintaining wildlife movement in that area.

2.4.5 Easement and Fee Title Acquisition

A traditional conservation practice in the face of development is acquisition of land in fee title or as conservation easements. This practice is common, but presents uncertainties that cannot be ignored (also see Section 4, Habitat Acquisition).

2.4.6 Habitat Prioritization

There are many ways that lands can be prioritized for action under the options listed here. For the last decade, conservation biologists have been developing tools to assist in decision-making about potentially effective habitat protection strategies. These include approaches that optimize selection of lands for action based only upon potential conservation value. Others combine cost with conservation value to select sets of lands that cost-effectively provide the values being sought. Still others address uncertainties associated with incomplete knowledge, climate change effects, changes in regulation, and changing costs and availability of funds.

Conservation prioritization is a common, economical way to address impacts and mitigation. A triage process is often performed to locate in space and time the places and/or actions that are likely to cause the greatest irreversible change. This process may create three priority tiers: high priority for action, moderate priority, or watch for change, and low priority.. Lands that have high ecological value or that are irreplaceable are given moderate to high priorities depending on whether change is unlikely (or unknown) or whether change is imminent. Similarly, lands that have low (or unknown) ecological value are given low to moderate priorities.

Using the INRMP study area as an example, community areas and highway 50 corridor areas could be prioritized because of the high likelihood of development and the resulting ecological high value of remaining lands. A second tier of priority areas would be areas in the study area that were identified in the General Plan as intended for eventual development and that serve current natural functions. The third tier would be lands that are unlikely to be developed under the current General Plan, such as the eastern portion of the study area which is mostly coniferous forest. Since this area is unlikely to be affected by development, it should be given a low priority for conservation efforts.

A habitat prioritization system can also be utilized to rank habitat quality and to provide recommendations for appropriate mitigation measures (see Section 3). Less mitigation, for example, would be required for impacts to lower quality habitat. This type of system can also be used for purposes of determining what land to acquire (see Section 4, Habitat Acquisition).

2.4.7 Williamson Act

Another option for temporary habitat protection could be accomplished by entering into Williamson Act contracts with land owners. This offers the benefit of tax relief to the property owner while the land remains less developed. In this option lands may enter and leave Williamson Act designations so long as total acreages of habitat to be protected are maintained. The issue of temporary habitat protection could be addressed by requiring a replacement Williamson Act contract with habitats and acreages comparable to those removed.

2.4.8 Considerations of Wildlife Movement for Road and Construction Projects

Non-interchange infrastructure projects also provide opportunities for incorporation of wildlife movement needs into designs and planning. Wildlife movement needs could be used to help identify route alternatives with the lowest impact to wildlife and landscape connectivity. Specific design considerations could be included at locations of highest probability of crossing by animals. Improved roadway designs (e.g. medians that allow crossing by many species) could be incorporated in all infrastructure projects in the INRMP planning area. This section could also serve to identify which specific roads within the County constitute major roadways that are in need of wildlife considerations, and would prioritize proposed improvements based on cost effectiveness.

Table 2 Summary of Optional Approaches for Habitat Protection

Option Type	Advantages	Disadvantages	Relative Cost
Local ordinance and land use regulations	• Predictable landscape outputs • Can plan for ecological patterns and processes that cross parcel boundaries	• County responsible for full implementation • Requires County action	Low
	•	•	
Revise and Update Important Biological Corridors	• Current adopted IBCs were developed for the environmentally constrained General Plan Alternative, which was not adopted in its entirety • Current IBCs were not scientifically developed	• Requires a General Plan Amendment	Moderate
Payment for ecosystem services	• Politically popular because of funding to landowners	• Can be expensive • Results are not predictable	Potentially high
Stewardship & education	• Politically popular and palatable	• Effectiveness highly variable and hard to measure	Moderate
Easement and fee title acquisition	• Politically popular because of funding to landowners	• Likely to be expensive • Results are not predictable	Potentially high
Habitat prioritization	• Rationale for investment of funds, conservation-based	• Relies on willingness of sellers	Low
Williamson Act	• Can offer relatively quick protection from development	• Temporary – property can be taken out of contract	Low
Consideration of Wildlife Movement for Road and Construction Projects	• More cost effective to incorporate design concepts during initial construction rather than retrofits.	• Higher construction costs	Moderate

3. MITIGATION ASSISTANCE

3.1 Introduction

This section describes options available to mitigate for unavoidable impacts to areas identified as important habitat. These are impacts that are the result of development activities for which a discretionary permit is issued. Not everything can be protected, so priority for inclusion in the acquisition portion of the INRMP (Section 4, Habitat Acquisition) must be established to optimize cost and effectiveness of the program and to capture key opportunities.

3.2 General Plan Context

The following text is presented verbatim from Subsection C of Policy 7.4.2.8:

C. Mitigation Assistance. This part of the INRMP shall establish a program to facilitate mitigation of impacts to biological resources resulting from projects approved by the County that are unable to avoid impacts on important habitats. The program may include development of mitigation banks, maintenance of lists of potential mitigation options, and incentives for developers and landowner participation in the habitat acquisition and management components of the INMRP.

3.3 Background Information

The County currently has two mitigation programs in place: the Ecological Preserve and the Oak Woodland Management Plan. The INRMP could adopt or modify strategies developed in one of these plans to identify areas to conserve and set priorities of lands to be acquired or for which a different instrument (Memorandum of Understanding (MOU), lease, easement) may be appropriate.

- Ecological Preserve Plan
    - Ranks three types of lands that require varying degrees of mitigation for impacts.
    - Identified an ecological preserve area; impact fees collected are used to acquire parcels from willing sellers in that area.
- Oak Woodland Management Plan
    - Identified Priority Conservation Areas where parcels from willing sellers should be acquired or conservation easements could be obtained in perpetuity.
    - Options for developers include replacement of oak trees on-site as mitigation for loss of oak canopy.

These programs have established priorities for acquisition and mitigation requirements.

3.4 Optional Approaches

3.4.1 Avoidance of Impact

There are several ways for the County to avoid impacts under the General Plan. One is to discourage development of areas with natural values that are either difficult to replace or irreplaceable. Another is to develop ordinances that protect certain features because they have been shown scientifically to provide environmental benefits (e.g., riparian/upland setbacks associated with streams, last-remaining wildlife movement areas). A third is to use development agreements and the permit process as ways to limit development of certain areas. A fourth is to use potential impacts from enhanced transportation system capacity as a result of development as a way to gauge development impacts and thus avoid them. Transportation system avoidance of impact can occur by placing development so that increased circulation does not result in impacts to natural systems, and by avoiding parts of the landscape which have irreplaceable or difficult to replace values. These actions have moderate fiscal costs to the county for management of the ordinance development and permit & agreement review. These actions may result in lost development opportunities to individual land-owners, which is a common result of General Planning.

3.4.2 Minimization of Impact

When development occurs, potential impacts can sometimes be mitigated by changing practices on site. One method is to consider clustered vs. dispersed development. From an ecological point of view, low-density development is better than high-density, if the impacted area stays the same, but the number of units can vary. Conversely, high-density, clustered development may be better than low-density, dispersed development if the impacted area and the number of units stayed the same.

Because the pattern of development can matter for ecological attributes and processes, minimization of impacts can occur on-site through design modification. General Plan Policy 7.4.2.2 calls for mandatory clustered development in areas identified as important habitat for wildlife movement. Utilizing this option could help fulfill that policy. There will still be impacts from site development that may need to be mitigated off-site, but by clustering proposed development to less than 50% of the site, greater ecological function is likely. Minimization of transportation system impacts can occur by retaining materials and energy from construction on-site, by muffling noise produced by construction or use of infrastructure, by providing passage for animals under or over the right-of-way, and by designing the overall road network to provide for wildlife movement and other ecological flows.

3.4.3 Restoration of Impacted Area

Some infrastructure projects will have impacts that cannot be avoided in implementing the project, but can potentially be restored on-site. These types of impacts could include sites for construction material and vehicle storage, underground infrastructure, or other temporary types of impacts. If possible, it is generally ecologically preferable to restore these degraded areas rather than seek compensatory mitigation off-site. This approach can also save time and resources that would otherwise have to be allocated to finding new off-site mitigation opportunities. If a large portion of a project area is to be permanently converted then often only a small amount of on-site restoration will be possible, with the remainder of the ecological impacts requiring compensatory mitigation.

3.4.4 Compensation for Impact

True compensation for impacts from development is often impossible because of the land-consumption that accompanies development, both on constructed sites and from fragmentation of landscapes and stream systems. What is called compensatory mitigation is actually compensation for area affected, which will tend to under-compensate for actual impacts. Developed area compensation can take several forms: 1) fee-title acquisition of undeveloped land at a certain ratio to the developed footprint; 2) acquisition of conservation easements similar to (1); and 3) acquisition and restoration of degraded lands to function at a higher ecological level. The first two options are common features of Habitat Conservation Plans (HCPs), Natural Communities Conservation Plans (NCCPs), and ad hoc mitigation for urban development not under an HCP or NCCP. These methods have mixed results when viewed from an administration or planning point of view and sometimes poor results from an environmental point of view. Some federal agencies have moved toward giving preference to mitigation banks and in-lieu fees because they have found these mitigation measures are more effective than small, site-specific on-site mitigation. The third approach of restoring environmental attributes and processes is less common, but is likely to provide the most value of the three approaches.

Transportation system impacts are similarly unlikely to be truly compensated for because of the land-consumption, fragmentation, and other direct effects of the road network. What is commonly called compensatory action for transportation systems is similar to compensatory mitigation for development and suffers similar weaknesses. Restoring function lost due to transportation system development and daily use is the closest option to truly compensating for impacts. This can include restoring wildlife movement, restoring plant community connectivity, restoring aquatic flows, and restoring natural geomorphic and disturbance processes. Over-arching the approaches is the general approach of replacing like with like.

3.4.5 Mitigation Banks within the INRMP Study Area

As part of the compensation approach, the County could create mitigation banks within the INRMP study areas by acquiring easements in perpetuity or by purchasing land in desired areas or delineating areas for inclusion in a preservation area. In-lieu fees collected from developers would reimburse the County for the acquisition of these lands. This option could be expensive, but would keep money spent by the County within the INRMP study area. If the bank is large enough, the County could cooperate with adjacent jurisdictions to provide mitigation lands and share the cost of acquisition. It may be desirable to set up different mitigation banks for different important habitat types.

3.4.6 Regional Mitigation Banks

The County could participate in regional, private, mitigation banks or non-profit land trusts that have identified willing sellers of desirable habitats, such as the American River Conservancy and the Cosumnes River Preserve. The advantage of this option is that it is a pay-as-you-go system. The disadvantage is that money from the County could go to acquiring habitat in another area.

3.4.7 In-Lieu Fees

In-lieu fees collected from developers could be used to purchase land or conservation easements or to construct capital improvement projects to improve wildlife conditions.

3.4.8 Options for Property Owners and Developers

The County could credit fees owed to the INRMP by property owners and developers for covered activities. The credits could be issued for: restoration of degraded habitat or high fire-risk/excessive fuels habitat, either on-site or off-site; preserving corridors or important habitat on-site by effective clustering or avoidance of key habitat areas; participating in other mitigation programs (preserving wetlands, participation in Ecological Preserve or OWMP).

Table 3. Summary of Optional Approaches for Mitigation Assistance

Option Type	Advantages	Disadvantages	Relative Cost
Avoidance of Impact	• No impact to wildlife	• Lost development opportunities to individual land owners	Moderate
Minimization of Impact	• Allows development to occur and still accommodates wildlife • Encourages creative and environmentally sensitive design	• May require zoning change	Moderate
Restoration of Impacted Area	• Can correct for temporary situations • Ecologically preferable to compensation	• Usually not possible to restore entire site	Moderate to High
Compensation for Impact	• Provides options for developers	• Landscape fragmentation • Requires frequent monitoring	High
Mitigation Bank within INRMP study area	• pay-as-you-go system • Keeps collected fees within INRMP study area • Could provide mitigation opportunities for adjacent jurisdiction and cost sharing for the County	• Cost of administration	High
Regional or Private Mitigation Banks	• Pay-as-you-go system	• Protected habitat may not be within study area	Moderate
Capital Improvements	• Pay-as-you-go system • Provides source of funding to improve existing conditions	• Administrative costs	Moderate
Restoration by property owner or developer	• On-site restoration	• Need to monitor to evaluate success • Requires dedication in perpetuity.	Moderate
Credit for wildlife sensitive design	• Lessens impacts	• Hard to measure	Low
Credit for participation in other mitigation programs	• Other programs already established	• Not all habitat types are currently represented by other programs	Low

4. HABITAT ACQUISITION

4.1 Introduction

This section describes specific strategies to identify and acquire land that supports habitat of high value so that it can be protected from development. Land will be acquired through easements or fee title from willing sellers only and may include habitat that supports special-status species, habitat that provides important linkages or improves connectivity, or habitat that has been identified to support biodiversity or other INRMP goals.

4.2 General Plan Context

The following text is presented verbatim from Subsection D of Policy 7.4.2.8:

D. Habitat Acquisition. Based on the Habitat Protection Strategy and in coordination with the Mitigation Assistance program, the INRMP shall include a program for identifying habitat acquisition opportunities involving willing sellers. Acquisition may be by state or federal land management agencies, private land trusts or mitigation banks, the County, or other public or private organizations. Lands may be acquired in fee or protected through acquisition of a conservation easement designed to protect the core habitat values of the land while allowing other uses by the fee owner. The program should identify opportunities for partnerships between the County and other organizations for habitat acquisition and management. In evaluating proposed acquisitions, consideration will be given to site specific features (e.g., condition and threats to habitat, presence of special status species), transaction related features (e.g., level of protection gained, time frame for purchase completion, relative costs), and regional considerations (e.g., connectivity with adjacent protected lands and important habitat, achieves multiple agency and community benefits). Parcels that include important habitat and are located generally to the west of the Eldorado National Forest should be given priority for acquisition. Priority will also be given to parcels that would preserve natural wildlife movement corridors such as crossing under major roadways (e.g., U.S. Highway 50 and across canyons). All land acquired shall be added to the Ecological Preserve overlay area.

4.3 Background Information

Phase I of the INRMP generated much of the material required to identify habitats and wildlife corridors which should be part of the final INRMP. Task 1a of Phase I identified important habitat by habitat type within the County. Lands targeted for acquisition will either be part of the identified important habitat areas or lands associated with wildlife movement and corridors. These lands could be identified by the Habitat Prioritization task proposed as a part of Section 2, Habitat Protection Strategy.

4.4 Optional Approaches

Lists that identify the land that should be acquired need to be developed prior to initiating programs for land acquisition. Numerous factors would be used to determine priority for acquisition including, results of habitat prioritization studies (see Section 2, Habitat Protection

Strategy), parcels that offer the largest contiguous pieces of habitat, parcels that offer the best conservation value in terms of their cost and as Policy 7.4.2.8 indicates, areas west of the National Forest and parcels that are strategically located in areas needed for wildlife crossings or corridors. Below are four techniques that could be used in some combination to generate a prioritized list of lands for acquisition.

4.4.1 Acquisition by Habitat Type

The background material developed in Phase I is available in a GIS database. GIS modeling and other techniques can be further utilized to identify parcels that meet the above identified criteria. This task could also serve to develop ratios of habitat to protect by habitat type (number of acres to protect based on the number of acres identified as important habitat).

4.4.2 Lands at Risk of Conversion

Another approach to prioritizing land acquisition would be to identify parcels of land identified as important habitat that are at risk of conversion to an incompatible land use. This could either be a stand-alone study or a continuation of the first option. Utilizing GIS or other methods, parcel lists can be further identified or prioritized based on the introduction of additional GIS layers such as Zoning, General Plan Designation, or Development Agreements.

4.4.3 Survey to Identify Willing Sellers

A third option may be as simple as sending queries to property owners whose parcels are located within areas of important habitat. The query letter could include relative background information about the INRMP and include a survey to be sent back by the property owner (postcard format) that identifies their willingness to participate.

4.4.4 Targeted Properties

A fourth option for land acquisition would be to target specific parcels previously identified. These could include parcels ranking high in habitat prioritization or parcels that may have strategic importance such as parcels adjacent to major roadways where new wildlife crossings are desired, or existing crossings could be improved.

As indicated in General Plan Policy 7.4.2.8, acquiring land for the purposes of habitat protection or restoration does not necessarily involve gaining fee title to the subject property. There are numerous other property rights strategies that could be employed and for which inquiries and options could be made to property owners. Those strategies are described below.

1. **Fee Title.** This is the acquisition of most or all of the rights to a tract of land. There is a transfer of property rights with the formal conveyance of a title. While a fee title acquisition involves most rights to a property, certain rights may be reserved or not purchased.
2. **License or Permit.** This type of agreement is an acquired authorization for a specific activity on land of another party. They are temporary in nature, and no property rights are acquired. Their advantages are simplicity and ease to negotiate. An example would be a license or permit to conduct a wildlife inventory.
3. **Cooperative Agreement, MOU, and Memorandum of Agreement.** This is a simple habitat protection action, and no property rights are acquired. An agreement is usually

long term but can be modified by either party. They are most effective in establishing multiple uses for management of land. An MOU is a document describing a bilateral or multilateral agreement between parties. It expresses a convergence of will between the parties, indicating an intended common line of action. It is often used in cases where parties either do not imply a legal commitment or in situations where the parties cannot create a legally enforceable agreement.

4. **Easement.** This is the acquisition of a limited right(s) (less-than-fee). The right to control access, grazing, timber harvest, hunting, and development of the property are some typical examples of rights acquired in easements. A conservation easement is legally binding, whether the property is sold or passed on to heirs. Because use is permanently restricted, land subject to a conservation easement may be worth less on the open market than comparable unrestricted and developable parcels.
5. **Use Reservation.** It is sometimes desirable to acquire fee title to land, but the existing owner is permitted to continue to live on or use the land. This is called "extended use" or "use reservation." An example is a property with a residence that would not interfere with project management if allowed to remain. A use reservation may be reserved by the owner for a specified period of time or for the remainder of his/her life. Many types of use reservations can be negotiated.
6. **Agency Mitigation.** Land could also be acquired and added to the ecological preserve from state and federal jurisdictional agencies as part of existing mitigation requirements for INRMP issues such as wetlands (money could be directed at the INRMP program for acquisition purposes instead of offsite mitigation). While potentially beneficial to the INRMP program, this approach does not fulfill the County's requirement for mitigation under CEQA.
7. **Lease.** A lease is a contract calling for the lessee (user) to pay the lessor (owner) for use of an asset.

Table 4 Summary of Property Rights Strategies

Acquisition Type	Advantages	Disadvantages	Relative Cost
Fee Title	• Total transfer of property rights • Property rights can be transferred to another agency for management	• Cost • Need for management and maintenance of the acquired lands	High
License or Permit	• Low initial cost	• Temporary	Low
MOU	• Low cost	• Temporary • May not be legally binding • Does not fulfill CEQA requirement for mitigation	Moderate
Easement	• Achieves goal without cost of ownership	• Usually only applies to a portion of the property • Monitoring enforceability	Moderate
Use Reservation	• Retains property rights • Accommodates existing land owners	• Possible incompatible land uses • Property access • Monitoring enforceability	Moderate
Agency Mitigation	• Utilizes programs already in place	• Need for management and maintenance of the acquired lands • Does not fulfill CEQA requirement for mitigation	Low
Lease	• Purchase not required	• Temporary • Does not fulfill CEQA requirement for mitigation	Moderate

4.5 Potential Partnerships

Although this report describes many partnering opportunities with other agencies, it is the County's sole responsibility to implement the INRMP. Other agencies may augment action taken by the County but they are not responsible for implementing and enforcing the INRMP. Land acquisition, for example, may be by state or federal land management agencies, private land trusts, mitigation banks, or other public or private organizations with assistance from the County. The County could assist in the initial acquisition and then turn the management and ownership over to another agency or entity.

List of Potential Partners

Federal
- Bureau of Land Management (BLM)
- Bureau of Reclamation
- Environmental Protection Agency (EPA)
- Federal Highway Administration
- Farm Service Agency
- USFWS
- USFS
- National Center for Recreation and Conservation
- National Resources Conservation Service

State
- California Conservation Corps
- California Department of Conservation
- CDFG
- California Department of Forestry and Fire Protection (CDF)
- California Department of Parks and Recreation
- California Department of Transportation
- California Resources Agency
- California Wildlife Conservation Board

Special Districts
- Georgetown Divide Resource Conservation District (GDRCD)
- El Dorado County Resource Conservation District (EDCRCD)
- El Dorado Irrigation District (EID)
- Georgetown Divide Public Utility District (GDPUD)
- Other special districts

Private
- Mitigation banks
- American River Conservancy
- The Nature Conservancy
- Other private organizations

Table 5 Summary of Optional Approaches for Habitat Acquisition

Option Type	Advantages	Disadvantages	Relative Cost
Acquisition by Habitat Type	• Takes advantage of previously preformed work	• Requires specific software	Moderate
Lands at Risk of Conversion	• Development agreements may already be in place • Density requirements may already be in place and other areas that could accommodate those densities would need to be identified and changed	• Ignores biology of what is existing ‘on the ground’ • Leaves little room for negotiation	High
Survey to Identify Willing Sellers	• Available parcels may be fragmented	• Not everyone will respond to the survey • Willingness may change over time • Property ownership may change	Low
Targeted Properties	• Critical properties can be identified based on previous studies	• Identified properties may not have willing sellers	Low

5. HABITAT MANAGEMENT

5.1 Introduction

After property or easements have been acquired, lands need to be properly managed in order to provide optimal wildlife value. In the event that property rights are not acquired, agreements can be made with property owners so that they can provide management activity. This section describes optional approaches to habitat management. A key component will be the identification of responsible parties (who does what and how is it paid for). It is closely related to Section 4, Habitat Acquisition and Section 6, Habitat Monitoring.

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5.2 General Plan Context

The following text is presented verbatim from Subsection E of Policy 7.4.2.8:

E. Habitat Management. Each property or easement acquired through the INRMP should be evaluated to determine whether the biological resources would benefit from restoration or management actions.

Examples of the many types of restoration or management actions that could be undertaken to improve current habitat conditions include: removal of non native plant species, planting native species, repair and rehabilitation of severely grazed riparian and upland habitats, removal of culverts and other structures that impede movement by native fishes, construction of roadway under and overcrossing that would facilitate movement by terrestrial wildlife, and installation of erosion control measures on land adjacent to sensitive wetland and riparian habitat.

5.3 Background Information

Phase I of the INRMP identified important habitats within the study area by habitat type. Each habitat type may require different management strategies.

5.4 Optional Approaches

5.4.1 <u>Design</u>

Develop specific habitat management plan for each major habitat type.
Each major vegetation type will require specific management considerations and actions tailored to their characteristics.

Design Guidelines
While new infrastructure construction impacts existing ecological features such as wildlife connectivity, it also provides the opportunity to account for wildlife needs in the early phases of design and construction. New road alignments or alternatives for other types of projects could be selected to minimize the expected effects on wildlife connectivity. Suitable wildlife crossings and corridors could be explicitly included in designs for new projects. Design guidelines that

benefit wildlife movement can be developed and included in the County's Design Standards Improvement Manual.

Interchange Replacements to Include Concepts That Benefit Wildlife
Implementation of road projects, such as interchange replacement, provides an opportunity to retrofit existing transportation infrastructure for enhancement of wildlife connectivity. Interchange upgrades are unique opportunities in that these locations often already include cross-highway movement potential, albeit for motor vehicles. Options to be considered could include possible means of integrating wildlife movement into the interchange infrastructure. Landscape-scale patterns should be used to identify the potential for individual species to use interchanges in their movement patterns.

Considerations of Wildlife Movement for Road and Construction Projects
Non-interchange infrastructure projects also provide opportunities for incorporation of wildlife movement needs into designs and planning. Wildlife movement needs could be used to help identify route alternatives with the lowest impact to wildlife and landscape connectivity. Specific design considerations could be included at locations of highest probability of crossing by animals. Improved roadway designs (e.g. medians that allow crossing by many species) could be incorporated in all infrastructure projects in the INRMP planning area. This section could also serve to identify which specific roads within the County constitute major roadways that are in need of wildlife considerations, and would prioritize proposed improvements based on cost effectiveness.

Best Management Practices on Improved Parcels to Preserve Habitat and Prevent Degradation
Best Management Practices (BMPs) could be established for management activities both within conservation areas and for projects in the vicinity of conservation areas.

5.4.2 Infrastructure Improvements/Construction

Vegetated Underpasses
Many animal species have been shown to utilize vegetated under-crossings if they are designed in species-appropriate ways. Considerations in design of underpasses include the amount and spatial arrangement of vegetation as well as the width, height, and length dimensions of the under-crossing. These parameters generally vary between species, so landscape-scale analyses could be used to identify the species most likely to be present at the location of any particular under-crossing. If new underpasses are being considered, the landscape analyses could be used for placement.

Culvert replacements
There are a number of design options for upgrading culverts for use by wildlife. Simple within-culvert additions can be used to facilitate use by smaller species. Larger species may require enlargement of existing culverts. Consideration should also be given to the spatial configuration of the entrance and exit points.

Fence Design and Location
Proper fencing keeps animals from crossing at unsafe locations and directing them to crossing structures. The length of fencing required will depend on landscape characteristics and the probability of wildlife crossing in locations away from crossing structures. Other fencing considerations include designs that allow for escape by animals that have managed to get into the right-of-way area.

Traffic calming
Roads can be designed to decrease vehicle speeds through such techniques as narrowing or tighter turns. Speed bumps or other grade changes can be used to reduce speeds as well. Caution signs warning motorists of wildlife hazards can be effective, especially if coupled with warning lights or posted vehicle speeds. Reduced traffic speeds can be used to enable ease of crossing for wildlife in discrete road segments of concern.

Other structural retrofits (improve existing impediments)
Other potential structures for enabling wildlife road crossings include vegetated overpasses. While these are relatively expensive infrastructure features, they have been shown to be effective for animal species that are unlikely to use under-crossings. Successful overcrossings generally include vegetation and solid barriers that prevent animals from seeing traffic below.

5.4.3 Coordinating Management

Identification of Responsibilities
The Habitat Management component of the INRMP must describe not only what needs to be done, how it will be accomplished, how it will be paid for and identify the responsible parties. Management options could include: no management; county management (i.e., existing county staff or new department); shared management between the County and some outside agency (BLM, CDF, USFS, etc.); full management by outside agency; private management (supported by County, et al.)

Monitoring and Controlling Invasion of Weeds
Invasive weeds are a major management issue in California. Without a specific plan for monitoring and controlling weeds, there is a likelihood of loss of native biodiversity from protected areas. Techniques for controlling invasion include: seasonally-appropriate prescribed fire, grazing regimes, biological agents, and control by hand. Various combinations of these methods could successfully reduce the ecological threat posed by invasive species.

Availability of Water
Seasonal water availability can be an important management issue in areas where water diversion takes place. If ecosystems in conservation areas are being negatively affected by lack of water, solutions could include acquisition of water rights from willing sellers, drilling wells, or even trucking water in for stocking small ponds or other features.

Coordinate Effort with Vegetation Management for Fire Control
Fire is an ecosystem process that plays a large role in many disturbance regimes. Different ecosystems react to this process in different ways. While some are highly sensitive to fire

disturbance, many Mediterranean ecosystems (such as those found in the INRMP planning area) are fire adapted. Management of these ecosystems requires fire or similar disturbance to maintain ecosystem health. These ecosystem needs may also have to be balanced with safety concerns for nearby residents however. Management plans could include prescribed fire, grazing, logging, or other actions to account for fire presence and management.

Table 6 Summary of Optional Approaches for Habitat Management

Option Type	Advantages	Disadvantages	Relative Cost
Design	• Habitat wildlife considerations planned prior to construction	• Fee structure needs to be in place to pay for improvements • May require updates to County policies, manuals, and regulations • Requires coordination of multiple agencies	Low
Infrastructure Improvements/Construction	• Most likely to reduce effects of roads and other infrastructure • Able to plan for most large-scale patterns and processes	• Requires a large amount of county involvement and outside resources	High (but potentially offset)
Coordinated Management	• Can plan for ecological patterns and processes that cross parcel boundaries	• Less owner control of process • Requires county action	Moderate

6. MONITORING

6.1 Introduction

This section describes several approaches to habitat monitoring. Once investments are made under the INRMP, then monitoring the effectiveness of the investments is prudent. Monitoring can take many forms from specific species population monitoring to habitat condition monitoring. It can be done on a variety of temporal and spatial scales as well. Whatever the form of monitoring, it needs to provide feedback information to the County so that modifications can be made to the INRMP as necessary to meet the habitat and species protection goals of the INRMP (e.g., adaptive management).

6.2 General Plan Context

The following text is presented verbatim from Subsection F of Policy 7.4.2.8:

F. Monitoring. The INRMP shall include a habitat monitoring program that covers all areas under the Ecological Preserve overlay together with all lands acquired as part of the INRMP. Monitoring results shall be incorporated into future County planning efforts so as to more effectively conserve and restore important habitats. The results of all special status species monitoring shall be reported to the CNDDB. Monitoring results shall be compiled into an annual report to be presented to the Board of Supervisors.

6.3 Background Information

Why is it monitored?
Before any monitoring program is put in place, clear goals should be established in order to make the information meaningful. The results of the monitoring efforts should be able to answer specific questions about ecosystem conditions.

What is monitored?
This section describes the various habitat and species attributes that can contribute to understanding successes and failures associated with INRMP implementation, so that effective investments are continually made. Monitoring can include indicator species, and identifying habitat values and landscape attributes such as connectivity that can be used in periodic programmatic understanding of the INRMP strategies. Results of the monitoring program should be updated periodically and included with the three year updates to the Habitat Inventory report.

Where is it monitored?
Typically, monitoring would take place on lands controlled under the INRMP. However, not all values will be located only on these lands, or be best measured on these lands (e.g., downstream effects). The scale of monitoring could vary from sites (location on the ground) to stream reaches to habitat types.

When is it monitored?
In designing a monitoring program, consideration should be given to describe the potential timing, frequency, and longevity required of monitoring to understand how things are changing in response to INRMP implementation. Time of year is important in measuring certain ecosystem attributes. Frequency is important and determined by the goal of monitoring and the ecosystem attribute of concern.

Who monitors and uses the information?
The County can take advantage of existing monitoring in the County by other agencies, encourage new monitoring programs by other agencies, pursue grant opportunities to improve County monitoring, and cost-effectively develop its own monitoring as needed. There are existing and proposed monitoring actions within the INRMP study area that the County could use as sources of information. This section describes options for sharing information with other parties and stakeholders so that conservation investors, including the public, can measure the effectiveness of the overall program.

Types of monitoring
There are several types of monitoring that could be conducted to measure conservation return on investments. They range from outputs measures (acres affected by program) to outcome measures (wildlife population health, community satisfaction).

6.4 Optional Approaches

This section presents general ways of monitoring the success of the INRMP over time. These include methods that directly measure the condition of habitats and wildlife populations as well as more indirect ways of monitoring the success of the program, like measuring community satisfaction. Some combination of these approaches should be applied to the INRMP monitoring program.

6.4.1 Program Actions
Two common and related measures of program activity are the amount of money spent and the acres of habitat partially or completely protected. The INRMP needs to identify projected revenue to determine the extent of the program.

6.4.2 Indicator Species Presence/Absence
Monitoring the indicator species described in the Indicator Species report could be an appropriate way to measure ecological performance under the INRMP. This would include monitoring across landscapes under different levels of protection.

6.4.3 Habitat Condition
Habitat fragmentation, exotic species invasion, loss of animal species, changes in natural processes, and climate change can all affect habitat condition. Although presence of indicator species is one indication of habitat health, other conditions may exist that could be assessed through monitoring of habitat characteristics over time. This could include progress of development and its impacts on connectivity and large expanses of native vegetation.

6.4.4 Indicator Species Population Health

The presence or absence of indicator species, or condition of their habitat, could be moderately useful performance measures of conservation investment. Usually, monitoring is conducted on desired ecological outcomes of a program. In this case, the well-being of populations of plants and animals, including indicator species, would be a major desired outcome.

6.4.5 Community Satisfaction

The INRMP is a program to mitigate for impacts resulting from development in western El Dorado County as the 2004 General Plan is implemented. Satisfaction with the program will be important so that stakeholders (e.g., landowners, regulatory agencies, conservation organizations, developers) and the general public understand how funds are invested, what county actions are taken, and the benefit received from the investment.

6.4.6 Data Collection and Evaluation

Monitoring can be a laborious and expensive process. It can also involve smart use of the information generated by other agencies so that the County can strategically target specific places and processes to monitor, Whether the information collected by the county itself, or from other sources, it should fit into an INRMP-knowledge base that is designed for multiple types of data from multiple sources (i.e. Geographic Information System (GIS)).

6.4.7 Performance Indicators

The goal of the knowledge base is not just to collect data, but to inform effectiveness evaluation. The function of evaluating effectiveness is to show what is gained from fiscal and political investments, as well as what is lost. Evaluation of how well a program is doing relative to program goals is the starting point of each smart management cycle. High level goals can be linked to elements or objectives that can be measured.

Table 7 Summary of Optional Approaches for Monitoring

Option Type	Advantages	Disadvantages	Relative Cost
Program actions	• Inexpensive	• Low information content about program performance	Low
Indicator species	• Broad information about ecological benefits	• Generally low information content about each species	Moderate
Habitat condition	• Broad information about potential ecological benefits	• Wildlife benefits unknown	Moderate
Indicator species population health	• Broad and deep information about potential ecological benefits	• Expensive	High
Community satisfaction	• Provides meaningful connection to stakeholders and public	• Relates only to perception of program performance	Moderate
Data collection and evaluation	• Takes advantage of and shares information generated by other agencies • Tool for evaluating program's success.	• Requires skilled technicians to maintain database • Inaccurate or incomplete data	Moderate
Performance Indicators	• Provides means for evaluating plan's effectiveness	• Multiple performance indicators would need to be monitored for.	Moderate

7. PUBLIC PARTICIPATION

7.1 Introduction

Public awareness and acceptance of the concepts and policies that will be presented in the INRMP will be a key component to program success. This section describes various public participation options that could facilitate and maximize stakeholder involvement.

7.2 General Plan Context

The following text is presented verbatim from Subsection G of Policy 7.4.2.8:

G. Public Participation. The INRMP shall be developed with and include provisions for public participation and informal consultation with local, state and federal agencies having jurisdiction over natural resources within the County.

7.3 Background Information

Currently there are two separate County committees that are specifically devoted to development of the INRMP: PAWTAC and ISAC. Both committees advise the Board of Supervisors in the decision making process. Both committees are extensively involved in the preparation of Phase I of the INRMP. This section will describe the public participation options for reaching out to members of the community.

7.4 Optional Approaches

7.4.1 Maintain Current Organization

Maintain current organization utilizing the PAWTAC, ISAC and informing the public through the INRMP website and optional notification of updates and meetings via email.

7.4.2 Increase Public Involvement

Encourage more public involvement with workshops and enhance participation of both local and regional stakeholders.

- Public involvement
    - Continue to engage general public through website postings and email lists to keep citizens apprised of the INRMP process.
    - Public workshops could be scheduled to inform the public at large and provide opportunity for comments. The INRMP has seven sections (7.4.2.8 A-F, H) which the public can review at the draft and the final stages. Workshops could be held to increase public review time for all sections.
    - Provide worksheets to attendees that encourage written input and ranking of components of the plan by importance.
- Involve local, state and federal agencies having jurisdiction over natural resources within the County.
    - This could be achieved by creating an agency stakeholders group which meets regularly to comment on the INRMP development. Members of this group could represent the broad range of interests in the County, and could include agencies that may be involved in funding, habitat acquisition and habitat monitoring.
    - The agency stakeholder group could be organized so that a small subset of the group reports to the Board of Supervisors to keep them informed of the progress of the INRMP.
    - In addition to the agency stakeholder group, a technical advisory group (e.g., PAWTAC) which reviews the INRMP on strictly technical issues could be continued. Members of the agency stakeholder group could also participate in the technical group, but separation of those duties should be maintained.
    - Suggested List of Agency Stakeholder Committee members:
        - Local Representatives
            - El Dorado County Planning Department
            - El Dorado County Water Agency (EDCWA)
            - EID
            - SMUD
            - City of Placerville
            - El Dorado County Department of Transportation (EDCDOT)
            - Local Community Services Districts
            - GDPUD
            - Resource Conservation Districts

- California State Representatives:
    - CDFG
    - California EPA
    - Caltrans
- US Government Representatives
    - USFWS
    - USBR
    - USFS
    - BLM

7.4.3 Property Owner Survey

Conduct survey(s) (telephone or postcard) to solicit specific information from property owners within the study area in order to identify and address concerns and interests regarding the INRMP.

7.4.4 Individual Stakeholders Meetings

Invite stakeholders (property owners, developers, environmentalists) to individual meetings that specifically address their concerns.

Table 8 Summary of Optional Approaches for Public Participation

Option Type	Advantages	Disadvantages
Maintain Current Organization	• No action required by Board or County Staff	• Fewer opportunities for public involvement • Narrow range of interested or affected groups participate in the process
Encourage Public involvement and Enhanced stakeholder participation	• Improves public awareness and appreciation for transparency of the process • Engages stakeholders that are involved or could be involved in other elements of the INRMP such as funding, acquisition, monitoring	• Must identify and enlist new members for the committees • Additional staff time for workshops/outreach
Surveys	• Avoids excessive input from a vocal minority	• Cost
Individual Stakeholder Meetings	• Site specific information can be incorporated into the plan	• Possibility of too many or too few meetings

8. FUNDING

8.1 Introduction

This section describes the funding for implementation of the INRMP, which is expected to come from a variety of sources including mitigation fees (see Section 3, Mitigation Assistance), state/federal grants, and/or the County General Fund. Mitigation fees are required to account for the full cost of mitigation including habitat protection, acquisition, and management and monitoring. Grants and General Fund contributions could be used to establish, supplement and strengthen the program.

8.2 General Plan Context

The following text is presented verbatim from Subsection H of Policy 7.4.2.8:

H. Funding. The County shall develop a conservation fund to ensure adequate funding of the INRMP, including habitat maintenance and restoration. Funding may be provided from grants, mitigation fees, and the County general fund. The INRMP annual report described under item F above shall include information on current funding levels and shall project anticipated funding needs and anticipated and potential funding sources for the following five years.

8.3 Background Information

One possible methodology for establishment of a conservation fund in-lieu fee was previously established and accepted by the Board of Supervisors for the OWMP. This section of the INRMP could identify a similar methodology applicable to other important habitat types covered by General Plan Policy 7.4.2.8

8.4 Optional Approaches

8.4.1 Grants

Many federal, state and private grants are available for purposes that are compatible with the goals of the INRMP. These grants however, cannot be used as a source to fund required mitigation components of the INRMP. Since the INRMP is in itself a mitigation measure, grant applications need to be clear that the funding will be used to implement broad based conservation efforts associated with the INRMP, and not be used as a funding source for mitigating impacts caused by development.

Federal Grant Sources

United States Army Corps of Engineers

Although the USACE does not offer grants, it can provide assistance through cost-sharing arrangements. The following programs are offered by the Corps:

- Section 1135: Restoration and acquisition of wetlands previously affected by a USACE project.

- Section 206: Restoration of aquatic ecosystems structure and function. No relationship to an existing USACE project is required.

Bureau of Land Management

The BLM can provide assistance for projects that contain areas of critical environmental concern. They also provide partnerships for local governments for purposes such as land acquisition and environmental education.

Bureau of Reclamation

Through the Central Valley Conservation Program, the Bureau of Reclamation can fund projects for the purchase of land and easements, habitat protection, restoration and enhancement and providing educational information. Projects must benefit listed species or species of special concern.

Environmental Protection Agency

The EPA can provide assistance for projects that provide comprehensive wetlands monitoring.

Federal Highway Administration

- Conservation Lands Program: The purpose of this program is acquisition of scenic lands, historic sites and wildlife corridors of statewide interest and priority along transportation corridors where those lands also have a high value for conservation habitat.
- Transportation Enhancement Activities: This program can fund projects that enhance the travel experience including projects that provide environmental mitigation to address water pollution from highway runoff or to reduce vehicle-caused wildlife mortality while maintaining habitat connectivity.

U.S. Fish and Wildlife Service

- Central Valley Project Improvement Act Habitat Restoration Program Section 3406(b)(1)
- North American Wetlands Conservation Act Grants Program
- Partners for Fish and Wildlife Program

National Center for Recreation and Conservation

- Land and Water Conservation Fund (LWCF): LWCF provides grants for acquisition or development of neighborhood, community or regional parks.
- Rivers, Trails and Conservation Assistance Program (RTCA): RTCA works with local and state government to conserve rivers, provide open space and develop trails and greenways.
- Federal Lands to Parks Program: This program helps communities create new parks and recreation areas by transferring surplus federal land to state and local governments.

Natural Resources Conservation Service

- Farm Security and Rural Investment Act of 2002
- Grasslands Reserve Program: This program offers landowners opportunity to protect, restore and enhance grasslands on their property.

- Resource Conservation and Development: This program seeks to accelerate the conservation, development and utilization of natural resources, improve the general level of economic activity and to enhance the environment and standard of living in designated areas.
- Wildlife Habitat Incentives Program: This program provides technical assistance and cost sharing to help develop a wildlife habitat development plan.

State of California Grant Sources

Sierra Nevada Conservancy

The SNC supports the Sierra Nevada Region in many tangible ways: from providing funding for local projects to offering technical assistance and other support for collaborative projects in partnership with local government, non-profit organizations and Tribal entities. Activities supported will contribute to the following program objectives:

- Provide increased opportunity for tourism and recreation in the Region;
- Protect, conserve and restore the Region's physical, cultural, archaeological, historical and living resources;
- Aid in the preservation of working landscapes;
- Reduce the risk of natural disasters, such as wildfire;
- Protect and improve water and air quality; and
- Enhance public use and enjoyment of lands owned by the public.

California Department of Fish and Game

Land Owner Incentive Program: This program helps to protect habitat for special status species

California Department of Forestry and Fire Protection

California Forest Stewardship Program: This program seeks to improve the economic value and environmental quality of forestlands. Financial assistance is available to help rebuild forest and wildlife resources to maintain a healthy environment and productive forests.

California Department of Parks and Recreation, Office of Grants and Local Services

Habitat Conservation Fund: This program can be used for acquisition of wildlife habitat and wildlife corridors, the enhancement and restoration of wetlands, riparian and aquatic habitat, and the acquisition and construction of trails that attract and educate people to and about local wildlife resources. Six project categories are eligible for funding:

- Habitat for rare and endangered, threatened, or fully protected species
- Wildlife corridors and urban trails
- Aquatic habitat
- Deer and lion habitat, including oak woodlands
- Riparian habitat
- Wetlands

California Resources Agency

Environmental Enhancement Mitigation - Resource Lands Program: projects involve the acquisition of real property in fee title or through a conservation easement and may include the restoration or enhancement of resource lands to mitigate the loss of, or detriment to resource lands lying within the right-of-way acquired for proposed transportation projects.

California Wildlife Conservation Board

The three main functions of the California Wildlife Conservation Board (WCB) are land acquisition, habitat restoration and development of wildlife oriented public facilities. Programs include:

- California Riparian Habitat Conservation Program
- Habitat Enhancement and Restoration Program
- Inland Wetlands Conservation Program
- Land Acquisition Program
- Oak Woodlands Conservation Program
- Public Access Program
- Rangeland, Grazing Land and Grassland Protection Program

Private Foundations

The following list of private foundations also offer grant opportunities, many of which are available to private property owners:

- California State Wildlife Foundation
- Conservation Fund
- Doris Duke Charitable Foundation
- Ducks Unlimited
- William and Flora Hewlett Foundation
- James Irvine Foundation
- Andrew W. Mellon Foundation
- National Fish and Wildlife Foundation
- National Geographic Education Foundation
- National Tree Trust

Table 9 Summary of Grant Opportunities

Grant Source	Habitat Inventory (Planning)	Habitat Protection Strategy	Mitigation Assistance	Habitat Acquisition	Habitat Management	Habitat Monitoring	Public Education
Federal Grant Sources							
Army Corps of Engineers	✓	✓			✓		
Bureau of Land Management	✓	✓				✓	✓
Bureau of Reclamation	✓	✓		✓	✓		✓
Environmental Protection Agency	✓	✓		✓	✓		✓
Federal Highway Administration		✓		✓			✓
Fish and Wildlife Service	✓	✓		✓	✓	✓	✓
National Center for Recreation and Conservation	✓	✓		✓	✓		✓
Natural Resources Conservation Service	✓	✓		✓	✓		✓
State of California Grant Resources							
CA Dept. of Fish and Game	✓	✓			✓	✓	
CA Dept. of Forestry and Fire Protection	✓	✓		✓	✓		✓
CA Dept. of Parks and Recreation		✓		✓	✓		✓
CA Resources Agency		✓		✓	✓		
California Wildlife Conservation Board		✓		✓	✓	✓	✓
Foundations							
California Wildlife Foundation					✓		✓
Conservation Fund	✓	✓		✓	✓		
Duke Foundation	✓			✓	✓		✓
Ducks Unlimited		✓		✓	✓		✓
Hewlett Foundation	✓			✓	✓		✓
Irvine Foundation	✓			✓	✓		✓
Mellon Foundation	✓			✓	✓		✓
National Fish and Wildlife Foundation	✓				✓	✓	✓
National Geographic Society Education Foundation					✓		✓
National Tree Trust	✓				✓		✓

8.4.2 Mitigation Fees

Conservation in-lieu fees can be established for projects that cannot provide their own on-site mitigation. In-lieu fees could then be used for acquisition or for funding specific capital improvement projects that will meet the intended mitigation objective(s).

8.4.3 Permitting Fees

Permitting Fees could also be established and associated with project development, portions of which could be designated for mitigation purposes.

8.4.4 Assessment Districts

Special assessments districts or financing options could be set up so that funding for wildlife protection measures could be paid for by the developer or future occupants of the development.

8.4.5 Administrative Fees

Once a mitigation fee methodology has been established, the County could charge an additional fee to cover costs associated with administration and management of the INRMP program. This fee could be based on a percentage of the mitigation fee.

8.4.6 County General Fund

County could contribute financially to the INRMP during years when excess funds are available.

Table 10 Summary of Optional Approaches for Funding

Option Type	Advantages	Disadvantages	Relative Cost
Grants	• Many sources available • Could benefit property owners as well as County	• Many grants require matches • Requires staff time to prepare grant application • Grants can not be used to pay for mitigation necessary to address the General Plan	Low
Mitigation Fees	• Can pay for capital improvements or habitat acquisition	• Requires staff time to monitor fee implementation and management of funds	Moderate
Permit Fees	• Funds raised prior to construction impacts	• Existing development fees are already high – more fees could drive away potential developers	Moderate
Assessment Districts	• Puts responsibility on property owner	• Payment could be postponed • Taxes are politically and socially unpopular	Low (to County)
Administrative Fee	• Protects over burden of General Fund	• Existing development fees are already high – more fees could drive away potential developers	Low (to County)
County General Fund	• Funding can be used for whatever component of the INRMP needs it most	• County limitations on unallocated funds • Lag time for County to allocate funds during the budget cycle	High

9. ACRONYMS

BLM	Bureau of Land Management
BMPs	Best Management Practices
CDF	California Department of Forestry and Fire Protection
CDFG	California Department of Fish & Game
CNDDB	California Natural Diversity Database
CRLF	California red-legged frog
EDCDOT	El Dorado County Department of Transportation
EDCRCD	El Dorado County Resource Conservation District
EDCWA	El Dorado County Water Agency
EID	El Dorado Irrigation District
EPA	Environmental Protection Agency
GDPUD	Georgetown Divide Public Utility District
GDRCD	Georgetown Divide Resource Conservation District
GIS	Geographic Information System
HCPs	Habitat Conservation Plans
IBCs	Important Biological Corridors
INRMP	Integrated Natural Resources Management Plan
ISAC	INRMP Stakeholders Advisory Committee
LWCF	Land and Water Conservation Fund
NRCS	Natural Resource Conservation Service
NWI	National Wetlands Inventory
OWMP	Oak Woodland Management Plan
PAWTAC	Plant and Wildlife Technical Advisory Committee
PCAs	Oak Woodland Priority Conservation Areas
PES	payment for ecosystem services
RTCA	Rivers, Trails and Conservation Assistance Program
SNC	Sierra Nevada Conservancy
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USFWS	U.S. Fish & Wildlife Service
USFS	U. S. Forest Service
USGS	U.S. Geological Survey
WCB	California Wildlife Conservation Board

10. LIST OF PREPARERS

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Appendix B
Other Jurisdiction Programs

As part of the preparation effort for this report, the SEA Team researched programs adopted or in development by nearby jurisdictions designed to protect wildlife habitats. The following table summarizes the programs that were found to have goals that are similar to those of the INRMP. Many of these plans are Habitat Conservation Plans (HCPs), which serve primarily to protect endangered or threatened species. Plans that are not HCP-type plans are listed at the bottom of the table

Table A1 Other Jurisdiction Programs with Goals of Wildlife Habitats Protection

Selected Habitat Planning Activities Near El Dorado County			
Plan Title (Website)	**Format**	**Status**	**Plan description (from website)**
East Contra Costa County HCP/NCCP (http://www.co.contra-costa.ca.us/depart/cd/water/hcp/)	HCP/NCCP	Approved	Protects open space and habitats, streamlines endangered species and wetland compliance, and maintains local control of land use. Acquires land or easements from willing sellers, restores lands, and promotes connectivity in a preserve system. Funded by development impact fees and grants and other funding sources. Provides for monitoring of mitigation efforts and management of lands.
San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (http://www.sjcog.org)	HCP	Approved	Balances need to conserve open space with need for development. Protects agricultural lands, property owner's rights, protects listed and species at risk for listing. Plan streamlines environmental review and permitting process for development. Administered by participating cities on the county which purchase easements from willing sellers whose lands fall in one of several established preserves. Funded by development impact fees.
Natomas Basin Habitat Conservation Plan (http://www.natomasbasin.org/)	HCP	Approved	Acquires lands for habitat preserves, designs and constructs wildlife reserves and manages marsh, riparian and grasslands. Mitigates impact of development in the Basin. Directed by the Natomas Basin Conservancy, funded by development impact fees for activities in Basin.
Butte County Regional Habitat Conservation Plan and Natural Communities Plan (http://www.buttehcp.com/)	HCP/NCCP	In development	Cooperative planning effort among local cities, agencies and the County of Butte, this plan proposes to conserve resources of natural communities, covered species and their habitats, open spaces and working landscape and to streamline environmental review and permitting process in the Planning Area. Funded by development impact fees, public and private funding sources.

South Sacramento Habitat Conservation Plan (http://www.southsachcp.com/Home.aspx)	HCP	In Development (Preliminary Draft released)	Proposes to protect and enhance wetlands, upland habitats, and streamline permitting for development projects. Thirty plant and animal species covered, 10 which are special status species. Will promote avoidance, minimization of impact and will use compensation measures, land acquisition and easement dedications. Will be funded by development impact fees. Will use additional funds through grants and other sources.
Placer County Conservation Plan (http://www.placer.ca.gov/Departments/CommunityDevelopment/Planning/PCCP.aspx)	HCP/NCCP	In Development (Admin. Draft released)	Proposes to integrate several programs to protect fish and wildlife habitat and protect streams, wetlands and water resources and form a preserve system. Will create standards and guidelines for a land conservation strategy and streamline environmental review for development projects. Will be funded by development impact fees and outside funding sources for ongoing management and monitoring of the preserves.
Santa Clara Valley Habitat Conservation Plan (http://www.scv-habitatplan.org)	HCP/NCCP	Second Draft released	Plan will be collaborative among four local city and county partners to promote protection and recovery of natural resources and endangered species while streamlining the environmental review and permitting process for development projects in the County. Will create a conservation strategy of land acquisition in a reserve system, and provide for long term management, restoration and management. Will be funded through development impact fees, local, state and federal funding.
Yuba-Sutter NCCP/HCP (http://www.yubasutterhcp.org/)	HCP/NCCP	In Development	Plan will be a collaboration between two counties to establish a reserve area for protection. Will follow established guidelines for HCP/NCCP process.
Solano County Multispecies Habitat Conservation Plan (http://www.scwa2.com/Conservation_Habitat_FinalAdminDraft.aspx)	HCP	Final Administrative Draft released	Plan will be collaborative among cities, agencies and County to promote conservation of biological diversity and preserve endangered species and private property rights while streamlining environmental review for development projects. Will define high, medium and low value conservation areas for mitigation efforts. Will provide for monitoring and management. Will be funded by development impact fees.

Yolo Natural Heritage Program (http://www.yoloconservationplan.org/)	HCP/NCCP	In Development	Plan proposes to protect regional biodiversity by protecting natural communities, agricultural landscapes through conservation measures to minimize and mitigate impacts from development and use adaptive management and monitoring while streamlining the environmental review and permitting process for development projects in the County. Plan will be overseen by JPA of cities, UC Davis and the County of Yolo.
Other Area Conservation Efforts, Not HCP-Based			
Plan Title (Website)	**Format**	**Status**	**Plan description (from website)**
Sonoma County Agricultural Preservation and Open Space District (http://www.sonomaopenspace.org/)	Special District	Approved	District was formed by vote of County citizens and is overseen by an Open Space Authority which is mandated to preserve agricultural lands and open space by acquisition and voluntary conservation agreements. Funded by quarter-cent sales tax and additional funding partners.
Tuolumne County Biological Resources Conservation Handbook (http://portal.co.tuolumne.ca.us)	Planning Guidebook	Draft circulated	Will streamline permitting and mitigation process for land developers while protecting biological resources and provide mitigation guidelines and address specific impacts to various habitat types ranked by priority. Allows flexibility in mitigation measures. GIS database of habitats will be maintained by County. Program will be funded by development impact fees.
Nevada County Natural Resources Report (http://www.yubanet.com/nrr/index.html)	Information only	Complete	The report provides description of County's ecosystems including distribution. Intended to inform the Board and Community Development Agency.

Lists of completed conservation plans in California:

http://www.fws.gov/sacramento/es/hcp_list.htm

http://www.ceres.ca.gov/planning/hcp/

Appendix C
Optional Conceptual Approaches

Table of Contents

List of Figures

1. INTRODUCTION

The following examples describe how the eight required elements of the INRMP could fit together to form a plan for the County which protects habitats and allows flexibility in planning and mitigating impacts of development. Each example emphasizes a different aspect for an INRMP, such as landscape permeability, restoration of degraded habitats or protection of corridors and each includes options outlined previously in this Report.

The examples are provided to assist the County in developing an overall Phase II strategy. The actual strategy adopted by the County may resemble one of these approaches, or could be a combination of these plans with other approaches not described here.

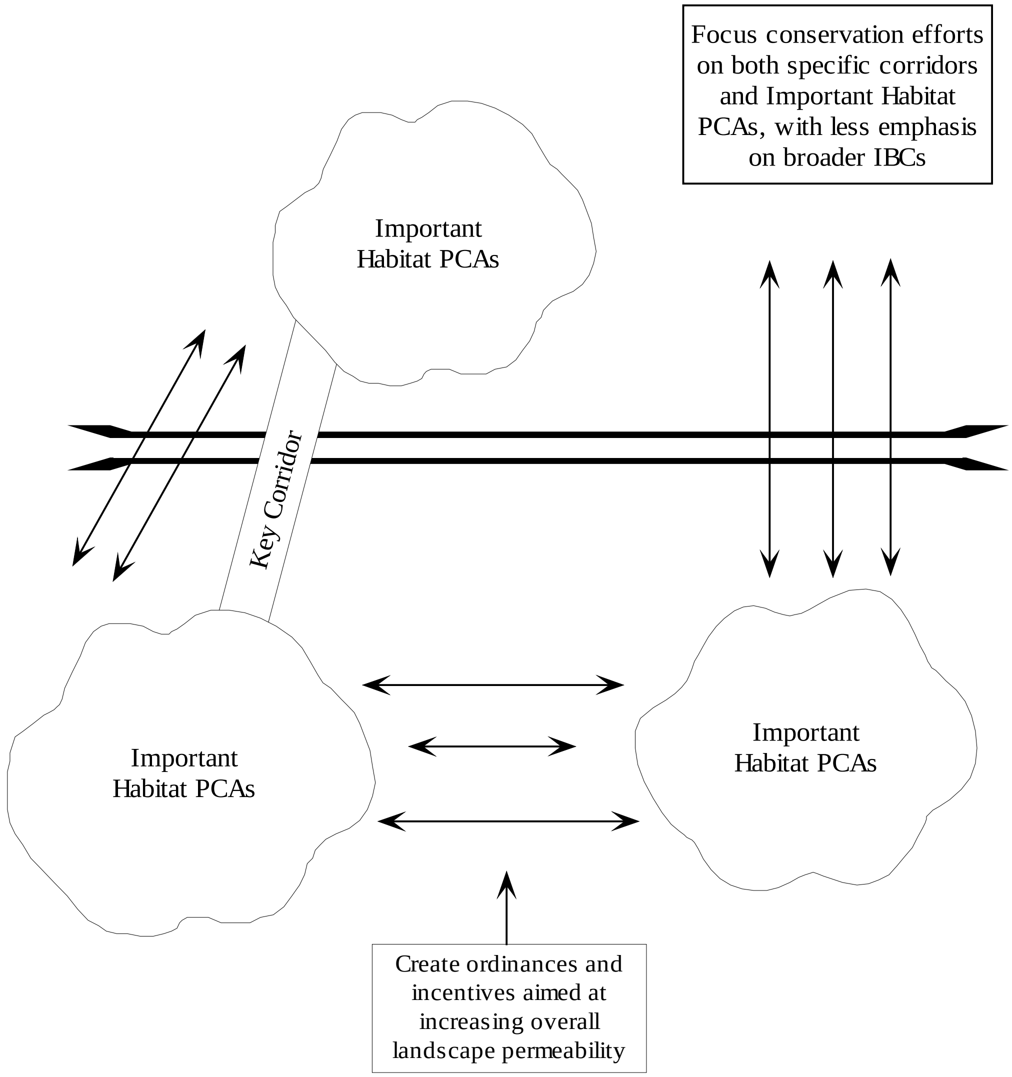
When writing the INRMP, the County should consider the multiple options described in this Implementation Options Report. The final INRMP also needs an adaptive management component to accurately assess the Plan so that necessary corrections can be made to keep it functional and relevant. Ideally this adaptive management component would also describe an overall administrative approach to implementing the INRMP.

2. LANDSCAPE PERMEABILITY EMPHASIS EXAMPLE

For this conceptual conservation strategy option, the County would design the INRMP to focus General Plan development impact mitigation and conservation on protecting lands in the immediate vicinity of existing and future Highway 50 under-crossings. Ordinances and incentives would be developed to encourage land development that is "permeable to wildlife movement" throughout the study area but concentrated around important wildlife crossing zones along Highway 50 and other major roadways. Conservation easements or fee title acquisition of lands would be directed toward Priority Conservation Areas for each of the major habitat types. Figure B1 is a conceptual drawing of this example.

A. **Habitat Inventory:** Primarily completed in Phase I; Priority Conservation Areas (PCAs) would be delineated for each of the major habitat types; acreages impacted and acquired as mitigation would be tracked.
B. **Habitat Protection Strategy:** Connectivity and permeability would be required in defined zones. Acreage could be acquired or funded by the developer for acquisition based on area and type of habitat impact. In addition to direct habitat impact mitigation, indirect habitat impact mitigation would be required to fund easement acquisitions, vegetation management, and Highway 50 undercrossing improvements and management.
C. **Mitigation Assistance:** Mitigation fees would be collected for impacts to important habitats and used to acquire lands critical for maintaining connectivity. A range of other mitigation options and incentives would be developed to reduce mitigation costs.
D. **Habitat Acquisition:** This concept would generally limit habitat acquisition to areas where wildlife movement is critical adjacent to Highway 50 and the PCAs to be delineated generally within the large expanses mapped in Phase I.
E. **Habitat Management:** Habitat acquired as conservation easements or fee title (i.e., areas adjacent to Highway 50 under-crossings and PCAs as described above) would be managed for targeted biological purposes (ground-dwelling wildlife movement and core habitat values, respectively).
F. **Monitoring:** Habitat impact and acquisition acreages, development compliance with "permeable to wildlife" conditions, and vegetation management in acquired conservation easements and lands would be monitored and reported on annually to the Board of Supervisors by County staff.
G. **Public Participation:** Public education, landowner vegetation management incentives, and volunteer organizations would be established and encouraged to participate in maintenance activities through the County resource conservation districts.
H. **Funding:** Funding for habitat easements/acquisitions and management of habitat acquisitions would be through mitigation fees associated with development activities. Funding for complementary conservation actions including public education would be through grant funding opportunities.

Figure B1 INRMP Landscape Permeability Emphasis Example

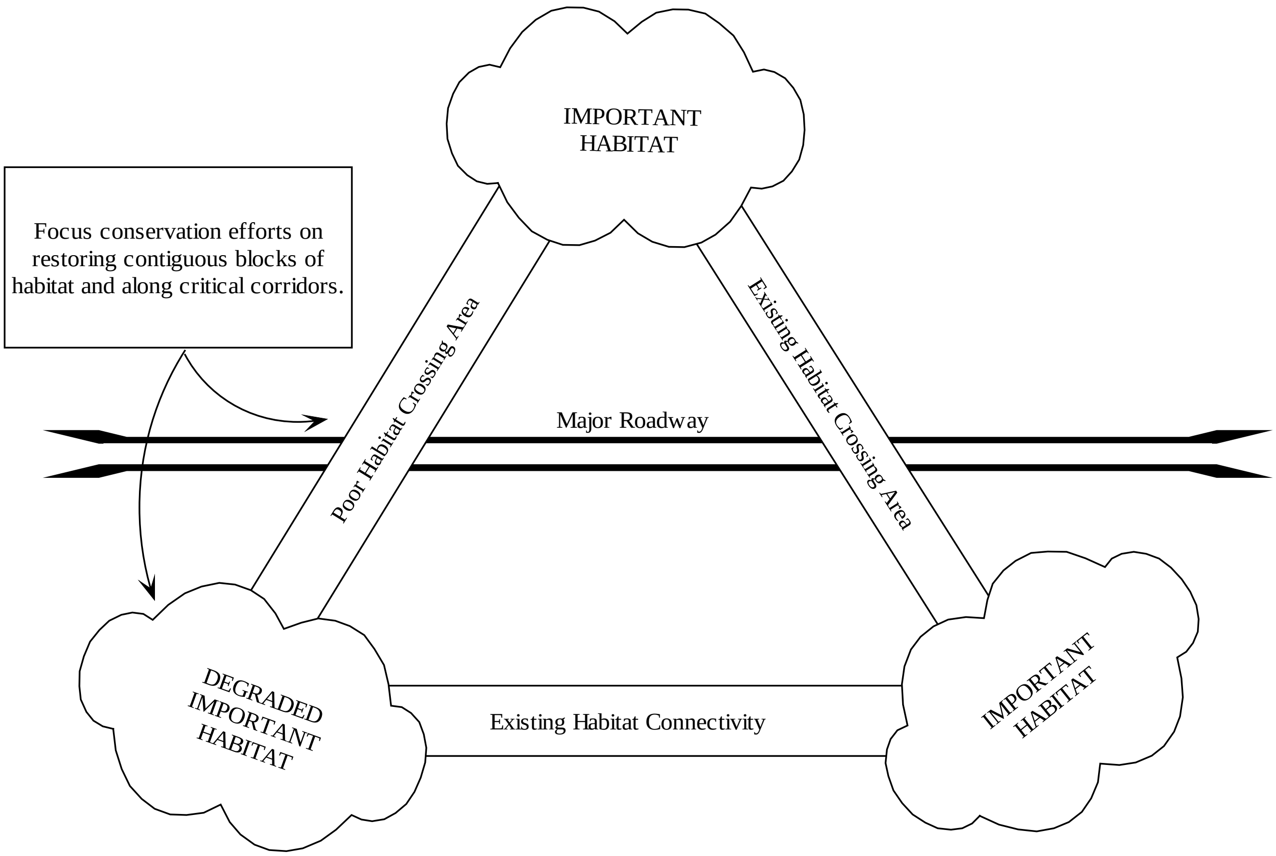


3. RESTORATION EMPHASIS EXAMPLE

A Restoration Emphasis Plan would promote improving wildlife habitat in the INRMP study area by concentrating on restoration efforts in the areas defined as large expanses of native vegetation. The goal of this strategy would be to preserve and restore contiguous blocks of important habitat. Mitigation would be focused on making improvements that protect or enhance existing conditions. Acquisition efforts would be directed at parcels that provide critical links to wildlife movement corridors and that are in need of restoration. Monitoring would be focused on evaluating the success of the restoration efforts to guide future restoration activity. Funding for acquisitions and capital improvements (such as road crossing infrastructure) would be provided by mitigation in-lieu fees and grant opportunities. Figure B2 is a conceptual drawing of this example.

A. **Habitat Inventory:** Primarily completed in Phase I, would require prioritizing important habitat focused on parcels that would benefit from restoration, additional corridor modeling, and periodic updates with new data.
B. **Habitat Protection Strategy:** Develop incentive program for developers and property owners to make wildlife beneficial improvements on their properties. Develop list of capital improvements needed for restoration and prioritize them in terms of associated wildlife benefit, cost, ease of implementation, etc. As money becomes available, top priority items would be implemented first.
C. **Mitigation Assistance:** Mitigation fees would be collected and directed toward the projects identified in the habitat prioritization study. Mitigation fees for habitat and species impacts will be directed to banks within the study area. Encourage habitat restoration plans to be developed and included as part of development proposals.
D. **Habitat Acquisition:** Focus on properties that have strategic importance such as those adjacent to major roadways where wildlife crossings are needed.
E. **Habitat Management:** County develops wildlife sensitive design guidelines and incorporates them into the Design Standards Improvement Manual. Crossing structures, including vegetated underpasses, wildlife sensitive culvert improvements and fencing to be constructed with mitigation and grant funds. Emphasis placed on restoration efforts including control of invasive weeds, water delivery systems, habitat improvement plans, planting of native vegetation and coordinated effort with vegetative management for fire control.
F. **Habitat Monitoring:** Emphasis would be placed on monitoring the success of restoration efforts within the study area by conducting before and after studies.
G. **Public Participation:** No explicit new public involvement process would be required but meetings with the current ISAC and PAWTAC committees should be continued.
H. **Funding:** Money from the County General Fund would be needed as seed money to initiate the program. The program would utilize in-lieu mitigation fees and grant funding where available to construct wildlife improvements within the study area.

Figure B2 INRMP Restoration Emphasis Example

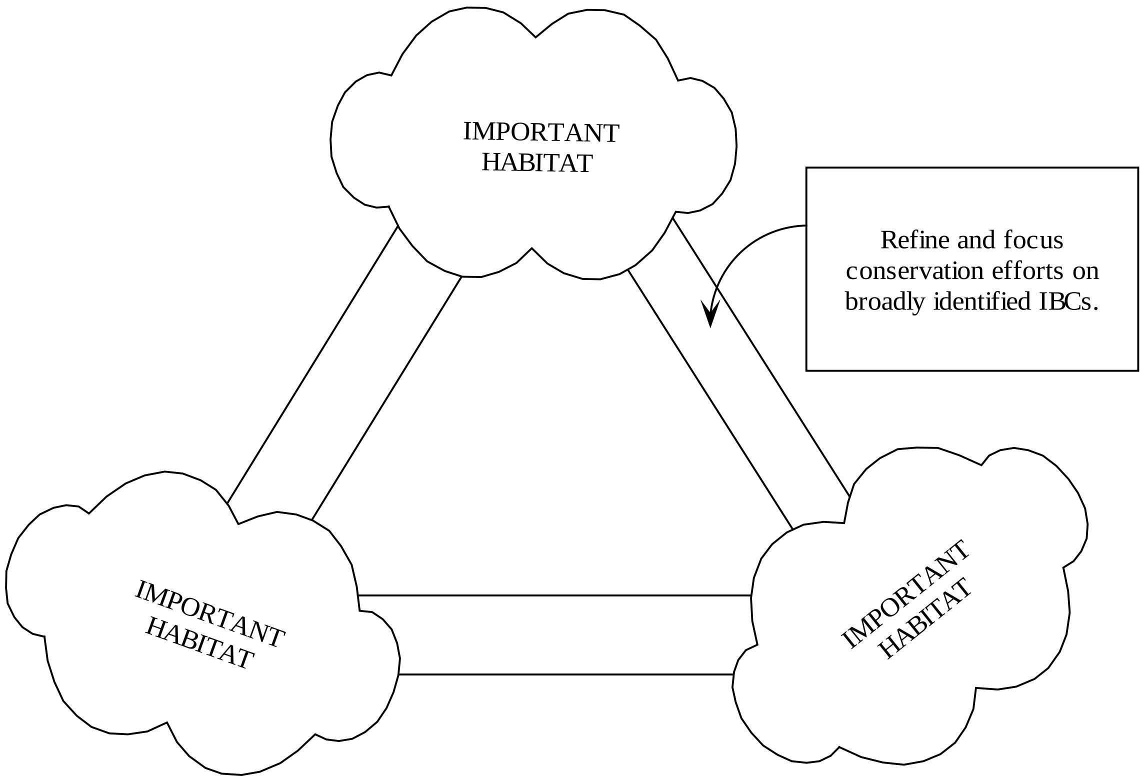


4. CORRIDOR NETWORK PLAN EXAMPLE

A Corridor Network Plan would use newly delineated IBCs as the basis for conservation planning within the INRMP study area. An interlinked set of corridors would be protected through both regulatory and mitigation-based processes. A regulatory structure would be implemented to reduce impacts within designated IBCs, while off-site mitigation actions associated with development impacts to species or habitats covered by the INRMP outside IBCs would be focused within the IBCs. The spatially explicit and regulatory nature of this approach would lessen the necessity for multi-stakeholder involvement. Additional funding for plan elements (such as road crossing infrastructure) would be sought through external sources. Figure B3 is a conceptual drawing of this example.

A. **Habitat Inventory:** Primarily completed in Phase I, additional corridor modeling to be used to systematically identify and delineate new IBCs; periodic updates with new data.
B. **Habitat Protection Strategy:** Most IBC-based habitat protection would rely on land use regulations for areas delineated within IBCs (see GP for these regulations). Corridor delineation and regulation would be the focus of this strategy. Strategic areas within designated IBCs would be protected through either fee title or easement acquisition.
C. **Mitigation Assistance:** Mitigation fees for habitat and species impacts would be directed to mitigation banks or parcel acquisition within delineated IBCs.
D. **Habitat Acquisition:** The explicit nature of the IBCs means that certain critical properties would be targeted for acquisition from willing sellers.
E. **Habitat Management:** Design elements such as canopy structure and fencing would be important components in an IBC-based plan. Crossing structures would be required where IBCs cross major transportation corridors. IBC's will be less effective if there is no cross-parcel management for wildlife movement, so strategies would focus on increasing overall landscape permeability near IBC's.
F. **Habitat Monitoring:** Monitoring would focus on assessment of landscape structural connectivity within IBCs rather than indicator species.
G. **Public Participation:**
County would work with agency representatives to achieve goals of the Plan. Regular meetings of the current ISAC and PAWTAC committees could be used to achieve public participation goals.
H. **Funding:** A variety of outside funding sources could be tapped for connectivity enhancement within IBCs (e.g. federal money for highway crossing structures). Mitigation fees associated with impacts outside IBCs would be directed to areas within designated IBCs.

Figure B3 INRMP Corridor Network Plan Example

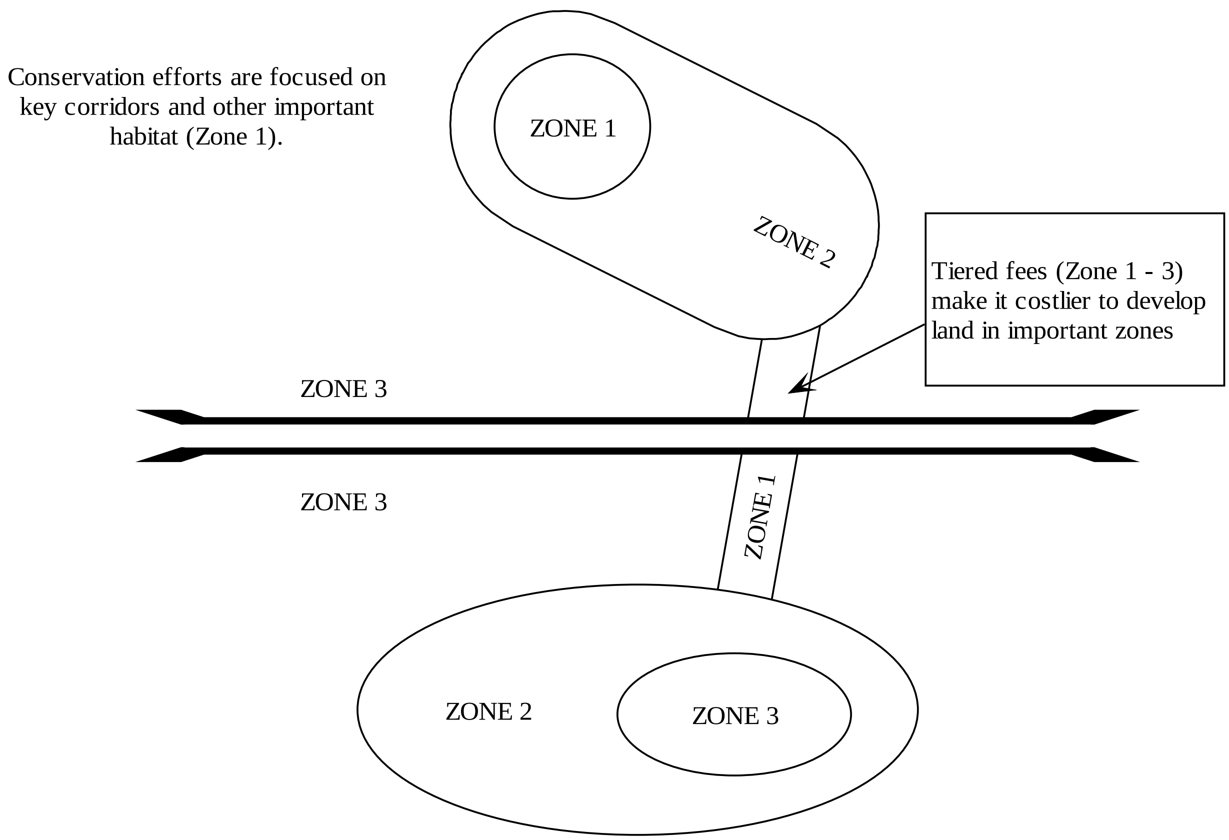


5. ECOLOGICAL PRESERVE-TYPE EXAMPLE

In this approach, modeled after the existing rare plant program, areas identified as important habitat would be classified into zones, which would reflect specific mitigation requirements. Important habitat would include some portion of the lands identified in the initial inventory along with areas representing important connectivity. In addition to identifying these important habitats and categorizing them into zones, a separate program would be needed to address future impacts due to roads and other development to wildlife movement. Figure B4 is a conceptual drawing of this example.

A. **Habitat Inventory:** Primarily completed in Phase I, would require prioritizing important habitat, additional corridor modeling, and periodic updates.
B. **Habitat Protection Strategy:** This strategy uses tiered fees to make it costlier to develop lands that are determined to be important to wildlife movement and other areas of important habitat. Fees collected from this program would go toward purchasing lands or development rights of these important habitats. GIS modeling and mapping completed in Phase I would be used to determine priority areas for acquisition.
C. **Mitigation Assistance:** A mitigation fee would be established based on the zones determined above to purchase land or development rights within priority habitats. Additional mitigation measures would be developed to increase habitat permeability and provide options for on-site mitigation to reduce fees.
D. **Habitat Acquisition:** The County would acquire land in the form of conservation easements or fee title using funds from the mitigation fees charged to developers. Lands designated as Zone 1 (most important habitats) would be purchased (or conservation easements are obtained) from willing sellers. Lands would be acquired in consultation with appropriate agencies, and care taken to make sure acquisitions do not conflict with General plan land use designations. .
E. **Habitat Management:** Management of the land could be turned over to a public agency such as BLM or CDFG, or other designee of the agency. An MOU or similar cooperative management agreement could be set-up to guide the management of the preserve area. The agency would determine best management practices for fuels treatment, restoration, habitat enhancement and other management activities. Some portion of the fees collected by the County as part of mitigation could be used to maintain purchased lands. This would be determined in consultation with the agency managing the lands.
F. **Monitoring:** Monitoring of the preserve would rest primarily with the agency, which would use volunteers and its own staff. Monitoring efforts would focus on evaluating habitat conditions within the preserves and the agency would share monitoring results with the County.
G. **Public Participation:** County would work with agency representatives to achieve goals of the Plan. Regular meetings of the current ISAC and PAWTAC committees could be used to achieve public participation goals.
H. **Funding:** Funding comes primarily from the fees collected by the mitigation program and from the public agency managing the preserve. Additional sources of funding from grants and other federal and state programs should be sought to enhance and compliment the mitigation fees.

Figure B4 INRMP Ecological Preserve Type Example

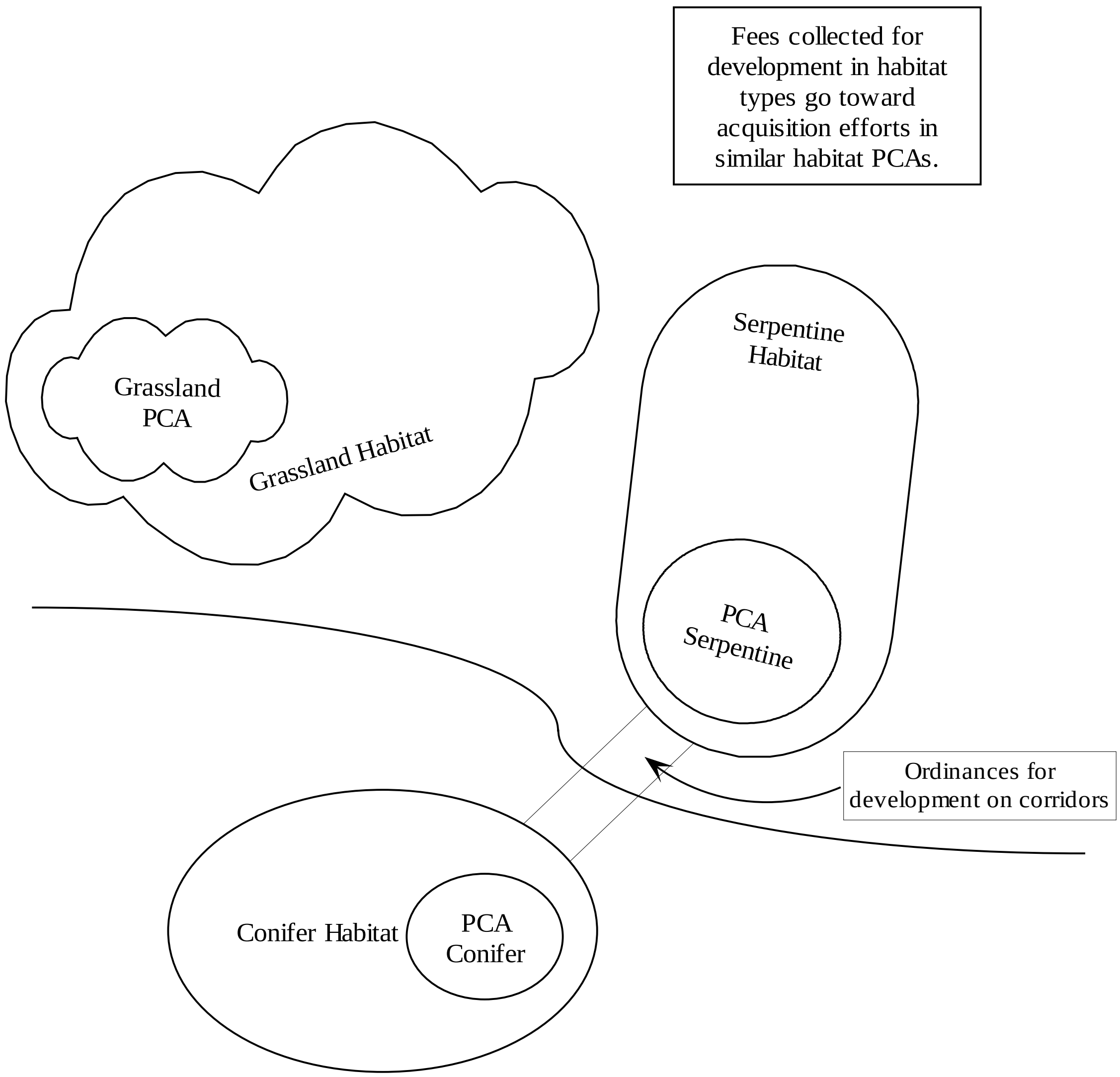


6. HABITAT-EMPHASIZED (OWMP-TYPE) EXAMPLE

This plan would define mitigation standards/ratios and thresholds for mitigation activities. Priority conservation areas would be identified for each of the five named habitats plus areas promoting wildlife movement through corridors. The existing IBCs might become part of the priority areas, but likely would be redrawn. Willing sellers in the PCAs would be identified. The plan would allow for flexibility in assessing fees to accommodate on-site efforts of design change, restoration, and on-site protection of habitat and encourage voluntary conservation and management to maintain existing important habitats. The plan would identify grant funding sources to offset costs of management and protection of habitats. Figure B5 is a conceptual drawing of this example.

A. **Habitat Inventory:** Primarily completed in Phase I; would require prioritizing important habitat, additional corridor modeling, and periodic updates. Add land-use overlay to exclude lands slated/zoned for development.
B. **Habitat Protection Strategy:** Set goals for proportion/percentage of habitats to preserve and determine threshold for action. Set standards/thresholds for mitigation. Local ordinances would apply, as in the case of IBCs. Promote stewardship, voluntary efforts through education
C. **Mitigation Assistance:** Prioritize lands in study area using land-use overlay (above) and establish fee structure based on impact. Create mitigation banks/districts for 5 habitat types, identify the Important Biological Corridors where land-use ordinances would apply, as well as additional corridor opportunities. Identify on-site mitigation opportunities, restoration, design options that can be credited against fees.
D. **Habitat Acquisition:** Identify willing sellers to participate in the banking programs. Lands would be acquired through fee title, conservation easements and would reflect the mitigation ratios defined. Prioritize sellers/lands based on C work (above).
E. **Habitat Management:** Establish BMPs relevant to the habitat. Identify public agency, or private partners to oversee management.
F. **Monitoring:** Establish Indicator Species population/presence study and time frame to conduct study.
G. **Public Participation:** Enhance both stakeholder participation and public involvement to identify the PCAs and corridors.
H. **Funding:** In-lieu fees assessed to development, assessment districts would provide funding for acquisition; grants for stewardship would be identified to assist with on-going management.

Figure B5 INRMP Habitat Replacement Example



Appendix D
Strategy for Preparing Phase II Scope of Work

Table of Contents

1. SUMMARY

Phase II of the INRMP consists of developing an implementable plan for mitigating impacts of General Plan development, composed of multiple methods for the County to use to protect and manage lands and natural systems. According to the General Plan, the INRMP plan must contain the following elements: habitat inventory, habitat protection strategy, mitigation assistance, habitat acquisition, habitat management, monitoring, public participation, and funding. Each of these contains multiple optional strategies and activities to meet the goals of the INRMP. Tying them together is the function of the Phase II plan. The outcome of Phase II would be a plan that has had broad input, is adaptable to change, and can immediately be implemented and administered by the County.

2. MOVING FORWARD

There are several possible ways forward for Phase II, given various constraints. One is for the County staff to take on developing the Phase II plan, using existing resources and advisory committees. This would be the least costly, probably take longer than other options (because of staff availability), and may not meet the County's schedule or other needs. A second possibility would be for the County to extend the existing process using contract extensions and the existing or modified advisory committees. This process could then be phased by task to meet critical needs first and less critical needs later. This option would be more costly than the first, but would take less time than other options, and would more quickly meet the County's needs. A third possible approach would be for the County to develop a Request for Qualifications or Proposals, solicit competitive proposals, and select a consultant group to carry out Phase II. This option could be the most expensive, would lose the momentum developed through Phase I tasks, take an intermediate amount of time (compared to the other options), and would likely meet the County's needs. The strategy described here could be applied to any of these three options.

3. STRATEGIC STEPS

Step 1 Identification of Goals and Objectives

The General Plan contains broad goals for the INRMP, yet considerable time was devoted with committee members during Phase I on reviewing and further defining these goals. Objectives are the actionable and measurable tactics within each goal. These have yet to be stated clearly, leaving a gap between General Plan goals and on-the-ground actions under the INRMP. A clear statement by the Board on the goals and corresponding objectives that is provided to the committees would help subsequent steps and choices. This identification would best occur in an iterative process with staff, consultants, and advisory committees.

Step 2 Administrative and Advisory Structures

The organizational model under Phase I seemed to be particularly functional in meeting Phase I needs. This includes: a) the technical consultant team formulating and writing possible scientific and technical reports for the County; b) two advisory committees that provide input early in the report generation and 2 cycles of review of the report products; c) County staff directing the consultant group, administering the overall program, and interfacing between the County, consultants, and advisory committees; and d) the Board of Supervisors providing the overall vision and guidance for the process and reviewing reports for consistency with that vision. Modifications to the Phase I process that may help with small issues that have arisen include earlier discussions with the Board about proposed approaches and combining the two advisory committees into one committee for Phase II that then also ultimately advises on implementation of the program.

Step 3 Prioritization of Actions

There are short-term and long-term needs under the INRMP that can be addressed in different time frames. For example, opportunities will be lost if during a 2-year period of INRMP Phase II development, no conservation action occurs. A triage process that identifies critical near-term mitigation, conservation, fiscal and administrative needs, and opportunities should be conducted first. If adopted, this step would be followed by a process of identifying at least three tiers of priorities, (see Figure 1 in the main body of this report) from the most critical to least critical areas and actions. Priority actions would occur initially in some part of the developed and developing Highway 50 corridor and community areas. Certain actions, such as new or revised conservation ordinances, may be prioritized because of the time it can take to implement them.

Step 4 Plan Formulation

Formulation of an implementable plan should be based on the goals and objectives, guiding and technical process, and priorities. The plan would describe options for meeting various INRMP elements described above. The raw material for the optional strategies is contained in the main report and would be enhanced as the implementable plan was formulated. The plan itself would not contain a single strategy, but would be a structured toolbox, providing alternative ways to meet conservation and other goals and including a planning and learning process that ensures effectiveness. Important elements of the plan may require highlighting because of conservation concern (e.g., lower foothills connectivity), political concerns (e.g., landowner rights), cost (e.g., developing ordinances, highway crossings for wildlife), and complexity (e.g., impacts from the whole General Plan vs. just individual projects). Strategically bringing these elements forward early in the process would give various interests time to consider them thoroughly during plan development.

Step 5 Plan Implementation

Without knowing the content of the ultimate INRMP, there are predictable actions that will need to happen to implement the INRMP. These primarily include identifying an administrative structure within or controlled by the County to carry out the Plan, identifying resource streams to meet different plan needs, and identifying County personnel and others who would be responsible for administering the fiscal, legal, public information, and environmental components of the program.

Shawna Purvines <shawna.purvines@edcgov.us>

Legistar File 12-1203 General Plan Biological Resources Policy Update and Oak Resources Management Plan DEIR

1 message

monique.w@comcast.net <monique.w@comcast.net> Mon, Aug 15, 2016 at 4:14 PM
To: shawna.purvines@edcgov.us
Cc: bosone@edcgov.us, bostwo@edcgov.us, bosthree@edcgov.us, bosfour@edcgov.us, bosfive@edcgov.us, edc.cob@edcgov.us

Dear Ms. Purvines;

Thank you for the opportunity to comment on the General Plan Biological Resources Update and Oak Resources Management Plan Draft EIR.

I have the following concerns:

1. Policies that are being eliminated or changed are the MITIGATION for development, approved by the voters in the 2004 General Plan, via that document's Environmental Impact Report (EIR). The policies were to be the vehicle to implement the mitigation for development. Many of the policies that are being eliminated or changed were NEVER implemented, in violation of CEQA. El Dorado County has been in violation of CEQA for twelve years. Please explain how El Dorado County will address the violations of CEQA that have occurred, and how the preferred alternative is not a continuation of these CEQA violations of failure to mitigate for development.

The 2008 Oak Woodland Management Plan was sued for various reasons, and the County lost the lawsuit. The 2008 Oak Woodland Management Plan's In-Lieu Fee was changed significantly by the Planning Commission and the Board of Supervisors in response to Developer, Agriculture, and Chamber of Commerce pressure. The same developers and agriculturalists who exerted political pressure to decrease the fee arbitrarily, then were appointed to the Community Economic Development Advisory Committee (CEDAC) and in particular, the Regulatory Reform Subcommittee, which did not conform to the Brown Act (and included a current sitting Supervisor). CEDAC and the Regulatory Reform Subcommittee have had the opportunity to provide unlimited input to the Board of Supervisors and actually crafted much of the TGPA/ZOU, rezoning many properties without proper notice, resulting in another lawsuit.

For this DEIR to state that there are significant impacts that are unavoidable, and not "feasible" to mitigate, suggests that the County has never had the intention to mitigate impacts on oak woodlands and biological resources or to conform to the Settlement Agreement on the 2004 General Plan (GP).

2. Please explain why it is not "feasible" to mitigate for the significant and unavoidable impacts, due to "likely increase costs of development in the El Dorado Hills and Cameron Park communities." Please provide evidence (via specific parcels and written documentation) that developers have chosen not to develop due to the Interim Oak Woodland Guidelines, which require no net loss of oak woodlands. Please provide evidence, and not speculation (LIKELY increase costs of development - pg 10-4,5). <u>The interim guidelines allow conservation easements on other parcels; payment into the County oak woodland mitigation fund; and replanting.</u> Are the

costs unreasonable because the developers do not want the costs associated with mitigation, and they won't make as much profit or it won't pencil out?

Such is the risk inherent in land development, that developers choose to take, and their risky financial decisions should not be assigned higher priorities in the DEIR than the policies (MITIGATION FOR DEVELOPMENT) voters and residents of the county chose in choosing the 2004 General Plan.

3. Please explain why the "No Net Loss of Oak Woodlands Alternative" was rejected as the reasons given are not adequate. The Alternative states: "It is expected that this alternative would require greater amounts of on-site retention for all future development projects that affect oak woodland and a focused effort on woodland restoration and creation." Please refer to the Interim Guidelines which refers to No Net Loss. It does not require greater amounts of on-site retention. It offers options to on-site retention (see #2 above).

4. The same section regarding "No Net Loss of Oak Woodlands Alternative" (page 10-4) states: “Achieving a no net loss standard would require extensive restoration programs and replanting to offset the temporal loss of oak woodlands. I would remind you that the 2004 EDC GP EIR on page 5.12-31 states that “Standiford et al. (2002), using a modeling approach to evaluate blue oak plantation development, found that average blue oaks were still quite small and that canopy cover was relatively low 50 years after being planted, even with a fairly aggressive restoration effort.” A 1:1 mitigation results in habitat loss, as documented by many studies. Please explain the logic of why it is acceptable that it is unreasonable to require from developers, the restoration or replanting to offset the 50 plus years of loss of oak woodlands? Why do developer's needs to profit on their development project become more important than the will of the voters of the 2004 General Plan?

Is not the quality of life of the County residents, as well as the ecosystem services provided by oak woodlands, worthy of being mitigated? Or is the oak plan and biological resources policy update solely to benefit the developers?

5. The same section regarding "No Net Loss of Oak Woodlands Alternative" (page 10-4) states: “Although this alternative would avoid the project’s significant impacts related to habitat loss and greenhouse gas (GHG) emissions, this alternative was rejected as infeasible because it would constrain development to the extent that it would prevent the County from fully implementing the General Plan and would be contrary to existing policies.” Please explain the logic rejecting infeasibility, further. Given the real climate change implications due to GHG, and the great loss of carbon sequestration that would occur under the preferred alternative, how is the No Net Loss of Oak Woodlands Alternative infeasible, other than developers having to profit less in order to conform with required mitigation? Please explain the logic that the No Net Loss of Oak Woodlands Alternative is infeasible because it “constrains development.” Please provide evidence. Has the current Interim Guidelines constrained development? Please provide evidence, not speculation, which developers have chosen not to develop parcels because of oak woodland mitigation currently in force under the Interim Guidelines, which is a No Net Loss policy. Please explain why individual developer’s “constraints” on development due to a lesser financial profit outplays the will of the voters in the 2004 General Plan?

6. The same section regarding "No Net Loss of Oak Woodlands Alternative" (page 10-4,5) states: “Further, it would likely increase costs of development in the El Dorado Hills and Cameron Park communities, where the majority of the oak woodland impacts are anticipated to occur. This would drive more development into the County’s rural areas, particularly those at higher elevations where oaks are less common. This would increase development intensity and habitat loss in those areas and require residents to drive further to reach the commercial and employment opportunities in the community regions, thus increasing air pollution and GHG emissions.” Please explain the logic of

this statement, as there cannot be higher density or “more development” in more rural areas, as that is protected by zoning and land use – there can only be the amount of development that is allowed in the rural regions.

7. The same section regarding "No Net Loss of Oak Woodlands Alternative" (page 10-4,5) states: “Further, this would be incompatible with the General Plan’s goals for arranging land uses by intensity, with higher-intensity, more urban and suburban uses in the community Regions of El Dorado Hills and Cameron Park, which allows for the more rural communities to support lower-intensity land uses and retain their rural character. Specifically, this alternative would conflict with General Plan policies that encourage concentration of high-intensity uses in Community Regions and Rural Centers to preserve the remaining Rural Regions as open space and natural resource areas (including agriculture and timber).” Please explain the logic of this statement, as there cannot be higher density or “more development” in more rural areas, as that is protected by zoning and land use – there can only be the amount of development that is allowed.

Again, No Net Loss oak woodland policies can work, and create an aesthetically pleasing quality of life, higher neighborhood and land values, and provide ecosystem services in the Community Region areas, albeit not to the profit advantage of the developers. Therefore, the No Net Loss of Oak Woodlands Alternative should not be rejected due to loss of developer profit (aka “infeasible”). Also, please explain the use of the word, “urban.” There is no “urban” development in El Dorado County. “Urban”: 1. Of, relating to, or located in a city 2. Characteristic of the city or city life (American Heritage® Dictionary of the English Language, Fifth Edition, 2011). The most compact of our communities, El Dorado Hills and Cameron Park, would likely consider themselves suburban, not urban.

I would also comment that some communities, such as Shingle Springs, identifies as “rural” although the County is targeting the Shingle Springs area as a Community Region. As a Shingle Springs resident, I identify and value my quality of life especially as defined by the oak woodland in my community. I do not want to see Shingle Springs scraped bare of all oak trees as the preferred alternative suggests will be possible as a “Community Region.” With the "urban" wording above, it appears that there is a disconnect between the County Board of Supervisors, Planning Commission, and Long-Range Planning staff with county residents as to what is envisioned for El Dorado County.

8. Please explain how mitigation monitoring will be implemented. Mitigation monitoring, required by CEQA, is not required of County staff. Please explain how mitigation on the 2004 GP was monitored. Please address the success rate of acorn planting and oak tree planting from 2004 to 2016. Please address follow-up that was conducted for parcels with projects that preserved or had a conservation easement placed for rare plants and oak trees, to be sure the oak trees were not removed, from 2004 to 2016. Please explain how many reports were collected from property owners and provided to the County as required by the OWMP and the Oak Woodlands Interim Guidelines. If monitoring was not conducted during those twelve years, please explain how monitoring will be different and enforced this time. Have annual reports been received from property owners and reviewed by staff, to conform to CEQA? What is the measurable ratio of success of replanting? The Oak Woodland Interim Guidelines require that property owners submit reports on health and survivability of oak tree mitigation. Where are these reports housed? Who on staff is assigned to follow-up with oak woodland mitigation? What is the net loss of oak woodland based on these performance standards that were instituted? Has the County mapped parcels that have removed oak woodland? All of this information constitutes a baseline which will support the County’s preferred alternative. Without implementation, there is non-compliance with CEQA, and it is not mitigation at all. Will the County self-monitor? There seems to be a lack of success by the County in self-monitoring.

9. The significant and unavoidable impacts, after mitigation, are unacceptable. Impacts listed on Table 1-1 include: Have a substantial adverse effect on special-status species; have a substantial adverse effect on wildlife movement; result in the removal, degradation, and fragmentation of sensitive habitats; conversion of farm land; generate greenhouse gas emissions; **substantially degrade the existing visual character or quality of the area or region.** While these significant and unavoidable impacts that will occur in our communities are unacceptable, to “substantially degrade the existing visual character or quality of the area or region” will impact most residents of the County. Most residents live in the County because of the visual character and quality of the area and region they live in. Explain why priority is given to developers to clear to bare soil and scrape away oak woodlands in preference to the QUALITY OF LIFE of residents? Houses and commercial development can be built in harmony with the environment, avoiding oak woodland, and mitigating for it, although it may cost developers more.

This General Plan Biological Resources Policy Update and Oak Resources Management Plan violates the California Environmental Quality Act (CEQA), and constitutional protections for procedural due process, substantive due process, and equal protection.

This General Plan Biological Resources Policy Update and Oak Resources Management Plan does not properly examine its adverse environmental impacts as required by CEQA, does not adequately analyze the other alternatives (such as the No Net Loss Alternative) to the project outlined in the EIR, and offers insufficient or unclear mitigation measures to these impacts.

This General Plan Biological Resources Policy Update and Oak Resources Management Plan does not adequately address the plan’s cumulative impacts or account for the regional impacts on wildlife habitat or the effects on the quality of life and aesthetic and visual character for residents.

This DEIR is not an objective document, but was conceived and engineered to promote a specific outcome rather than to inform the decision-making process.

Monique Wilber

Shingle Springs resident

No Net Loss of Oak Woodlands Alternative: This alternative would modify the ORMP to require that mitigation for loss of oak woodlands achieve a "no net loss" standard. This would require preservation of existing woodlands and restoration of degraded woodland habitat and areas that historically supported woodlands, so that the total acreage of woodlands in the County does not decrease, but remains constant or increases. It is expected that this alternative would require greater amounts of on-site retention for all future development projects that affect oak woodland and a focused effort on woodland restoration and creation. Achieving a no net loss standard would require extensive restoration programs and replanting to offset the temporal loss of oak woodlands. Although this alternative would avoid the project's significant impacts related to habitat loss and greenhouse gas (GHG) emissions, this alternative was rejected as infeasible because it would constrain development to the extent that it would prevent the County from fully implementing the General Plan and would be contrary to existing policies. Further, it would

likely increase costs of development in the El Dorado Hills and Cameron Park communities, where the majority of the oak woodland impacts are anticipated to occur. This would drive more development into the County's rural areas, particularly those at higher elevations where oaks are less common. This would increase development intensity and habitat loss in those areas and require residents to drive further to reach the commercial and employment opportunities in the community regions, thus increasing air pollution and GHG emissions. Further, this would be incompatible with the General Plan's goals for arranging land uses by intensity, with higher-intensity, more urban and suburban uses in the Community Regions of El Dorado Hills and Cameron Park, which allows for the more rural communities to support lower-intensity land uses and retain their rural character. Specifically, this alternative would conflict with General Plan policies that encourage concentration of high-intensity uses in Community Regions and Rural Centers to preserve the remaining Rural Regions as open space and natural resource areas (including agriculture and timber).

Shawna Purvines <shawna.purvines@edcgov.us>

Public Comment-DEIR-El Dorado Co Bio Resources Policy Update & Oak Resources Mngmt Plan

Mjasper <mjasper@accessbee.com> Mon, Aug 15, 2016 at 1:19 PM
Reply-To: mjasper@accessbee.com
To: shawna.purvines@edcgov.us
Cc: boardofsupervisors@amadorgov.org, bos@placer.ca.gov, oakstaff@californiaoaks.org

Greetings Shawna Purvines:

Please accept the attached comments on the Draft Environmental Impact Report (DEIR) for El Dorado County's Biological Resources Policy Update and Oak Resources Management Plan.

If you can acknowledge receipt by simply hitting "Reply," it would be greatly appreciated. Thank you,

Marilyn Jasper

Conservation Chair

Sierra Club Placer Group

El Dorado-DEIR-Comments-SCPG 8-15-16.pdf
806K

SIERRA CLUB
FOUNDED 1892

PLACER GROUP
P.O. BOX 7167, AUBURN, CA 95604

Sent via email: shawna.purvines@edcgov.us August 15, 2016

Shawna Purvines, Principal Planner
Community Development Agency
Long Range Planning Division
2850 Fairlane Court
Placerville, CA 9567

RE: DEIR—Biological Resources Policy Update and Oak Resources Management Plan

Thank you for the opportunity to comment on the El Dorado County Biological Resources Policy Update and Oak Resources Management Plan (BRPU and/or ORMP).

Because oak woodland resources have been, and currently are, considered extremely valuable in almost all California communities, and because, in many areas oak woodlands and/or their vitality have diminished, the BRPU/ORMP must be go the extra mile to strictly protect and conserve oak resources in El Dorado County. Whether it is aesthetic beauty, ecosystem diversity, wildlife habitat, or other highly valued attributes, it appears that the BRPU/ORMP is woefully deficient in that it does not adequately recognize unique oak woodland natural resource values and that it does not propose meaningful, strong, unequivocal, enforceable protection measures.

If/When mature oak woodlands that have taken many decades to establish are destroyed, the BRPU/ORMP's antidote of either in-lieu fees or on/off site mitigation measures (MM), restoration, etc., are inadequate. What is lost with the destruction of mature oak woodlands, especially those with heritage oaks, is never fully recovered—especially if the "swap" lands are remote, unlikely to ever be developed, and create a net loss for wildlife habitat or critical corridors. Viable alternatives that provide wildlife corridors must be considered and analyzed, such as those submitted by the Sierra Nevada Conservation Alliance.

Of particular importance is oak woodlands' ability to lock up carbon and prevent it from escaping and contributing to global warming. (See Exhibit A.) The PRPU/ORMP does not fully analyze the impacts that its "plan" will create nor does it require adequate MM. The California Wildlife Foundation/California Oaks comments covered the GHG issues: The DEIR fails to inform the decision makers and the public of the full extent of the very real potential adverse greenhouse gas emission impacts that the project will create.

Additionally, in order for MM to be fully effective, fully funded performance bonding should be required up front. Five- or ten- or more years of mitigation monitoring can and do fail—either through lack of funds, applicant bankruptcy,[1] incompetence, or mistakes by conservation organization(s) hired to carry out the MM. Also, there are always further oak woodland threats that will be caused by future proposed amendments to General Plans and/or land-use rezoning approvals.

It is almost incomprehensible to grasp the scale of potential destruction of over 138,000 acres of oak woodlands with all the subsequent watershed impacts, wildlife

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[1]Placer County's oak woodlands MM for an approved project known as "Bickford Ranch" were a complete failure. The oaks were removed (clear cut), but with a bankruptcy (2008), the MM were abandoned.

habitat (see Exhibit B), along with other more subtle, less obvious negative changes to natural amenities—including but not limited to: reduced soil moisture retention capacity, lower groundwater tables and stream recharge, increased runoff with potential flooding and sediment loads in creeks (some of which may also impact critical anadromous fish habitat). Yet these impacts have not been reviewed in the DEIR.

The BRPU/ORMP needs to analyze opportunities to keep all working landscapes in balance with the natural landscapes, with the top priority being preservation of ecosystem values that benefit all—landowners, citizens, and the region as a whole. Although good models of agricultural operations are proof that they can and do co-exist with oak woodland preservation throughout the state, it is important to keep the focus on oak preservation—not agriculture economic entrepreneurship or sprawling development. Developers, ranchers and farmers can adapt; a clear-cut oak woodland cannot.

The DEIR's range of alternatives is egregiously inadequate. CEQA requires a range of alternatives to the proposed project that would be reasonable in reaching the project's primary objectives and would reduce or avoid the significant impacts.[2] A proper analysis of alternatives is critical in order for El Dorado County to comply with CEQA's mandate that significant environmental damage be avoided or substantially lessened where feasible.[3] As stated in Laurel *Heights Improvement Association v. Regents of University of California*, "[w]ithout meaningful analysis of alternatives in the DEIR, neither the courts nor the public can fulfill their proper roles in the CEQA process. . . . [Courts will not] countenance a result that would require blind trust by the public, especially in light of CEQA's fundamental goal that the public be fully informed as to the consequences of action by their public officials."[4] The DEIR's discussion of alternatives lists only two.[5] However, to comply with CEQA, especially with a project this large, with so many potential impacts, many more than only two alternatives are called for and must be considered.

We urge El Dorado County officials to recognize the county's uniquely beautiful, sensitive, and special natural resources—the very reason many people choose to live in El Dorado County—and send the BRPU/ORMP back to the drawing board.

Thank you for considering our views,

Marilyn Jasper

Marilyn Jasper, Conservation Chair

cc: The Honorable Edmund G. Brown, Jr.
Board of Supervisors, Amador County
Board of Supervisors, Placer County
California Oaks Coalition
The Honorable Senator Fran Pavley

Attachments: Exhibits A and B

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[2] Public Resource Code § 21100(b)(4); CEQA Guidelines § 15126(d).

[3] Public Resource. Code§ 21002; CEQA Guidelines §§ 15002(a)(3), 15021(a)(2), 15126(d); *Citizens for Quality Growth v. City of Mount Shasta* (1988) 198 Cal.App.3d 433, 443-45.

[4] 47 Cal. 3d 376, 404 (1988)

[5] DEIR, page 1-5 and in Chpt 10.

Exhibit A—Sierra Club Placer Group Comments-El Dorado BRPU/ORMP

http://www.latimes.com/science/sciencenow/la-sci-sn-old-trees-carbon-capture-20140115,0,5642959.story#axzz2qZoSACyK

Big, old trees keep growing and capturing carbon, study finds

The world's biggest trees - such as this large western white pine in the Sierra Nevada - are also the fastest-growing trees, according to a new study. (Rob Hayden)
By Bettina Boxall January 15, 2014, 7:17 p.m.

Scientists who gathered decades of measurements from hundreds of thousands of trees all over the world are punching a hole in the common assumption that large, old trees are biologically pretty much over the hill.

To the contrary, researchers found that the senior trees have rapid growth rates and keep capturing carbon – lots of it.

"The growth rate just keeps increasing as trees get bigger," said study leader Nate Stephenson, a California-based research ecologist with the U.S. Geological Survey.

The findings, published Wednesday in a letter in the journal Nature, are based on repeated measurements of 673,046 trees belonging to 403 species across every forested continent.

The 38 authors said that extraordinary growth was not limited to a few standout species, like giant sequoias. "Rather, rapid growth in giant trees is the global norm and can exceed [1,300 pounds] per year in the largest individuals," they wrote.

The productivity of individual leaves – that is, the amount of mass a tree adds per unit of leaf area – does decline with age. "But the thing is that old trees have so much more leaf area than a little tree, they more than compensate for that decline in productivity," Stephenson said.

It's well known that large trees are good at locking up carbon, preventing it from escaping into the atmosphere and contributing to global warming. But the research suggests that the big guys are not just storing carbon. They are fixing large amounts of it with continued rapid growth, every year adding a little more mass to their trunks, limbs and leaves.

At the high end, the authors said a single big tree can in one year add the same amount of carbon to a forest as is stored in an entire mid-sized tree.

"It's the equivalent of managing a sports team," Stephenson said. "You need to know who your star players are. It turns out they're not the 20-year-olds. They're the 90-year-olds."

In old growth plots in the western U.S., the authors said the largest trees comprised 6% of the forest but contributed a third of the annual growth in forest mass.

That does not mean, however, that on a forest level old stands capture more carbon overall than young stands. Young forests are denser, with more trees, and when old trees die, they release carbon back into the atmosphere.

Stephenson and Adrian Das, a USGS coauthor, got the idea for the study after observing rapid growth rates in big trees in Sierra Nevada research plots.

They wanted to know whether the same was true elsewhere. So they put out a call for data.

Researchers from around the world responded, providing diameter measurements that had periodically been taken of the same large trees, in some cases over decades. The measurements were then used to figure increases in the trees' overall mass.

"We already knew it's important to conserve old trees for the species that depend on them," Stephenson said. "I just think this adds a little bit of extra emphasis. Not only do they lock up a lot of carbon, they're really good at pulling carbon out of the atmosphere."

bettina.boxall@latimes.com -- *Twitter: @boxall*

EXHIBIT B—Sierra Club Placer Group Comments-El Dorado BRPU/ORMP

LIVING AMONG THE OAKS—
A Management Guide for Woodland Owners and Managers

University of California—Agriculture and Natural Resources
Oak Woodland Conservation Workgroup
http://anrcatalog.ucdavis.edu ANR Publication 21538:
Page 13-15, Excerpts:
….

Wildlife Enhancement

Oak environments are among the richest wildlife habitats in the state; 110 species of birds use oak habitats during the breeding season, and 35 percent of California's land mammals utilize oaks during some time of their lives. California's deer herds are particularly dependent on oak habitats. By maintaining the health of your oak woodlands, you promote wildlife health and increase the abundance and diversity of both terrestrial and aquatic species.

Although a few animals can adversely affect oak seedlings, wildlife generally does not harm mature oaks and often provides important benefits through maintaining ecological balances. For instance, blue jays are important acorn planters because they cache large numbers of acorns in the soil but do not retrieve all of them. Some of these germinate and develop into seedlings. The presence of wildlife also adds beauty to a woodland and value to property. Landowners can take some measures ot increase the abundance and diversity of wildlife on their lands….
…..

Large, old trees, especially deciduous species, are particularly valuable for wildlife. They have abundant foliage for foraging birds and insectivorous bats, deeply furrowed bark that provides wildlife cover and insect prey, abundant acorns, and nesting cavities in large limbs and trunks, both living and dead. Fallen leaves and other material form the canopy provide nutrients under these trees that support a host of soil invertebrates. At the landscape scale, a large, lone tree provides connectivity between wooded patches, adds structural diversity, and may provide a safe stopping point for migrating birds. Large trees have been referred to as a keystone species; that is, their ecological benefits are disproportionate to their numbers. Large dead trees in woodlands, called snags, are generally rare, but they provide important cavity and perch sites. They should therefore be retained, unless they pose a fire hazard or safety concern.
….

Wetlands. Probably no component of oak woodland habitat is more important for wildlife than riparian and other wetland areas. Because of the multiple layers of Vegetation in wetlands (ground, shrub, and tree), wetlands support numerous species of wildlife, including many threatened and endangered species…. Oaks along streams help stabilize the banks, and by shading the stream, they help keep the water cool for native trout and other fish…..

Shawna Purvines <shawna.purvines@edcgov.us>

General Plan Biological Resources Policy Update and Oak Resources Management Plan Draft Environmental Impact Report (EIR) - Comments

Roger Lewis <re.lewis@comcast.net> Fri, Aug 12, 2016 at 9:13 AM
To: shawna.purvines@edcgov.us
Cc: jim davies <j854davies@att.net>, Shirley Parker <sparker07@comcast.net>, Ron Kooyman <ron@thekooymans.com>, bosone@edcgov.us, bostwo@edcgov.us, bosthree@edcgov.us, bosfour@edcgov.us, bosfive@edcgov.us, edc.cob@edcgov.us

Ms. Shawna Purvines

Principal Planner

El Dorado County Community Development Agency

Long Range Planning Division

2850 Fairlane Court,

Placerville, CA 95667

Dear Ms. Purvines,

We have reviewed the subject DEIR and submit herewith our comments. We trust they will be considered and incorporated where possible into the final EIR.

As has been pointed out to the County on several occasions, we are extremely concerned over the inordinate amount of time it has taken to get this far. The continual delays have precluded our project from moving forward and has resulted in substantial financial losses to our company to the point where we are uncertain whether we can last much longer. We now trust that you will adhere to your estimated timeframe of Dec 2016 for adopting the final EIR, ORMP, and implementing ordinances.

Sincerely,

Roger Lewis

El Dorado Sr. Housing, LLC.

854 Diablo Rd.

Danville, CA 94526

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Comments on Draft Environmental Impact Report (DEIR) for the General Plan Biological Resources Policy Update and Oak Resources Management Plan (ORMP)

By El Dorado Sr. Housing, LLC

August 12, 2016

Throughout the lead up to and preparation of the Draft Environmental Impact Report and its associated in-lieu fee policy, El Dorado Sr. Housing, LLC has thoroughly supported the County's efforts. We believe we have offered many constructive suggestions on how to evaluate the environmental impacts to the County's oak resources and determine a fair method for establishing in-lieu fees to mitigate impacts due to development. In general our objective was not to minimize the fees or diminish the assessment of impacts, but simply to streamline and expedite the process under the mantra of simpler is better. We have pointed out problems with and/or offered suggestions for

- Quantifying the impacts from development
- Defining the methodology of oak resource measurement
- Creating equitable mitigation ratios
- Accounting for natural regeneration of oak resources

The draft EIR appears to have ignored all of our suggestions except for quantifying the impacts from development. In Section 6 of the draft EIR the impact is quantified.

Table 6-2 of the draft EIR indicates a total of 246,806 acres of oak resources. Table 6-6 indicates that a total of 6,442 acres of oak resources are projected to be converted under general plan buildout by the year 2035. It is pointed out in the lead-up to Table 6-6 that in calculating the total potential oak woodlands conversion it was assumed that all of the oak woodlands on parcels projected to be developed would be impacted by that development. In other words, the oak woodlands conversion acreage assumes that no onsite oak woodlands retention would occur. Therefore, the conversion acreage totals likely overestimate potential impacts.

Using the above projected conversion acreage as a basis results in an average conversion rate of 339 acres/yr for the next 19 years. However, using a reasonable assumed percentage of retention, say just 25%, would result in only about 250 acres/yr conversion.

In our Comments on the Notice of Preparation, August 11, 2015, we suggested the following:
"Determine and include the effects of natural regeneration of resources in any assessment of impact. This obviously will have the effect of mitigating any impacts. In fact it might be revealed that natural regeneration of resources more than offsets impacts from development."

In Chapter 6 of the draft EIR our concern was referenced in a list of concerns posed in response to the NOP of July 17, 2015. The list included the concern: "The degree to which natural regeneration could offset development impacts to oak woodlands." We do not think this concern was adequately addressed in the draft EIR.

Section 1.1.5 of Appendix A of Appendix C (Proposed Oak Resources Management Plan) addresses natural regeneration. It refers to several sources that discuss regeneration. It is noted that several factors have been implicated in *poor* oak regeneration. But it does not present evidence of *zero* regeneration. And that is the crux of our concern.

Natural regeneration of some reasonable percentage should have been accounted for. Assuming 0.2%/yr (equivalent to approximately 500 acres per year), as Commissioner Pratt suggested during the Planning Commission hearing of August 13, 2015, would more than offset any development impacts and would have the effect of regenerating the entirety of the County's existing resources in 500 years. Even a regeneration rate of just 0.1% per year (approximately 250 acres/yr) would balance the development impact and would regenerate the forest in 1000 yrs. But a zero rate is an admission that the entire acreage in El Dorado County, all 246,806 acres of oak resources, will die out in the time it takes for the last tree to succumb, i.e. approximately 500 years. Of course this scenario seems unthinkable, but if true, then all attempts at mitigating developmental impacts of just 6,442 acres will be fruitless.

The only viable scenario is then to consider a reasonable amount of natural regeneration. But since any reasonable amount can be shown to completely offset developmental impacts, the obvious conclusion is that there is no significant impact from development, and that the EIR should not have been necessary.

If a common sense approach to this issue had been pursued from the outset, our company, El Dorado Sr. Housing, would have saved years of wasted time and hundreds of thousands of dollars in unnecessary expenses.

Hopefully, these comments will give the Community Development Agency, the Planning Commission, and the Board of Supervisors good reason to reject proposals for additional study and to deliberate very carefully before accepting any forthcoming objections to the draft EIR and allow the final EIR to quickly become a reality.

CALIFORNIA
Water Boards

Edmund G. Brown Jr.
Governor

Matthew Rodriquez
Secretary for
Environmental Protection

Central Valley Regional Water Quality Control Board

29 July 2016

EL DORADO COUNTY
RECEIVED
AUG 03 2016
LONG RANGE PLANNING

Shawna Purvines
El Dorado County
2850 Fairlane Court
Placerville, CA 95667

CERTIFIED MAIL
91 7199 9991 7035 8422 2591

COMMENTS TO REQUEST FOR REVIEW FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, EL DORADO COUNTY BIOLOGICAL RESOURCES POLICY UPDATE, OAK RESOURCES MANAGEMENT PLAN AND ORDINANCE PROJECT, SCH# 2015072031, EL DORADO COUNTY

Pursuant to the State Clearinghouse's 30 June 2016 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Draft Environment Impact Report* for the El Dorado County Biological Resources Policy Update, Oak Resources Management Plan and Ordinance Project, located in El Dorado County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

I. Regulatory Setting

Basin Plan

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues.

For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website:
http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/.

Antidegradation Considerations

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Policy is available on page IV-15.01 at:
http://www.waterboards.ca.gov/centralvalleywater_issues/basin_plans/sacsjr.pdf

In part it states:

> *Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.*
>
> *This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.*

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

II. Permitting Requirements

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]
The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/.

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.sht ml

Industrial Storm Water General Permit
Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 2014-0057-DWQ.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml.

Clean Water Act Section 404 Permit
If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the

[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements.

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916) 557-5250.

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACOE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications.

Waste Discharge Requirements – Discharges to Waters of the State

If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation.

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit2.shtml.

Dewatering Permit

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Risk General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Risk Waiver) R5-2013-0145. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

For more information regarding the Low Risk General Order and the application process, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf

For more information regarding the Low Risk Waiver and the application process, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2013-0145_res.pdf

Regulatory Compliance for Commercially Irrigated Agriculture

If the property will be used for commercial irrigated agricultural, the discharger will be required to obtain regulatory coverage under the Irrigated Lands Regulatory Program. There are two options to comply:

1. **Obtain Coverage Under a Coalition Group.** Join the local Coalition Group that supports land owners with the implementation of the Irrigated Lands Regulatory Program. The Coalition Group conducts water quality monitoring and reporting to the Central Valley Water Board on behalf of its growers. The Coalition Groups charge an annual membership fee, which varies by Coalition Group. To find the Coalition Group in your area, visit the Central Valley Water Board's website at: http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/app_approval/index.shtml; or contact water board staff at (916) 464-4611 or via email at IrrLands@waterboards.ca.gov.

2. **Obtain Coverage Under the General Waste Discharge Requirements for Individual Growers, General Order R5-2013-0100**. Dischargers not participating in a third-party group (Coalition) are regulated individually. Depending on the specific site conditions, growers may be required to monitor runoff from their property, install monitoring wells, and submit a notice of intent, farm plan, and other action plans regarding their actions to comply with their General Order. Yearly costs would include State administrative fees (for example, annual fees for farm sizes from 10-100 acres are currently $1,084 + $6.70/Acre); the cost to prepare annual monitoring reports; and water quality monitoring costs. To enroll as an Individual Discharger under the Irrigated Lands Regulatory Program, call the Central Valley Water Board phone line at (916) 464-4611 or e-mail board staff at IrrLands@waterboards.ca.gov.

Low or Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Dewatering and Other Low Threat Discharges to Surface Waters* (Low Threat General Order) or the General Order for *Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Superchlorination Projects, and Other Limited Threat Wastewaters to Surface Water* (Limited Threat General Order). A complete application must be submitted to the Central Valley Water Board to obtain coverage under these General NPDES permits.

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0074.pdf

For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0073.pdf

NPDES Permit

If the proposed project discharges waste that could affect the quality of the waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit.

For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/centralvalley/help/business_help/permit3.shtml

If you have questions regarding these comments, please contact me at (916) 464-4644 or Stephanie.Tadlock@waterboards.ca.gov.

Stephanie Tadlock

Stephanie Tadlock
Environmental Scientist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento

Shawna Purvines <shawna.purvines@edcgov.us>

Fwd: Comments to the DEIR for The Oak Resources Management Plan ("ORMP") and The Oak Resources Conservation Ordinance ("ORCO").

1 message

Timothy White <tjwhite510@aol.com> Mon, Aug 15, 2016 at 4:57 PM
To: Shawna Purvines <shawna.purvines@edcgov.us>

A revised copy with corrected typos.

Tim

Begin forwarded message:

From: Timothy White <tjwhite510@aol.com>
Date: August 15, 2016 at 4:50:28 PM PDT
To: shawna.purvines@edcgov.us
Subject: Comments to the DEIR for The Oak Resources Management Plan ("ORMP") and The Oak Resources Conservation Ordinance ("ORCO").

Ms. Shawna Purvines
EDC COMMUNITY DEVELOPMENT AGENCY
LONG RANGE PLANNING DIVISION
2850 Fairlane Court, Bldg. C
Placerville, CA 95667

Dear Ms. Purvines :
As I stated in my comments to the EDC Planning Commission last week, the ORMP and the ORCO are a good starting point, but they can and should be better, with the goal of having the best in class plan and ordinance that can be used as a template in other California cities and counties as they amend and/or establish their own plans and ordinances dealing with oak resources. In the estimated build-out scenario for 2025 and 2035, EDC is facing the loss of oak woodlands totaling 4009 and 2433 acres respectively, a staggering total loss of 6442 acres. The total number of oak trees that will be lost to construction in the oak woodlands does not include individual trees, including Heritage Trees, that are not covered by the definition of Oak Woodlands. Such trees could easily number in the thousands. My comments are as follows:
1. Section 130.39.070 F. of the ORCO requires a security deposit "in an amount not less than ten thousand dollars" for on-site oak tree or oak woodland retention. As a floor this is a de minimis amount and should be raised to at least $50,000. The difference in cost for a surety bond or a performance bond between those two amounts is not that great - the higher minimum amount will provide the assurance that the necessary funds are available to complete the required mitigation efforts if the developer fails to do so. A developer with a good track record of successful mitigation will pay less for a bond, a developer who fails to mitigate properly and in compliance will pay more.
2. Section 130.39.050 A. Exemption for Single-Family Parcels. I question the need for this exemption. Oak trees may be removed during construction of a single family residence - I understand the rationale for the exemption, but believe that a modicum of mitigation should be required.
3. Section 130.39.050 D. Exemption for County Road Projects. EDC is exempting itself from paying mitigation fees that it requires from others !! It should be a requirement that road widening and realignment projects pay mitigation fees as the fees paid do to the Oak Woodland Conservation Fund- a dedicated specialized fund with specific uses. If a road project is out sourced by EDC, then the cost of the required mitigation fees will be built into the bids made for the work.
4. Section 130.39.060 B. 1. As it stands, a developer can select a Qualified Professional of her choosing to prepare the required Oak Resources Technical Report. No matter the qualifications of the Qualified Professional, and her professional experience and standing, there will almost always be a perception that a developer has "paid" for a desired result. Let's bring a little transparency to this. EDC staff already has pre-approved outside experts and consultants it can request to submit bids to prepare DEIRS, EIRS and

similar reports. EDC should provide developers with a pre-approved, pre-authorized list of Qualified Professionals to prepare the Technical Report. The developer can then choose from that list. The public will have some assurance that process is more transparent than it currently is.

5. Mitigation Ratios. The purpose of mitigation is to lessen, to make less severe, to reduce the impact caused by an action- in this case the loss of oak trees and oak woodlands. You really can't fully mitigate for the loss of Heritage Oak Trees- those with a trunk of 36 inches dbh or more- those trees are likely 200 years old or more. These are the trees that the Miwok, Maidu and Nisenan tribal members gathered acorns from in the 1840's, the trees that provided shade to forty-niners and other miners in 1849 and subsequent years, the trees whose amazing silhouettes against a blazingly bright blue sky we admire daily as we drive along the roads of EDC. However, you can increase the required ratios of mitigation so that it is more likely than not that an increased number of replacement trees will be planted and survive so that in 2216 there will be Heritage Trees that our great-great-great-great-great- great-great-great grandchildren will sit under to enjoy the shade and admire from the roads. I strongly suggest that Tables 1 and 2, set forth in Section 130.39.070 C.2. be revised to double the recommended mitigation and replacement ratios. For example, the planting of 3 acorns is recommended to replace 1 inch of tree diameter removed - make it 6 or even 10.

6. Section 130.39.090. Bi-Annual Reporting - Oak Woodland Conservation Fund Fees. The use and documentation of the mitigation fees collected, as well as any recommended fee adjustments, should be made to the PC and the BOS on an ANNUAL basis, not every other year. This information is collected and accounted for annually, and should be reported and thus available to the public on an annual basis.

Thank you.

Timothy White

Shawna Purvines <shawna.purvines@edcgov.us>

RE: DEIR for General Plan Updates

Brennan, Whitney@Tahoe <Whitney.Brennan@tahoe.ca.gov> Fri, Jul 8, 2016 at 3:56 PM
To: Shawna Purvines <shawna.purvines@edcgov.us>

Thank you!

Whitney Brennan, PhD

Wildlife Biologist, California Tahoe Conservancy

Whitney.Brennan@tahoe.ca.gov

(530) 543-6054

From: Shawna Purvines [mailto:shawna.purvines@edcgov.us]
Sent: Friday, July 08, 2016 3:13 PM
To: Brennan, Whitney@Tahoe <Whitney.Brennan@Tahoe.ca.gov>
Subject: Re: DEIR for General Plan Updates

Hi Whitney,

Just to be sure I understand what you are asking; if you currently have two lots and want to move a lot line changing the size or shape of the two lots, a Boundary Line Amendment application would be filed with the County and approved under a ministerial review.

However, if your intent is to split an existing single parcel into two parcels you would need to file with the County a parcel map application which would require a discretionary review. If you would like to give me a call to discuss further my direct line is 530-621-5362.

For reference, the General Plan defines discretionary approval as follows:

Discretionary Decision As used in CEQA, an action taken by a governmental agency that calls for the exercise of judgement in deciding whether to approve and/or how to carry out a project. Includes such activities as the subdivision of property, the granting of general plan amendments or zone changes, the approval of specific plans, the approval of Williamson Act contracts, the granting of variances, special use permits, and others.

Discretionary Project A project which requires the exercise of judgment or deliberation when the public agency or body decides to approve or disapprove a particular activity, as distinguished from situations where the public agency or body merely has to determine whether there has been conformity with applicable statutes, ordinances, or regulations.

Hope this helps

Sincerely

Shawna Purvines

On Fri, Jul 8, 2016 at 2:49 PM, Brennan, Whitney@Tahoe <Whitney.Brennan@tahoe.ca.gov> wrote:

> Hi-
>
> What is included under development projects that require discretionary approval? Does this include lot line adjustments (e.g. if we want to sell of only part of a lot)? Thanks!
>
> *Whitney Brennan, PhD*
>
> *Wildlife Biologist, California Tahoe Conservancy*
>
> *Whitney.Brennan@tahoe.ca.gov*
>
> *(530) 543-6054*
>
> Every Californian should conserve water. Find out how at:
>
> Save Our Water
>
> SaveOurWater.com · Drought.CA.gov

--

Shawna L. Purvines

Principal Planner

County of El Dorado

Community Development Agency

Long Range Planning

2850 Fairlane Court

Placerville, CA 95667

Phone:(530) 621-5362/Fax: (530) 642-0508

shawna.purvines@edcgov.us

www.edcgov.us

Urgent! Update on El Dorado County General Plan – Revisions to Biological Resource Policies

August 6, 2016 – El Dorado County is updating its General Plan (GP), and we have an opportunity to comment on it by August 15! Land use affects everything about our quality of life, from how close our neighbors are to how crowded our roads. It also impacts the natural environment, including wildlife, oak woodlands, sensitive plants and water supplies. Planning for growth and how that growth occurs are central to the plan.

Global warming isn't a prediction. It is happening.

~James Hansen

The Center for Sierra Nevada Conservation's (CSNC) is particularly concerned about our fast-disappearing oak woodlands and the effect on wildlife habitat and movement. The County's plan is to "mitigate" losses of oak woodland by purchasing development rights on grazing lands far away from where wildlife is threatened. Since those lands are highly unlikely ever to be developed anyway, this so-called mitigation is a net loss for wildlife habitat and does nothing to protect important habitat and corridors actually being used by wildlife.

CSNC is proposing an alternative, asking the County to analyze where wildlife actually lives and provide long-term refuges and corridors for them to move about. If the County does nothing for wildlife, their movement and migration corridors will be eliminated, and any future potential to provide for them will disappear. Preserving some of the Highway 50 corridor habitat for wildlife will also help curb some of the dense growth there, as well as the resulting additional traffic.

You can make a difference for both wildlife and your future, by supporting our Conservation Alternative. CSNC has developed a feasible alternative that will protect oak woodlands and the wildlife that depends on them. Primarily, we are asking the County to analyze an alternative that provides wildlife corridors along Highway 50, where wild animals are most constrained.

CSNC's Conservation Alternative will:

- – Analyze "corridors" where wildlife might cross highways if able to do so.
- – Provide for directing mitigation funds to preserve habitat.
- – Link public lands to form refuges for wild animals.

Comments on the El Dorado County General Plan are due by **August 15, 2016.** Please indicate your support for CSNC'S Conservation Alternative, which will provide analysis of the actual impacts to wildlife and oak woodlands.

Send your letter supporting CSNC's Conservation Alternative now!

Your Name (required)

Your Email (required)

Subject

Protect El Dorado County wildlife and oak woodlands

Your Message

Dear Ms. Purvines,

As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.

Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Send

El Dorado County Board of Supervisors to hold public workshops on General Plan biological resources policies update.

The County is in the process of updating the biological resources policies and implementation measures in the County's General Plan. On January 13, 2015 the County Board of Supervisors approved the proposed project schedule. The 18 month project schedule includes a series of public workshops with the Board to be held in January 2015 through June 2015. Workshops will be held in the Board Chambers located at 330 Fair Lane, Bldg A, in Placerville. Workshops are scheduled on the following Mondays: Jan. 26, Feb. 23, March 30, and May 18, 2015. See Press Release and Fact Sheet.

The Biological Policies include the ***Oak Woodlands Management Plan****, an earlier version of which was successfully challenged by CSNC in court. It is important that the public let their representatives know we want polices that offer the utmost protection to our county's wildlife habitat and scenic beauty.*

Update: On August 17, CSNC and El Dorado Chapter of CNPS submitted a letter to the El Dorado County Planning Department urging better protection of Oak Woodlands than that being proposed in the Amended Biological Resources Policies. Read the letter.

OSV (Over Snow Vehicle) Plans are coming! Let's make sure the Forest Service gets it Right!

Tahoe National Forest proposed action:

> *"The Tahoe is only the second national forest to undergo winter travel management planning under the new OSV rule. To ensure rule implementation is off to the right start and avoid the specter of litigation that has plagued summer-time travel management planning, it is critical that the Tahoe's OSV plan satisfies the Forest Service's substantive legal duty*

to locate areas and trails designated as open to OSV use to minimize resource damage and conflicts with the majority of winter visitors enjoying non-motorized, quiet forms of recreation.[1] *Unfortunately, as detailed below, the Tahoe's proposed action and OSV planning process to-date fall terribly short of what is required to comply with that duty and with the plain language of the final OSV rule."*

The campaign to establish sensible and environmentally ethical management plans for over-snow travel is just beginning. What happens on the Tahoe Forest will have a big impact on plans for the Eldorado Forest.

Read CSNC's **Scoping Comments on Tahoe National Forest Over-Snow Vehicle Use Designation Proposed Action** and the companion **Proposed Preferred Alternative for Tahoe National Forest Over-Snow Vehicle Use Designation**

Eldorado National Forest Action Alert:

Winter Travel Management Planning on Eldorado National Forest

The Forest Service extended the deadline until **April 20** for accepting comments on the future of non-motorized winter recreation on Eldorado National Forest.

> *Eldorado National Forest is one of the most popular destinations in California for backcountry skiers, snowshoers and snowboarders. Highway 88 is particularly popular because of the normally excellent snow depths, terrain and scenery in the Carson Pass area. Unfortunately, the Forest Service's Proposed Action for the Carson Pass area designates nearly all the lands adjacent to the highway open to snowmobile use. This includes the route to Meiss Meadow, toward Winnamucca Lake and to Woods Lake.*

Please tell the Forest Service that this is unacceptable!

Update on Eldorado National Forest Meadow Roads

The Eldorado NF has begun the process of evaluating repairs for the 18 roads it determined were having a negative impact on sensitive meadows. You can read Forest Supervisor Crabtree's letter here: FS_correspondence

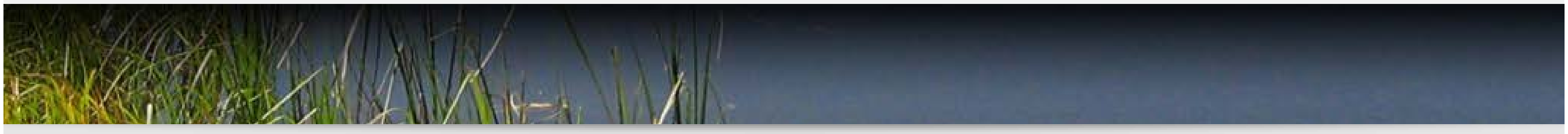
View photos and descriptions of proposed repairs here: Project Coordination for Nine Routes

Hot Issues

Three Sierra Nevada Amphibians Get Federal Protection

Foothill yellow-legged frog

Read More >>



Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sat, Aug 6, 2016 at 8:52 PM
Reply-To: autumnrg@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Autumn Gonzalez

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 11:10 AM
Reply-To: bstatti@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Bill Statti

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com>
Reply-To: cmcrmc@gmail.com
To: Shawna.purvines@edcgov.us

Fri, Aug 12, 2016 at 9:26 AM

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Connie & Rich Cashdollar

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Wed, Aug 10, 2016 at 3:20 PM
Reply-To: colleen.cleveland@hotmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Colleen and Randall Cleveland

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 10:50 AM
Reply-To: cargo@internet49.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Carole Goold

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 9:53 AM
Reply-To: cccrhigh@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Carin High

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sat, Aug 6, 2016 at 7:38 PM
Reply-To: cheryls_l@hotmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Cheryl Adler

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 2:42 PM
Reply-To: connie_freitas@msn.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Constance freitas

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 2:53 PM
Reply-To: dbrown@dslextreme.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

dave brown

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Thu, Aug 11, 2016 at 9:54 PM
Reply-To: Dolan@wildblue.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Don Dolan

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 8:22 AM
Reply-To: dmhmmnd@icloud.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

David Hammond

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 9:48 PM
Reply-To: dddejager@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Dan DeJager

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 3:43 PM
Reply-To: DanStheguitarman@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Daniel Stephenson

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 4:56 PM
Reply-To: colefamily@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

David cole

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 8, 2016 at 9:44 AM
Reply-To: rivercoyote@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Denise Pane

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 15, 2016 at 9:38 AM
Reply-To: e-holst@comcast.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Erik Holst

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 5:22 AM
Reply-To: ek4575@att.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Ellen V. Katz

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 11:09 PM
Reply-To: sierradogs@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Eden Halbert

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sat, Aug 6, 2016 at 11:57 PM
Reply-To: francescaduchamp@att.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Fran Duchamp

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sat, Aug 6, 2016 at 7:06 PM
Reply-To: sgbfab@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Frank Baker

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 12:02 AM
Reply-To: mononfan@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Geoff Burns

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 12:00 PM
Reply-To: gpcwoodwk@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Mr. Gail Cone

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 14, 2016 at 6:44 PM
Reply-To: gardengma10@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Hannah Jacobsen

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 6:48 AM
Reply-To: hmm1964@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Heidi Mayerhofer

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Thu, Aug 11, 2016 at 10:19 PM
Reply-To: beutlerjamie@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Jamie Beutler

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Thu, Aug 11, 2016 at 10:08 PM
Reply-To: janice.frogner@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Janice Frogner

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Thu, Aug 11, 2016 at 10:55 PM
Reply-To: johnhennessy101@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

John Hennessy

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 8:10 AM
Reply-To: j_mack_us@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

julie mack

Shawna Purvines <shawna.purvines@edcgov.us>

General Plan Biological Resources Policy

1 message

Jeannette Maynard <jeannette.maynard@yahoo.com> Mon, Aug 15, 2016 at 4:37 PM
Reply-To: Jeannette Maynard <jeannette.maynard@yahoo.com>
To: "shawna.purvines@edcgov.us" <shawna.purvines@edcgov.us>, Shiva Frentzen <bostwo@edcgov.us>, Supervisor Mikulaco <bosone@edcgov.us>, Supervisor Novasel <bosfive@edcgov.us>, Supervisor Veerkamp <bosthree@edcgov.us>, The BOSFOUR <bosfour@edcgov.us>, EDC COB <edc.cob@edcgov.us>

Dear Shawna Purvines and Board of Supervisors,

The proposed changes to the General Plan Biological Resources Policies threaten the biological diversity and natural beauty of El Dorado County. The changes, as proposed, will also add to the dense development of the Hwy 50 corridor -- increasing traffic on an already congested freeway.

For these reasons, I am vehemently opposed to the proposed changes.

I urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative. This plan will help to protect our oak woodlands, our wildlife corridors, and the natural beauty which makes El Dorado County so unique.

I thank you, in advance, for doing everything you can to protect the beauty and biological diversity of our county.

The Center for Sierra Nevada Conservation's plan is the way to go! Please study if carefully. Please adopt it!

Respectfully,

Jeannette Maynard
Shingle Springs resident

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Thu, Aug 11, 2016 at 10:10 PM
Reply-To: jennymonteiro@sbcglobal.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Jenny Monteiro

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 9:38 AM
Reply-To: gjpogue@jps.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Joyce Pogue

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 8, 2016 at 7:13 AM
Reply-To: riverchickee@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Jennifer sweatt

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 10:16 PM
Reply-To: jane_andrew@comcast.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Jane Andrew

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 6:43 AM
Reply-To: moonlitwater2001@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Joanne Abram

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 8, 2016 at 6:44 AM
Reply-To: johngiles10@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

John Giles

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 10:36 AM
Reply-To: jstatti@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Jonathan Statti

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 8, 2016 at 9:36 AM
Reply-To: kdavis@dynamicventures.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Kurt Davis

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 15, 2016 at 1:03 PM
Reply-To: kgladstein@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Kate Gladstein

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 6:16 AM
Reply-To: kmmichael1@hotmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,

As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.

Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Kristie Michael

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 8, 2016 at 7:40 AM
Reply-To: knschiro@sbcglobal.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Karen Schiro

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 6:06 AM
Reply-To: karenschumann@sbcglobal.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Karen Schumann

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 12:04 PM
Reply-To: dvinones@aol.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

karen warner

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sat, Aug 6, 2016 at 8:54 PM
Reply-To: kellen.dunlap@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Kellen Dunlap

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 3:20 PM
Reply-To: canyondweller1972@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Kelley Rogers

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 4:50 PM
Reply-To: kirkcallansmith@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Kirk Smith

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 2:47 PM
Reply-To: mousie@dslextreme.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Linda Brown

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Thu, Aug 11, 2016 at 9:51 PM
Reply-To: lindamattson95682@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Linda Mattson

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 8:29 AM
Reply-To: shawfamjlj@sbcglobal.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Luz Shaw

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Thu, Aug 11, 2016 at 9:59 PM
Reply-To: rosemontvista@mac.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Laura A Winston

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 12:00 PM
Reply-To: lkarcher@sbcglobal.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Lee-Anne Karcher

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 5:39 AM
Reply-To: firehorse61@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Linda Larkin

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 7:38 AM
Reply-To: lynnchristiansen68@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Lynn Christiansen

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 15, 2016 at 7:05 AM
Reply-To: mkb56@humboldt.edu
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Matt Brush

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 8, 2016 at 10:37 AM
Reply-To: maeharms76@hotmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Mae Harms

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 1:57 PM
Reply-To: kientzml@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Michelle Kientz

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 14, 2016 at 11:53 AM
Reply-To: zeileitz@directcon.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,

As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.

Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Michael Kokinos

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 9:33 AM
Reply-To: dogsintahoe@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

moya sanders

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 10:51 AM
Reply-To: mswartz@swartz-law.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Mark Swaratz

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 14, 2016 at 4:54 PM
Reply-To: Michael@watershednetwork.org
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Michael Wellborn

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sat, Aug 6, 2016 at 8:37 PM
Reply-To: monique.w@comcast.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Monique Wilber

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 8, 2016 at 10:23 AM
Reply-To: ruiz.d.nicole@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Nicole ruiz

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Wed, Aug 10, 2016 at 1:28 PM
Reply-To: nate_weldon@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Nate Weldon

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 4:47 PM
Reply-To: giambruno_n_49@sbcglobal.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Nancy Beverage

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com>
Reply-To: 4ginaflat@gmail.com
To: Shawna.purvines@edcgov.us
Sun, Aug 7, 2016 at 1:51 PM

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Natalia Grack

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 8, 2016 at 11:16 AM
Reply-To: drboylan@outlook.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Richard Boylan, Ph.D.

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com>
Reply-To: rhurzel@saber.net
To: Shawna.purvines@edcgov.us

Mon, Aug 15, 2016 at 9:19 AM

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Rick Frost-Hurzel

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 9:15 AM
Reply-To: Roguer5950@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Roger Nelson

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Wed, Aug 10, 2016 at 12:04 PM
Reply-To: backlunds@att.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,

As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.

Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Stanley Backlund

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 1:15 PM
Reply-To: ggupthehill@sbcglobal.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Sandra Eisner

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Mon, Aug 15, 2016 at 4:33 PM
Reply-To: suewrapsitup@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Sue Goodrich

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 10:35 AM
Reply-To: feezard@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Stephanie Harvey

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 8:02 AM
Reply-To: susanhennessy101@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Susan Hennessy

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Fri, Aug 12, 2016 at 1:14 AM
Reply-To: thelysters@me.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Stefanie Lyster

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Tue, Aug 9, 2016 at 5:32 PM
Reply-To: penders@flc.losrios.edu
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Sarah Pender

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 8:27 AM
Reply-To: elegantharvest@directcon.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Shilo nielsen

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sat, Aug 6, 2016 at 8:22 PM
Reply-To: SAS8721@hotmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Stacie Sherman

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 9:22 AM
Reply-To: raineybass2@aol.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
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Respectfully,

Susan Rainey

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 10:11 AM
Reply-To: susanstatti@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
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Respectfully,

Susan Statti

Shawna Purvines <shawna.purvines@edcgov.us>

General Plan , Alternative 2

Tim Thomas <trailtrials@gmail.com> Thu, Aug 11, 2016 at 8:39 AM
To: shawna.purvines@edcgov.us

Attn: Shawna Purvines ,

Now is the time to make a difference! Please recommend protecting oak woodlands from future development and for mitigating current and future impacts. Tell the El Dorado County Board of Supervisors that you recommend **Alternative 2** to the General Plan update because this alternative has less impact than the proposed action and is a better choice for protecting oak woodlands in our County.

Thank You ,
--- Tim Thomas

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Sun, Aug 7, 2016 at 2:45 PM
Reply-To: tdhazlett2002@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
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Respectfully,

Tara Hazlett

Cindy Johnson <cynthia.johnson@edcgov.us>

Fwd: Comments on Proposed General Plan Biological Resources Revisions

1 message

Shawna Purvines <shawna.purvines@edcgov.us> Wed, Aug 17, 2016 at 9:14 AM
To: Cindy Johnson <cynthia.johnson@edcgov.us>
Cc: Anne Novotny <anne.novotny@edcgov.us>

Below is a late response to the DEIR. I have also saved it in the file.

Also please add all e-mails/contact information from those that submitted comments to the LRP database and notification list.

Thanks
Shawna

---------- Forwarded message ----------
From: <sierran7@box884.bluehost.com>
Date: Tue, Aug 16, 2016 at 7:49 PM
Subject: Comments on Proposed General Plan Biological Resources Revisions
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Shari Kautzky

--

Shawna L. Purvines
Principal Planner

County of El Dorado
Community Development Agency
Long Range Planning
2850 Fairlane Court
Placerville, CA 95667
Phone:(530) 621-5362/Fax: (530) 642-0508
shawna.purvines@edcgov.us
www.edcgov.us

Aug 11, 2016

Shawna Purvines, Principal Planner
Community Development Agency
Long Range Planning Division
2850 Fairlane Court
Placerville, CA 9567

'5 AUG 15 AM 11:45
RECEIVED
PLANNING DEPARTMENT

Comment for DEIR on Biological Resources Policy Update

This project has the stench of wineries and developers behind it.

It's under the guise of managing oak trees, because everyone likes them, but it's coming in with county blessings to take out entire swaths of oak trees for profit making. We know developers' modus operandi, but wineries will destroy oaks also.

Wineries will clear cut oaks first, spray herbicides and who-knows-what to get started, smile, contribute to local nonprofits and supervisor campaigns, and are on their way to destroying ecosystems.

Once they get their innocuous "Wine Tasting" facility approved, all neighbors have to "WATCH OUT."

They spray the dickens out of their vineyards, pave over good food-growing soil so they can have [inadequate] parking for their ever-increasing events that should not be allowed. If Code Enforcement won't stop them, they get the Board of Supervisors to change the zoning! This Bio Resources Policy Update is just a fast track to approval. Oh, in the DEIR, it's even called "Streamlining" (Page 1-3). That's code word for loophole-laden, unenforceable or lax approaches to resource conservation, coupled with meaningless mitigation measures. As an objective, this one should be edited or stricken completely.

Second, after the oaks are gone, the wineries start holding many events—sometimes before their grapes are even producing because they buy grapes elsewhere. Later, when they buy non-El Dorado County grapes, it's, "Oh, we had a bad year. To stay in business we had to buy grapes, or wine, or even bottled wine (and slap their label on it—you name it) from outside the appellation." They become nothing but retail liquor outlets and event centers with multiple disturbing events that disrupt neighbors. They obtain county blessings via zoning variances or amended ordinances, but only old timers remember the beautiful, healthy, ecosystem-supporting oak woodlands.

That is what this misguided, disastrous so-called Biological Resources Policy Update is all about. Do NOT be snookered or allow it to be approved. Save our oaks!

Pete Martingale
General Delivery
3045 Sacramento St
Placerville, CA 95667

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Tue, Aug 16, 2016 at 7:49 PM
Reply-To: tskautzky@att.net
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Shari Kautzky

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Wed, Aug 17, 2016 at 6:43 PM
Reply-To: 27luckyduck@gmail.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Rose Lee

Shawna Purvines <shawna.purvines@edcgov.us>

Comments on Proposed General Plan Biological Resources Revisions

1 message

sierran7@box884.bluehost.com <sierran7@box884.bluehost.com> Wed, Aug 17, 2016 at 7:28 PM
Reply-To: cccrhigh@yahoo.com
To: Shawna.purvines@edcgov.us

Dear Ms. Purvines,
As residents of El Dorado County, my family and I value the beauty and biological diversity of our county. The proposed changes to the General Plan Biological Policies will threaten those values by further development of the Highway 50 corridor, to the detriment of oak woodlands and the wildlife that relies on that habitat. It will also cut off the few remaining places where wildlife are able to cross Highway 50. It is critical that this north/south corridor remain available for safe wildlife movement.
Furthermore, the changes will add to the dense development of the Hwy 50 corridor, increasing traffic on an already congested freeway. We urge you to adopt the Center for Sierra Nevada Conservation's Conservation Alternative, which will protect wildlife corridors and oak woodlands.

Respectfully,

Carin High

Shawna Purvines <shawna.purvines@edcgov.us>

Letter regarding the DEIR Biological Resources Policy Update and Oak Resources Management Plan SCH 2015072031

1 message

Cashdollar, Shaundra@Wildlife <Shaundra.Cashdollar@wildlife.ca.gov> Mon, Aug 22, 2016 at 12:00 PM
To: "shawna.purvines@edcgov.us" <shawna.purvines@edcgov.us>
Cc: "Drongesen, Jeff@Wildlife" <Jeff.Drongesen@wildlife.ca.gov>, "Barker, Kelley@Wildlife" <Kelley.Barker@wildlife.ca.gov>, "Quillman, Gabriele@Wildlife" <Gabriele.Quillman@wildlife.ca.gov>, "state.clearinghouse@opr.ca.gov" <state.clearinghouse@opr.ca.gov>

Ms. Purvines,

Please let me know that you have received this email and that you are able to open the attachment. The hard copy will follow via USPS.

Thank you,

Shaundra Cashdollar

Department of Fish and Wildlife

North Central Region/Region 2

1701 Nimbus Road, Suite A

Rancho Cordova, CA 95670

(916) 358-2930

Shaundra.Cashdollar@Wildlife.ca.gov

Every Californian should conserve water. Find out how at:

Save Our Water

SaveOurWater.com · Drought.CA.gov

Oak Resources Management Plan.pdf
1297K

State of California - Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
North Central Region
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670-4599
(916) 358-2900
www.wildlife.ca.gov

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director

August 22, 2016

Shawna Purvines
El Dorado County
Community Development Agency
2850 Fairlane Court, Building C
Placerville, CA 95667

Subject: DRAFT ENVIRONMENTAL IMPACT REPORT
BIOLOGICAL RESOURCES POLICY UPDATE AND OAK RESOURCES MANAGEMENT PLAN
STATE CLEARINGHOUSE NO. 2015072031

Dear Ms. Purvines:

The Department of Fish and Wildlife (Department) appreciates the opportunity to comment on the Draft Environmental Impact Report (DEIR) for the Biological Resources Policy Update and Oak Resources Management Plan (project) (State Clearinghouse No. 2015072031). The Department is responding to the DEIR as a Trustee Agency for fish and wildlife resources (California Fish and Game Code sections 711.7 and 1802, and the California Environmental Quality Act (CEQA) Guidelines Section 15386), and as a Responsible Agency regarding any future discretionary actions (CEQA Guidelines Section 15381), such as the issuance of a Lake or Streambed Alteration Agreement (California Fish and Game Code sections 1600 *et seq.*) and/or a California Endangered Species Act (CESA) Permit for Incidental Take of Endangered, Threatened, and/or Candidate species (California Fish and Game Code sections 2080.1 and 2081).

The proposed project consists of amendments to El Dorado County's (County; the CEQA lead agency) General Plan, development of a management plan for the County's oak resources, and adoption of an Oak Resources Conservation Ordinance. The proposed General Plan amendments replace the County's Integrated Natural Resources Management Plan (INRMP) with a Biological Resource Mitigation Program, which includes provisions for the conservation of habitats that support special status species, aquatic features, wetland and riparian habitat, habitat for migratory deer herds, wildlife movement corridors, and large expanses of native vegetation. The Oak Resources Management Plan and Ordinance establish mitigation requirements for impacts to oak woodlands, individual native oak trees, and Heritage Trees.

Comments and Recommendations

Following review of the DEIR, the Department offers the comments and recommendations presented below to assist the County in adequately identifying and/or mitigating the project's significant, or potentially significant, impacts on biological resources:

Pine Hill Plants

Western El Dorado County's gabbro soils support a unique community of rare and endemic plants, including Pine Hill ceanothus (*Ceanothus roderickii*), El Dorado County mule ears (*Wyethia reticulata*), El Dorado bedstraw (*Galium californicum* ssp. *sierrae*), Pine Hill flannelbush (*Fremontodendron decumbens*), Bisbee Peak rush-rose (*Helianthemum suffrutescens*), Red Hills soaproot (*Chlorogalum grandiflorum*), Stebbins' morning glory (*Calystegia stebbinsii*), and Layne's butterweed (*Packera layneae*), to which the DEIR collectively refers as the Pine Hill plants.

The DEIR's analysis of the General Plan's policies with respect to biological resources and the physical environmental effects resulting from buildout of the land uses anticipated under the General Plan includes a general discussion of the anticipated impacts to special-status species; however, it does not include an analysis of impacts to the Pine Hill plants. Because the Pine Hill plants and their habitat are a unique and significant aspect of the County's environmental setting, and because the Biological Resources Plan Update proposes revisions to policy pertaining to the Pine Hill plants' protection, such an analysis is warranted. The Department recommends that the DEIR be revised to include an analysis of the project's potential direct, indirect, and cumulative impacts on the Pine Hill plants and their habitat.

The proposed revisions to Policy 7.4.1.1 include a change of reference from County Code Chapter 17.71 to County Code Chapter 130.71 and the addition of the phrase "where feasible" to the requirement that the County establish and manage ecological preserves consistent with the United States Fish and Wildlife Service's (USFWS) *Gabbro Soil Plants of the Central Sierra Nevada Foothills Recovery Plan* (Recovery plan; USFWS 2002). The Department offers the following comments regarding the proposed revisions to Policy 7.4.1.1:

1. Please provide an account of any differences, including additions, omissions, and/or changes in wording, between Chapter 17.71 and Chapter 130.71, and explain what, if any, impacts the changes may have on the efficacy of the County's mitigation program for the Pine Hill plants.

2. The Department does not concur with the conclusion that the addition of the phrase "where feasible" will have no effect for the following reasons: a) the term "feasible" is not defined, and b) although, as the DEIR mentions, the Recovery Plan *by itself* is not a binding requirement, the existing policy explicitly requires

consistency with the Recovery Plan. The addition of the phrase "where feasible" changes the meaning of the Policy so that consistency with the Recovery Plan is no longer required. Because the term "feasible" is not defined, it is not clear by what process the County will determine when consistency is required and when it is not. This results in a relaxation of the standards by which the County is required to provide for the protection of the Pine Hill plants, and may, depending upon how it is interpreted, result in significant adverse impacts to the Pine Hill plants. The Department recommends that the phrase "where feasible" be removed from Policy 7.4.1.1, or that the DEIR be revised to include a thorough and detailed analysis of the potential effects of the wording change.

The Department understands that County Code Chapter 130.71 provides two options for project sponsors as a means to minimize and mitigate impacts on the Pine Hill plants, including: 1) payment into the County's in-lieu fee program, and 2) participation in the rare plant off-site mitigation program. The County's in-lieu fee program, in part, requires that fees be reviewed on an annual basis, and adjusted as necessary to ensure that the anticipated fees are appropriate to protect, improve, and maintain appropriate amounts of rare plant habitat. Specifically, Chapter 130.71.040 states "[t]here are hereby established an Ecological Preserve Mitigation requirement comprised of on-site and off-site mitigation standards and an ecological preserve fee in lieu of such mitigation. The amounts of the fee shall be established periodically by resolution of the Board and shall be based on the formula set forth in this Ordinance," and 130.71.070 states "[t]he fee amounts shall be reviewed on an annual basis and adjusted as necessary to insure that the anticipated fees are no more and no less than required for the purpose for which they are collected."

The current funds collected by the County's in-lieu fee program may not be adequate to offset the ongoing impacts to the Pine Hill plants and their habitat, or to meet the standard set forth by CEQA. To the Department's knowledge, the fee amount has not been adjusted since its establishment in 1998. Projects approved by the County over time have cumulatively led to the loss of rare plant habitat and rare plants throughout a significant portion of their limited range. Therefore, the Department recommends that the in-lieu fee program be re-evaluated and updated prior to its use to mitigate impacts to Pine Hill rare plants to below a level of significance.

CEQA guidelines section 15021 establishes a duty for public agencies to avoid or minimize environmental damage where feasible. CEQA also requires that lead agencies give major consideration to preventing environmental damage, and should not approve a project as proposed if there are feasible alternatives or mitigation measures available that would substantially lessen any significant effects that the project would have on the environment. The Department recommends that the County evaluate and demonstrate the General Plan's ability to avoid and minimize both direct and indirect impacts to Pine Hill plants and their habitat, and require further policy revisions as necessary to accomplish these tasks. For those projects where impacts to sensitive plants are unavoidable, a comprehensive mitigation strategy should be established to offset the impacts. Until such a strategy is established and adopted, significant adverse impacts to the Pine Hill plants will likely continue to occur. The Department recommends that the DEIR be revised to include a timeline for the establishment and adoption of a comprehensive mitigation strategy for the Pine Hill plants.

Sensitive Habitat Protection

The DEIR's Table 6-5 provides a list of sensitive vegetation communities found, or potentially found, within El Dorado County. Of the natural communities listed in Table 6-5, 52 are ranked S1 – S3, including many upland habitat types. The Department considers vegetation communities with State ranks of S1 – S3 to be imperiled and of high priority for preservation.

While the Department appreciates that upland communities other than oak woodlands are given consideration in the proposed Biological Resource Mitigation Program, the proposal to preserve non-oak woodland upland habitat at a 1:1 mitigation to impact ratio will not adequately offset potential impacts to natural communities designated S3 or rarer. A 1:1 preservation to impact ratio allows for a net loss of up to 50% of the existing unprotected habitat. This would be a significant adverse impact, particularly in the case of rare natural communities which are already declining and/or have limited distributions. The Department recommends that the Biological Resource Mitigation Program be revised to require a stronger mitigation proposal for natural communities ranked S1 – S3, and strongly encourages the County to adopt a no-net-loss standard for these imperiled habitats. It is also important to be sure that mitigation for these rare habitat types is in-kind. For example, a project impacting Fremont cottonwood forest should include creation and preservation of Fremont cottonwood forest specifically, rather than some other type of riparian habitat. The Department recommends that the General Plan be revised to explicitly state that habitat mitigation should be in-kind.

Wildlife Movement

The Department offers the following recommendations for the protection of wildlife movement corridors:

1. *Essential Wildlife Connectivity*: The Department's California Essential Habitat Connectivity Project (Spencer *et al.* 2010) has identified the corridor of relatively undeveloped land stretching from Marble Valley to Sawtooth Ridge as an area of essential habitat connectivity. The corridor's southern terminus is located in the Marble Valley area, west of Shingle Road, east of Latrobe Road, and south of Highway 50. It continues north over the highway, between the communities of El Dorado Hills and Cameron Park, and connects to undeveloped lands in the northwest portion of the County, east of Folsom Lake. The Department recommends that the County map this area as an Important Biological Corridor,

and that this be considered in the review and mitigation of future projects proposing impacts to wildlife movement in this area.

2. *Habitat Corridor Management*: The project proposes to revise Policy 7.4.2.4 to replace the word "manage" with "preserve" in respect to wildlife habitat corridors within public parks and natural resource protection areas, stating that "[g]enerally, preservation of the corridor should suffice to maintain its functionality for wildlife movement, so this would have little to no adverse effect." Although the Department agrees that a high degree of active management is unlikely to be required to maintain the function of preserved wildlife movement corridors, there are reasonably foreseeable circumstances in which management will likely be required. Management activities that may be necessary in order to maintain wildlife movement may include, but are not limited to, remediation following natural disasters (e.g., fires, floods, landslides, etc.), remediation of impacts resulting from unauthorized off-highway vehicle use, removal of invasive species, and removal of unauthorized encampments and/or human-deposited debris. Therefore, the Department recommends that the County include within its revised General Plan a mechanism to provide for as-needed management activities.

<u>Oak Resources Management Plan</u>

Following review of the proposed Oak Resources Management Plan (ORMP), the Department has identified concerns regarding the completeness of the impact analysis, the adequacy of the proposed mitigation measures, and the potential impacts to valley oak woodlands in particular.

1. *Impact Analysis*: The DEIR is unclear on how impacts to oak woodlands will be assessed. While it is clear that the outright removal of oaks represents an impact, indirect impacts including isolation of "retained" oak woodland from larger continuous habitat areas, removal or modification of understory vegetation, reduction of available recruitment ground due to paving near or around oaks, and other "edge effects" may substantially reduce the habitat quality of any oak woodlands remaining on-site following project buildout. Many species dependent on oak woodland as habitat require a minimum of five acres in order to derive long-term habitat value from the patch, including western grey squirrel (Thysell & Carey 2001) and lark sparrow (Stralberg & Williams 2002). In order to ensure that these adverse impacts are properly mitigated, the Department recommends that the ORMP be revised to state that oak woodlands that remain on-site but are fragmented into patches less than five continuous acres, are substantially modified from their natural state (e.g., through understory vegetation removal, paving, introduction of materials or vegetation likely to hinder natural recruitment, etc.), or are in any other way indirectly substantially impacted shall not be considered "retained" for the purposes of determining the appropriate project-specific mitigation ratio.

2. *Adequacy of the Proposed Mitigation Ratios:* The Department does not concur that a 1:1 to 2:1 mitigation ratio is sufficient to reduce per-project impacts to oak woodlands to a level that is less than significant. Because the mitigation options allow impacts to be mitigated via preservation only, a project impacting oak woodlands may mitigate the impacts by preserving existing oak woodlands in an amount equal to up to twice the area of impact. This would result in a net loss of the entire original impact area. While preserving existing oak woodlands prevents them from being impacted by hypothetical future projects, it does not add habitat value or area to compensate for the area and values lost from the originally impacted oak woodlands.

   In order to ensure that the functions and values of the impacted oak woodlands are replaced, the Department recommends that some oak woodland creation and/or restoration be required in addition to preservation requirements, rather than allowing creation and/or restoration to optionally replace up to 50% of preservation requirements.

   Although the DEIR concludes that a no-net-loss policy for oak woodlands is infeasible due to the likely cost, it does not provide an economic analysis supporting its conclusion, nor does it demonstrate that the proposed mitigation strategy is the best feasible mitigation. While potential impacts to oak woodlands may remain significant and unavoidable even with a higher mitigation ratio and required creation and/or restoration element, the cumulative impacts to oak woodlands would be substantially lessened. As mentioned earlier, a public agency should not approve a project as proposed if there are feasible alternatives or mitigation measures available that would substantially lessen any significant effects that the project would have on the environment (CEQA Guidelines §15021(a)(2)). Therefore, the Department recommends that the DEIR be revised to include a thorough evaluation of the proposed mitigation ratios and additional ways to strengthen them to the point where the cumulative impacts on oak woodlands are reduced to less than significant. The analysis should provide substantial evidence supporting the conclusion that mitigation measures considered and rejected are not feasible.

3. *Priority Conservation Areas*: The Priority Conservation Areas (PCAs) identified by the County are in large part located in areas that are geographically distant from the areas that are projected to be developed by 2035. This is problematic for two reasons: firstly, it separates the mitigation areas from the areas of impact, and secondly, it places unduly high conservation priority on areas that are less likely to be developed in the foreseeable future. Development within El Dorado County is heaviest around the Highway 50 corridor, and the projected growth through 2035 is similarly located. By designating only PCAs outside of the Highway 50 corridor, the County proposes mitigation outside of the area of highest impact. Furthermore, the placement of PCAs in areas that are less likely

to be developed prioritizes mitigation in the areas in which it is least urgently needed. The value of preservation as mitigation is predicated on the assumption that the areas to be preserved would, if not preserved, be likely to be developed. Preservation of habitat that is unlikely to be converted is inherently less valuable and less effective as mitigation than is preservation of habitat that would otherwise be likely to be converted. Therefore, the Department recommends that the ORMP be revised to include mitigation that specifically and effectively addresses impacts within the Highway 50 corridor.

4. *Valley Oak Woodland*: Valley oak woodland is a state-designated rare natural community that is endemic to California (CDFG 2010; Standiford *et al.* 1996; CIWTG). Rare natural communities have limited distribution and are often vulnerable to project impacts (CDFW 2009). Only remnant patches of valley oak woodland remain, and it is currently estimated that less than 10 percent of its initial distribution remains (Standiford *et al.* 1996). Research suggests that valley oak trees are not regenerating enough for eventual replacement (Zavaleta *et al.* 2007), and most surviving stands appear to be between 100 and 300 years old (CIWTG). Because valley oak prefers relatively flat, fertile sites, it has been disproportionately impacted by development and agricultural land conversion as compared with other foothill oak species (Sork *et al.* 2002).

   The DEIR estimates that approximately 3,970 acres of valley oak woodland currently exist within El Dorado County. By 2035, the DEIR estimates that up to 2,544 acres of valley oak woodland may be converted: 401 acres due to General Plan buildout, 29 acres in fire safe project areas, 11 acres in County road widening and/or realignment areas, and 2,103 acres in agricultural lands. This represents a potential loss of nearly 65% of the County's existing valley oak woodlands. Because the proposed ORMP mitigation options do not require restoration or replanting, any valley oak woodlands removed may never be replaced.

   Due to the scarcity of valley oak woodland and its severe decline statewide, the Department recommends that the County adopt a no-net-loss policy for this habitat type. If no-net-loss is not possible, then the Department recommends the mitigation strategy be strengthened to achieve as close to no-net-loss as possible, and that the EIR include a thorough and detailed feasibility analysis showing how the revised mitigation proposal was formulated.

5. *Proposed Exemptions*: the Department offers the following comments and questions regarding the proposed exemptions for the ORMP:

   a. *Single-Family Lot Exemption, County Road Project Exemption, and Affordable Housing Exemption*: The Department does not concur with the conclusion that the impacts of these exemptions would be less than significant. While the area of oak woodlands potentially impacted as a result of each of these specific exemptions may be comparatively small, they are a cumulatively significant contribution to the project's overall impacts on oak woodlands, which the DEIR has deemed to be significant and unavoidable. Therefore, the Department recommends that the DEIR be revised to include a discussion of the feasibility and appropriateness of adopting mitigation for impacts resulting from these activities.

b. *Agricultural Activities Exemption*: The DEIR states that adopting mitigation to address impacts resulting from agricultural activities would conflict with Goals 8.1 and 8.2, Objectives 8.1.1 and 8.2.2, and Policies 8.1.1.1 and 8.2.2.1. However, it is unclear how adopting mitigation for oak resources impacted as a result of agricultural activities conflicts with the aforementioned Goals, Objectives, and Policies, which make no mention of mitigation, much less discourage or prohibit its use. Because no such exemption appears within the Biological Resources Mitigation Program, it does not appear to be the case that requiring mitigation for agricultural impacts to habitat inherently contradicts the General Plan. Please clarify the source of the conflict, and how it was determined that adopting mitigation for impacts resulting from agricultural activities was deemed infeasible.

   It is also unclear why the Agricultural Activities Exemption includes *all* activities conducted on lands covered by Williamson Act or Farmland Security Zone contracts (agricultural preserves). Using parcel data County agricultural preserves in conjunction with the Department of Forestry and Fire Protection's (CAL FIRE) 2015 Fire and Resource Protection data regarding vegetation communities (CAL FIRE 2015), the Department calculated that approximately 16,936 acres of oak woodland exist on County agricultural preserves. Because neither Williamson Act nor Farmland Security Act contracts are permanently binding, this exemption may present an incentive for agricultural preserve owners who plan to develop the land once the contract expires to remove oak woodlands. Please clarify why it is necessary to exempt *all* activities on agricultural preserves, given the existing exemption for agricultural activities. If mitigation measures to offset impacts resulting from agricultural activities and/or all activities performed on lands covered by Williamson Act or Farmland Security Zone contracts are not found to be infeasible, they should be adopted.

<u>Project-Specific Assessment of Biological Resources and Avoidance/Minimization</u>

Proposed Policy 7.4.2.8 requires applicants for future development projects to prepare and submit a Biological Resources Report to determine the presence of special-status biological resources that may be affected by a proposed discretionary project. The Department offers the following guidelines for assessing the biological resources potentially present on future project sites and recommends that they be incorporated into the County's guidelines for the preparation of biological reports:

1. *Vegetation Mapping*: Vegetation communities should be assessed and mapped following *The Manual of California Vegetation*, second edition (Sawyer *et al.* 2009). Adjoining habitat areas should also be included in this assessment where site activities could lead to direct or indirect impacts offsite. Habitat mapping at the alliance level will help establish baseline vegetation conditions.

2. *Lake and Streambed Delineation*: Policy 7.3.3.1 requires projects that would result in the discharge of material to or that may affect the function and value of river, stream, lake, pond, or wetland features to include in their application a delineation of all such features, and that the delineation of wetlands be conducted using the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual. Please note that the USACE's limits of jurisdiction within rivers, streams, lakes, and wetlands differ from those of the Department. Because such projects are likely to require notification to the Department pursuant to FGC section 1602, the Department recommends that Policy 7.3.3.1 be revised to require project applications to also include a delineation of on-site features subject to FGC section 1600 *et seq*. By making this distinction explicitly clear in Policy, the County may reduce confusion and prevent potential project delays that may otherwise result if the Department requires additional delineations to be prepared during or after the CEQA process.

3. *Focused Surveys*: Focused species-specific surveys should be conducted by a qualified biologist, during the season(s) and time(s) at which the species in question is most likely to be present and identifiable (e.g., during blooming and/or fruiting for plants, at dawn and dusk for crepuscular species, during times of year when migratory species are expected to be present in the region, etc.). Focused surveys should follow the protocols recommended by the Department and/or the United States Fish and Wildlife Service (collectively, "the Wildlife Agencies"). The Department's recommended survey protocols and guidelines may be found at https://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html. In cases where the Wildlife Agencies do not have a specific recommended survey methodology, survey protocols based on the best available scientific knowledge should be established in coordination with the Wildlife Agencies.

4. *Survey Updates*: Focused surveys for animal species and annual or short-lived perennial plant species are generally considered valid for a period of one year, whereas surveys for longer-lived perennial plant species may be valid for two to five years, depending on the species and site conditions. If a project's construction is scheduled to begin more than one year after focused surveys have been conducted, the applicant should plan to conduct updated surveys prior to the project's start. Some projects may warrant periodic updated surveys

for certain sensitive taxa, particularly if the project is proposed to occur over a protracted time frame, or in phases, or if environmental conditions change during the project period.

In order to lessen the project's potential cumulative impacts on special-status species and their habitats, the Department recommends incorporating the following avoidance and minimization measures into the County's guidelines and/or policies for the protection of biological resources:

1. *Nesting Bird Avoidance:* If project activities with the potential to disturb nesting birds to the point of nest failure and/or mortality of nesting birds and their offspring, e.g. ground disturbing activities and vegetation removal, are planned during the avian nesting season (generally between February 1 and September 15, with variations depending on species and location), pre-construction nesting bird surveys should be performed by a qualified ornithologist within 72 hours prior to commencing the activities. If an active nest is discovered, the ornithologist should formulate and implement avoidance measures as needed to avoid causing nest failure, injury, or mortality. Such measures may include, but are not limited to: the use of buffers, sound walls, and project phasing/timing revisions. If, during the nesting season, project activities are halted for seven days or more, additional pre-construction nesting surveys should be implemented prior to resuming activity.

2. *Bat Avoidance:* If a project is determined to have the potential to affect bat roosting habitat (e.g. bridges, culverts, palm trees, hollow trees, buildings, crevices, caves, mines, etc.), then potential roosts should be surveyed by a qualified bat biologist prior to initiating project activities. If bats are found, then the following avoidance measures should be implemented:

    - If bats are present or potentially present, then work on top of, under, around, or near the roosting structure(s) should be scheduled outside of the bat maternity season (generally between March 1 and September 1, with variations depending on species and location).

    - Gasoline and diesel engines should not be stored or operated under any bridge.

    - Night work, or use of night lighting, should be avoided within the vicinity of the roosting structure(s).

    - Exclusionary devices should not be used if bats may be raising young (i.e., during the bat maternity season). If exclusionary devices are used, they should not contain mesh components, as wildlife may become entangled and/or injured. Exclusionary devices should only be used following consultation with and approval by the Department, and under the direct guidance of a qualified bat biologist.

3. *Wildlife Hazards*: Certain structures, equipment, and substances used during construction may cause wildlife to become trapped, entangled, injured, or poisoned unless proper preventative measures are taken. The Department recommends the following measures to reduce the potential for harm:

   - Structures in which wildlife may become trapped (e.g. open pipes, pits, trenches, etc.) should be tightly covered at the end of each work day. If covering the structure is not possible, an escape ramp should be provided to allow any wildlife that falls in to safely escape.

   - Debris piles, construction materials, equipment, and other items that may be used as refugia should be inspected for wildlife at the start of each work day and prior to disturbance. If wildlife is discovered, it should either be moved out of harm's way by a qualified biologist, or allowed to move off of the project site on its own.

   - Nets and mesh should be made of loose weave material that is not fused at the intersections of the weave, as nets with welded weaves present an entanglement risk.

   - Toxic materials and garbage should be removed from the work site and safely stored or disposed of at the end of each work day.

4. *Protection of Open Space*: Projects proposed to be constructed adjacent to open space areas may have indirect adverse impacts on wildlife within the open space. To reduce indirect impacts to open space, the Department recommends that the following measures be included in the final EIR:

   - If a proposed project has the potential to affect sensitive biological resources (e.g., nesting birds) by increasing ambient noise levels, a qualified biologist should be contracted to implement appropriate avoidance measures, such as sound walls, buffers, and changes in project phasing or timing.

   - Landscaping in projects near open space areas should avoid the use of exotic plants, particularly invasive species, to the greatest extent possible to prevent infestation of the adjacent lands. A list of invasive plant species of concern may be found at http://www.cal-ipc.org/paf/.

Further Coordination

The Department appreciates the opportunity to comment on the Biological Resources Policy Update and Oak Resources Management Plan (SCH No. 2015072031), and requests that the County address the Department's comments and concerns prior to circulating the final EIR. If you should have any questions pertaining to these comments, please contact Gabriele Quillman at (916) 358-2955 or gabriele.quillman@wildlife.ca.gov.

Sincerely,

Tina Bartlett

Tina Bartlett
Regional Manager

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Kelley Barker, Kelley.Barker@wildlife.ca.gov
Gabriele Quillman, Gabriele.Quillman@wildlife.ca.gov
Department of Fish and Wildlife

State Clearinghouse, State.Clearinghouse@opr.ca.gov

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STATE OF CALIFORNIA
GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

August 16, 2016

Shawna Purvines
El Dorado County
2850 Fairlane Court
Placerville, CA 95667

Subject: Biological Resources Policy Update, Oak Resources Management Plan and Ordinance
SCH#: 2015072031

Dear Shawna Purvines:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on August 15, 2016, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

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PLANNING DEPARTMENT

Document Details Report
State Clearinghouse Data Base

SCH# **2015072031**
Project Title Biological Resources Policy Update, Oak Resources Management Plan and Ordinance
Lead Agency El Dorado County

Type **EIR** Draft EIR

Description El Dorado County proposes to amend several General Plan objectives, policies, and implementation measures addressing biological resources and to adopt an Oak Resources Management Plan and Oak Resources Conservation Ordinance.

Lead Agency Contact

Name Shawna Purvines
Agency El Dorado County
Phone 530 621 5362 ***Fax***
email
Address 2850 Fairlane Court
City Placerville ***State*** CA ***Zip*** 95667

Project Location

County El Dorado
City
Region
Lat / Long
Cross Streets
Parcel No.
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways
Airports
Railways
Waterways
Schools
Land Use Various - project would alter General Plan policies that apply country-wide and adopt an Oak Resources Management Plan that would apply to all lands within the County at or below 4,000 feet in elevation.

Project Issues Aesthetic/Visual; Agricultural Land; Biological Resources; Forest Land/Fire Hazard; Vegetation; Wetland/Riparian; Landuse; Cumulative Effects; Other Issues

Reviewing Agencies Resources Agency; Department of Fish and Wildlife, Region 2; Cal Fire; Department of Parks and Recreation; Department of Water Resources; Caltrans, Division of Aeronautics; California Highway Patrol; Caltrans, District 3 S; State Water Resources Control Board, Division of Water Quality; Regional Water Quality Control Bd., Region 5 (Sacramento); Regional Water Quality Control Bd., Region 6 (So Lake Tahoe); Native American Heritage Commission; Public Utilities Commission

Date Received 06/30/2016 ***Start of Review*** 06/30/2016 ***End of Review*** 08/15/2016

Note: Blanks in data fields result from insufficient information provided by lead agency.

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

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29 July 2016

Governor's Office of Planning & Research
AUG 01 2016
STATE CLEARINGHOUSE

Shawna Purvines
El Dorado County
2850 Fairlane Court
Placerville, CA 95667

CERTIFIED MAIL
91 7199 9991 7035 8422 2591

COMMENTS TO REQUEST FOR REVIEW FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, EL DORADO COUNTY BIOLOGICAL RESOURCES POLICY UPDATE, OAK RESOURCES MANAGEMENT PLAN AND ORDINANCE PROJECT, SCH# 2015072031, EL DORADO COUNTY

Pursuant to the State Clearinghouse's 30 June 2016 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Draft Environment Impact Report* for the El Dorado County Biological Resources Policy Update, Oak Resources Management Plan and Ordinance Project, located in El Dorado County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

I. Regulatory Setting

Basin Plan

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues.

For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website: http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/.

Antidegradation Considerations

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Policy is available on page IV-15.01 at: http://www.waterboards.ca.gov/centralvalleywater_issues/basin_plans/sacsjr.pdf

In part it states:

> *Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.*
>
> *This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.*

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

II. Permitting Requirements

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]

The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/.

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml

Industrial Storm Water General Permit

Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 2014-0057-DWQ.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml.

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the

[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements.

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916) 557-5250.

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACOE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications.

Waste Discharge Requirements – Discharges to Waters of the State

If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation.

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit2.shtml.

Dewatering Permit

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Risk General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Risk Waiver) R5-2013-0145. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

For more information regarding the Low Risk General Order and the application process, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf

For more information regarding the Low Risk Waiver and the application process, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2013-0145_res.pdf

Regulatory Compliance for Commercially Irrigated Agriculture

If the property will be used for commercial irrigated agricultural, the discharger will be required to obtain regulatory coverage under the Irrigated Lands Regulatory Program. There are two options to comply:

1. **Obtain Coverage Under a Coalition Group.** Join the local Coalition Group that supports land owners with the implementation of the Irrigated Lands Regulatory Program. The Coalition Group conducts water quality monitoring and reporting to the Central Valley Water Board on behalf of its growers. The Coalition Groups charge an annual membership fee, which varies by Coalition Group. To find the Coalition Group in your area, visit the Central Valley Water Board's website at: http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/app_approval/index.shtml; or contact water board staff at (916) 464-4611 or via email at IrrLands@waterboards.ca.gov.

2. **Obtain Coverage Under the General Waste Discharge Requirements for Individual Growers, General Order R5-2013-0100**. Dischargers not participating in a third-party group (Coalition) are regulated individually. Depending on the specific site conditions, growers may be required to monitor runoff from their property, install monitoring wells, and submit a notice of intent, farm plan, and other action plans regarding their actions to comply with their General Order. Yearly costs would include State administrative fees (for example, annual fees for farm sizes from 10-100 acres are currently $1,084 + $6.70/Acre); the cost to prepare annual monitoring reports; and water quality monitoring costs. To enroll as an Individual Discharger under the Irrigated Lands Regulatory Program, call the Central Valley Water Board phone line at (916) 464-4611 or e-mail board staff at IrrLands@waterboards.ca.gov.

Low or Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Dewatering and Other Low Threat Discharges to Surface Waters* (Low Threat General Order) or the General Order for *Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Superchlorination Projects, and Other Limited Threat Wastewaters to Surface Water* (Limited Threat General Order). A complete application must be submitted to the Central Valley Water Board to obtain coverage under these General NPDES permits.

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0074.pdf

For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0073.pdf

NPDES Permit

If the proposed project discharges waste that could affect the quality of the waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit.

For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit3.shtml

If you have questions regarding these comments, please contact me at (916) 464-4644 or Stephanie.Tadlock@waterboards.ca.gov.

Stephanie Tadlock

Stephanie Tadlock
Environmental Scientist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento