COUNTY OF EL DORADO
Procurement & Contracts

ATTN: Purchasing Agent
360 Fair Lane
Placerville, CA 95667

REQUEST FOR PROPOSALS #17-918-017
DUE: 3:00 p.m., NOVEMBER 17, 2016
Sealed Proposals must be clearly marked on the outside of the package with:

"RFP #17-918-017: MAILROOM DO NOT OPEN"

ECOLOGICAL PRESERVE FEE PROGRAM UPDATE

The County of El Dorado Office of Procurement and Contracts, on behalf of its Community Development Agency, Development Services Division (also referred to as "County"), is requesting proposals for an Ecological Preserve Fee Program Update which would update the Rare Plant Mitigation In-Lieu Fee program established in 1998. The program update would include coordination with California Department of Fish and Wildlife to create a "full-mitigation" program for new development within areas of the County that may have Gabbro Soils rare plants.

This Request for Proposal (RFP) defines the scope of services and outlines the requirements that must be met by Proposers interested in providing such services. Proposers shall carefully examine the entire RFP and any addenda thereto, and all related materials and data referenced in the RFP or otherwise available, and shall become fully aware of the nature and the conditions to be encountered in performing the service. **Proposers are advised to read all sections of this RFP prior to submitting a proposal.**

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ATTACHMENTS:

I. PURPOSE

The County is updating the Rare Plant Mitigation In-Lieu Fee program established in 1998. The program update would include a review of the existing program and coordination with California Department of Fish and Wildlife to create a "full-mitigation" program for new development consistent with the El Dorado County General Plan, Government Code 66000 (Mitigation Fee Act) and the California Environmental Quality Act (CEQA).

II. BACKGROUND

The Rare Plant Mitigation In-Lieu fee program is an impact fee pursuant to Government Code 66000 and serves as the California Environmental Quality Act (CEQA) mitigation for County Capital Improvement Projects, discretionary applications, and permits from the California Department of Fish and Wildlife (1600 Streambed Alteration permits and 2081 "Take" permits). The fee program has been used to purchase property in the County for long-term protection of habitat for the eight rare plant species:

Stebbins' morning glory (Calysgtegia stebbinsii),

Pine Hill ceanothus (Ceanothus roderickii),

Pine Hill flannelbush (Fremontodendron californicum ssp. decumbens),

El Dorado bedstraw (Galium californicum ssp. sierrae),

Layne's butterweed (Packera layneae)

El Dorado mule ears (Wyethia reticulate),

Bisbee Peak rush-rose (Helianthemum suffrutescens) and

Red Hills soap root (Chlorogalum grandiflorum).

The species are collectively referred to as the Gabbro Soils Rare Plants (Rare Plants). These eight (8) plants are restricted to gabbro-derived soils or similar soil types within the Sierra Nevada foothills and occur primarily on the Pine Hill formation, in western El Dorado County.

The County has cooperated with the following agencies and organizations in efforts to protect the Rare Plants:

California Department of Fish and Wildlife (CDFW)

California Department of Forestry and Fire Protection (CDF)

California Wildlife Conservation Board (CWCB)

El Dorado County Water Agency (EDCWA)

US Fish and Wildlife Service (USFWS)

Bureau of Land Management (BLM)

Bureau of Reclamation (BOR)

El Dorado Irrigation District (EID)

California Native Plant Society (CNPS)

American River Conservancy (ARC)

The existing program was adopted in 1998 by Ordinance 4500 (Codified as Section 130.71 of the County Code) and Board of Supervisors Fee Resolution 205-98. The program was based on a report prepared by Economic and Planning Systems dated March 16, 1998. The in-lieu fee program requires payment of a fee for all new residential and non-residential development in identified Mitigation areas. The Mitigation areas were described as:

Mitigation Area 0 (Ecological Preserve overlay designation on the adopted General Plan land use map),

Mitigation Area 1 (areas outside of Mitigation Area 0 but within areas mapped as having gabbro soils), and

Mitigation Area 2 (areas outside of Mitigation Area 0 and 1, but within the El Dorado Irrigation District Sphere of Influence).

III. GOALS AND OBJECTIVES

The desired outcome of the Rare Plant Mitigation In-Lieu fee program is to participate in the long-term persistence of eight rare plant species associated with the gabbro soils in El Dorado County while allowing for planned development and the pursuit of a safe and reliable water supply necessary for growth as anticipated by the County General Plan.

The following objectives are desirable outcomes of this Request for Proposal (RFP):

a) Update the existing fee program to comply with Government Code 66000, including the nexus justification, fee assumptions, and cost allocations.

b) Update fee program to comply with current best accounting practices, including a recommendation for fund structure.

c) Streamline fee collection and expenditure practices.

d) Evaluate land acquisitions and recommend best acquisition strategies.

e) Evaluate and recommend perpetual land management activities.

f) Create in-lieu fee program that includes best practices of land acquisition, management, and administration of the program.

g) The initial focus of the updated fee program should be land acquisition with secondary focus on management and habitat enhancement after acquisition goals are complete.

h) The BLM Preserve Manager will continue to lead management activities.

i) Recognize past and future cooperation between County, Bureau of Land Management (BLM), Department of Fish and Wildlife (DFW), United States Fish and Wildlife Service (USFWS), Bureau of Reclamation (BOR), El Dorado Irrigation District (EID), Coastal & Native Plant Specialties (CNPS), and Agriculture Research Center (ARC).

j) Comply with El Dorado County General Plan, including Objective 7.4.1: Rare, Threatened, and Endangered Species.

k) Complete CEQA documentation to enable "full-mitigation" of new development through the In-Lieu fee. CEQA considerations need to include:

   a. The use of federal funding for Capital Improvement Projects.

   b. State/federal water rights and acquisition needs.

   c. Discretionary project's need to streamline the rare plant mitigation process.

l) Preparation of in-lieu fee Resolution, Ordinance, and procedures for administration (including land acquisition, land management, and administration of the program).

m) Fee program should include administration of the fee program, annual reports, five year reviews, and reimbursement of General funds used to update the fee program and CEQA documentation.

IV. SCOPE OF SERVICES

The County intends to acquire the most appropriate, financially attractive solution from a qualified Proposer to enable it to update the fee program, including full CEQA compliance and program administration documentation.

Task 1: Review background materials including:

a) Ordinance 4500.

b) General Plan Objective and Polices.

c) Resolution 205-98 and Economic & Planning Systems (EPS) Memo March 16, 1998.

d) Impact Analysis of Planned Future Development on Gabbro Rare Plant Suitable and Occupied Habitat in El Dorado County (LEIDOS, January 2014).

e) Cooperative Agreement between Bureau of Land Management and El Dorado County.

Task 2: Conduct interviews and collect data from coordinating agencies and organizations.

Task 3: Prepare draft report recommending specific changes to the Program and Ordinance, including nexus study and proposed fee schedule.

Task 4: Prepare CEQA documentation.

Task 5: Provide technical assistance; attend meetings, and public hearings. Prepare Fee Resolution, Ordinance amendments, and procedures for administration**.**

V. PROPOSAL SUBMITTAL REQUIREMENTS

One (1) original document (labeled original) and one electronic version (PDF format on flash drive) of the proposal shall be submitted in the format indicated in this section of the RFP.

In order for the County to conduct a uniform review process, all proposals must be submitted in the format set forth below. **Failure to provide any of the information requested by these paragraphs is grounds for the County to reject a proposal**.

Proposals should be prepared as simply as possible and provide a straightforward, concise description of the Proposer's capabilities to satisfy the requirements of the RFP. Expensive bindings, color displays, promotional material, etc., are neither necessary nor desired. Emphasis should be concentrated on accuracy, completeness, and clarity of content. All parts, pages, figures and tables should be numbered and clearly labeled.

Proposers are required to follow the outline below when preparing their proposals:

A. **Letter of Transmittal:** A letter of transmittal must be submitted with the Proposer's submittal. The letter must include the names of the persons who are authorized to make representations on behalf of the Proposer (include their titles, addresses, e-mail addresses and telephone numbers.

B. **Table of Contents:** The Table of Contents must indicate the material included in the proposal by section and page number. A proposal's table of contents should mirror this section of the County's RFP and must include all the items set forth in this section.

C. **Executive Summary:** This part of the response to the RFP should be limited to a brief narrative highlighting the Proposer's proposed solution and total cost.

D. **Statement of Qualifications:** Proposers must describe their firm's history and provide a statement of qualifications and experience providing the services identified in this RFP. The same information needs to be provided for any of Proposer's subconsultants.

E. **Response to Scope of Work**: The Proposer must provide narrative responses to each section of the Scope of Services. Written submittals should include in detail: timelines, resource requirements, assumptions, outcomes/deliverables, and any other applicable information.

F. **Cost Proposal:** Proposals are expected to be on a "not-to-exceed" basis where the County compensates Proposer on the basis of hours and expenses incurred up to a ceiling amount. If there is a "residual" amount at the end of the project (difference between total implementation contract amount and actual total costs), the County will retain the difference by simply not spending the funds. By contrast, if the proposal cost ceiling is exceeded, selected Proposers finish the work at no additional compensation, unless the County does not meet specific assumptions.

The County reserves the right to contact Proposers on cost and scope clarification at any time throughout the selection and negotiation processes. The County is asking

Proposers to propose costs for all categories with the understanding that the Proposers may have to make assumptions. Such assumptions must be documented as part of the proposal. Failure to fully provide cost estimates is likely to lead to Proposer elimination.

VI. PROPOSERS' QUESTIONS

Questions regarding this RFP must be submitted in writing to the Procurement and Contracts Office and must be received no later than **5:00 p.m. on OCTOBER 18, 2016**. All envelopes or containers must be clearly labeled **"RFP #17-916-017: QUESTION"** for convenience purposes. Envelopes or containers not clearly labeled may be overlooked and not responded to. Questions will **NOT** be accepted by telephone, facsimile (fax), electronically, or orally. County reserves the right to decline a response to any question if, in County's assessment, the information cannot be obtained and shared with all potential organizations in a timely manner. A summary of the questions submitted, including responses deemed relevant and appropriate by County, will be posted on our website on or about **NOVEMBER 2, 2016**.

All inquiries shall be submitted by U.S. mail to:

County of El Dorado
Procurement and Contracts
360 Fair Lane
Placerville, California 95667
RFP #17-918-017: Question

Proposers are cautioned that they are not to rely upon any oral statements that they may have obtained. Proposers shall direct all inquiries to the County Purchasing Agent and shall not contact the requesting department directly regarding any matter related to this Request for Proposal.

VII. PROPOSAL SUBMITTAL

Proposers must submit one (1) original and three (3) copies of their proposal, along with any addenda, in a sealed envelope or container, clearly marked **"RFP #17-918-017: MAILROOM DO NOT OPEN"**, **no later than 3:00 p.m. on NOVEMBER 17, 2016**, to:

County of El Dorado
Procurement and Contracts
360 Fair Lane
Placerville, CA 95667

A Proposer may withdraw its final proposal at any time **prior** to the opening deadline date and time by submitting a written request for its withdrawal to the County Purchasing Agent, signed by an authorized agent of Proposer's firm. Proposers may thereafter submit a new or modified proposal **prior** to the opening deadline date and time. Modifications offered in any manner, oral or written, will not be considered.

Proposers submitting less than the required number of copies of their proposal will be rejected and considered "non-responsive". Proposals received beyond the deadline will not be considered, and will be returned unopened.

It is the responsibility of the Proposer to assure that the proposal is received in the Procurement & Contracts Division prior to the proposal opening deadline date and time. Proposals received beyond the proposal opening deadline will not be accepted and will be returned unopened. The time stamp clock located in the office of the Procurement and Contracts Division will serve as the official time clock.

For questions regarding the Request for Proposal process, contact Linda Silacci-Smith, Sr. Department Analyst, at (530) 621-5417.

VIII. EVALUATION PROCESS

A County Evaluation Team will review all proposals received. At decision points in the process, the Team will evaluate Proposers according to specific criteria and will elevate a certain number of Proposers to compete against each other. Proposers will be evaluation on:

Thoroughness, clarity, and quality of proposal.	10%
Experience and qualifications of Proposer.	10%
Experience in El Dorado County (or similar County).	20%
Experience with similar Mitigation Fee Program Development.	10%
Experience with State Fish and Wildlife 2081 "Take" Permit.	10%
Experience with public outreach.	10%
Experience with Public Agency Financing of mitigation lands (acquisition, management, monitoring).	10%
CEQA documentation proposal.	20%

The County will use a competitive process based upon elevating Proposers from one phase to the next until a finalist is determined. The County recognizes that if a Proposer fails to meet expectations during any part of the process, it reserves the right to proceed with the remaining Proposers or to elevate a Proposer that was not elevated before.

When evaluation of the Proposals and presentations has been completed, a Proposer will be selected and negotiations will be initiated. If for any reason a contract cannot be negotiated, County reserves the right to select the next ranked prospective Proposer. County will then make recommendations for selection to the County Board of Supervisors, based on the selection criteria outlined in the preceding section.

Failure to comply with any of the requirements contained herein may result in disqualification. It is the responsibility of all Proposers to read ALL sections of this RFP prior to submitting a response.

IX. REJECTION OF PROPOSALS

Prospective Proposers interested in being considered must submit a Proposal in compliance with this notice. Failure to meet the minimum requirements of the RFP shall be cause for rejection of the Proposal. County reserves the right to reject any or all Proposals.

County may reject a Proposal if it is conditional, incomplete, contains irregularities, or reflects inordinately high cost rates. County may waive immaterial deviation in a Proposal. Waiver of an immaterial deviation shall in no way modify the RFP documents or excuse the proposing firm/team from full compliance with the contract requirements if the prospective Proposer is awarded the contract.

X. VALID OFFER

Proposals shall remain valid for 120 days from the due date. County reserves the right to negotiate with the successful Proposer any additional terms or conditions not contained in their proposal which are in the best interest of County or to otherwise revise the scope of this RFP.

This RFP does not constitute a contract nor an offer of employment. The cost of preparation of proposals shall be the obligation of the Proposer. All proposals, whether accepted or rejected, shall become the property of County and will not be returned. Unnecessarily elaborate responses, enclosures and specialized binding are not desired, and may be construed as an indication of Proposer's lack of cost consciousness.

XI. COUNTY'S RIGHTS

County reserves the right to:

1. Request clarification of any submitted information.
2. Waive any irregularity or immaterial deviation in any proposal.
3. Not enter into any agreement.
4. Not select any Proposer.
5. Cancel this process at any time.
6. Amend this process at any time.
7. To award more than one contract if it is in the best interest of County.
8. Interview Proposers prior to award.
9. To request additional information during an interview.

Waiver of an immaterial deviation shall in no way modify the RFP documents or excuse the proposing firm/team from full compliance with the contract requirements if the prospective Proposer is awarded the contract.

XII. CONTRACT AWARD

Award shall be recommended to the Proposer whose proposal best meets the needs of County. County reserves the right to reject any or all proposals, and to solicit additional proposals if deemed in the best interest of County to do so. The decision of the County Board of Supervisors shall be final in making such determination.

The successful Proposer will receive written notification of the award, along with instructions for finalizing the agreement documents.

Response and selection of a Proposal will not necessarily result in a contract with the County of El Dorado. Proposal opening does not constitute awarding of a contract. Contract award is by action of the El Dorado County Board of Supervisors and is not in force until fully executed by that Board.

XIII. WEBSITE REQUIREMENTS

It is the bidder's responsibility to monitor the County's website for possible addenda to this bid to inform him/herself of the most current specifications, terms, and conditions, and to submit his/her bid in accordance with the original bid requirements and all addenda. All available bids and related addenda can be found at:

http://edcapps.edcgov.us/contracts/invite.asp

Failure of bidder to obtain this information shall not relieve him/her of the requirements contained therein. Those bidders not acknowledging and returning Addenda as required will not be considered and will be rejected as "non-responsive."

XIV. CONFLICT OF INTEREST

Prospective Proposers warrant and covenant that no official or employee of County, or any business entity in which an official of County has an interest, has been employed or retained to solicit or aid in the procuring of the resulting agreement, nor that any such person will be employed in the performance of such agreement without immediate divulgence of such fact to County. Prospective Proposer's Proposal shall contain a statement to the effect that the Proposer is not currently committed to another project that would constitute a conflicting interest with the Project defined in this Request for Proposal (RFP).

XV. PUBLIC RECORDS ACT

All proposals shall become public information at the conclusion of the selection process, with the exception of those portions of a proposal that are identified at the time of submittal by the Proposer as trade secrets and/or which are deemed by County as not being public documents that must disclosed under the Public Records Act, or other appropriate statutes and regulations. Pricing and service elements of the successful proposal will not be considered

proprietary information. Proprietary information shall be submitted in a separate sealed envelope clearly labeled as proprietary with the RFP number on the outside of the envelope. All materials submitted in response to this Request for Proposal shall become the property of County and will not be returned.

XVI. BUSINESS LICENSE REQUIREMENT

It is unlawful for any person to furnish supplies or services, or transact any kind of business in the unincorporated territory of El Dorado County without possessing a County business license unless exempt under County Code Section 5.08.070. Contact the Tax Collector's Office at 360 Fair Lane, Placerville, CA 95667, or phone (530) 621-5800, for further information. El Dorado County is an equal opportunity employer (EOE). Minorities, females, and handicapped are encouraged to participate (M/F/H).

It is not a requirement to possess a County business license at the time of proposal submittal. Successful Proposers may be required to possess a County business license to award contract.

The County of El Dorado is an equal opportunity employer (EOE). Minorities, Females and Handicapped are encouraged to participate.

XVII. PUBLIC AGENCY

It is intended that other public agencies (i.e., city, special district, public authority, public agency and other political subdivisions of the State of California) shall have the option to participate in any agreement created as a result of this Request for Proposal to Bid with the same terms and conditions specified there in, including pricing. County shall incur no financial responsibility in connection with any agreement from another public agency. The public agency shall accept sole responsibility for contracting for services and making payment to the selected Proposer.

Your participation in the RFP process is important to El Dorado County!

EXHIBIT A

ORDINANCE No. 4500

ADDING CHAPTER 17.71, "ECOLOGICAL PRESERVES," TO THE EL DORADO COUNTY ORDINANCE CODE

THE BOARD OF SUPERVISORS OF THE COUNTY OF EL DORADO DOES ORDAIN AS FOLLOWS:

WHEREAS, Objective 7.4.1 of the El Dorado County General Plan and the Policies thereunder call for the establishment, management, maintenance, and monitoring of preserve sites for State and Federally recognized rare, threatened, or endangered plant species and their habitats, identified in the General Plan as the "Pine Hill endemics," consistent with State and Federal laws; and

WHEREAS, land acquisition, capital improvement, and operation and maintenance costs for such preserve sites require public funding; and

WHEREAS, under El Dorado County's land-use policies, the California Environmental Quality Act, and the State and Federal Endangered Species Acts, the protection of, and mitigation for impacts upon, rare, threatened, or endangered plant species and their habitat are legal requirements that can be triggered by development activities on sensitive land or by governmental actions, such as the acquisition or perpetuation of water supplies, that can facilitate development upon such land but from which development on all land served by such supplies also benefits; and

WHEREAS, for these reasons, and for the reasons set forth below, the Board of Supervisors deems it appropriate, within its power, and in the best interests of El Dorado County to establish a program of Ecological Preserve Mitigation and fees in lieu of such mitigation;

THE BOARD OF SUPERVISORS OF THE COUNTY OF EL DORADO DOES ORDAIN AS FOLLOWS:

Section 1 (UNCODIFIED): Purpose. The purpose of this Ordinance is to establish an integrated method of protecting certain rare, threatened, or endangered plant species and their habitat in the County as required by the El Dorado County General Plan, the California Environmental Quality Act, and the State and Federal Endangered Species Acts and, at the same time, to make the

development process simpler for landowners who, by complying with this Ordinance, may be able to minimize or avoid the more complicated process of crafting individualized mitigation measures for the direct or indirect impacts of the development of their property on these plant species and their habitat.
Section 17.71.010 is hereby added to the El Dorado County Ordinance Code as follows:

Section 2 (Uncodified): Chapter 17.71, "Ecological Preserves," is hereby added to the El Dorado County Ordinance Code as set forth in this Ordinance.

Section 3: Section 17.71.010 is hereby added to the El Dorado County Ordinance Code as follows:

17.71.010 Definitions. In this Chapter,

A. "California Endangered Species Act" or "State Endangered Species Act" means those statutes found at California Fish and Game Code sections 2050-2098 and implementing regulations.

B. "California Environmental Quality Act" or "CEQA" means those statutes set forth at California Public Resources Code section 21000 et seq. The "CEQA Guidelines" are set forth at the California Code of Regulations, Title 14, Section 15000 et seq.

C. "California Department of Fish and Game" or "DFG" means the California State Department of Fish and Game, a part of the State Resources Agency.

D. "Development Project" means any project undertaken for the purpose of development. "Development project includes a project involving the issuance of any discretionary or ministerial approval or permit, including a permit for construction or reconstruction, but not a permit to operate.

E. "Ecological Preserve" means an area officially designated as such on General Plan maps on file in the County Planning Department.

F. "Ecological Preserve Mitigation" means on and off-site mitigation standards that address direct or indirect impacts on rare plants or rare plant habitat and includes the Rare Plant Off-Site Mitigation Program.

G. "EID" means the El Dorado County Irrigation District.

H. "Federal Endangered Species Act" means those federal statutes found at 16 U.S.C. 1531 et seq. and implementing regulations.

I. "Mitigation Area 0" means lands within an Ecological Preserve as shown officially on maps on file in the County Planning Department.

J. "Mitigation Area 1" means lands outside of Mitigation Area 0 but within the area described as the "rare soils study area," shown officially on maps on file in the County Planning Department.

K. "Mitigation Area 2" means lands outside of Mitigation Areas 0 and 1 but within the EID service area, excluding those parcels served by wells, shown officially on maps on file in the County Planning Department.

L. "Rare plants" or "Pine Hill endemics" means plants found in serpentine or gabbroic soils that are considered rare, threatened or endangered on a state or federal list prepared under the Endangered Species Acts. At the time of adoption of this chapter, rare plants included the species listed below. Other plant species added to the state or federal lists in the future are automatically deemed to be included here, unless the county is notified by the DFG that the added species habitat requires modification of this chapter.

El Dorado bedstraw	Galium californicum ssp. sierrae
Laynes butterweed	Senecio layneae
Pine Hill ceanothus	Ceanothus roderickii
Pine Hill flannel bush	Fremontodendron californicum ssp. decumbens
Stebbins' morning glory	Calystegia stebbinsii
Bisbee Peak rush rose	Helianthemum suffrutescens
El Dorado mule ears	Wyethia reticulata
Red Hills soaproot	Chlorogalum grandiflorum

M. "Rare Plant Off-Site Mitigation Program" means acquiring and restoring rare plant habitat through the purchase of fee interests or conservation easements of land within a designated Ecological Preserve. Acquisition and Restoration of rare plant habitat must be equal to 1.5 times the number of acres developed. Off-site mitigation must be conducted according to guidelines established by the county and will be subject to review by

representatives of USFSWS and DFG. The land or development rights purchased must be dedicated to a specified resource protection agency such as the Bureau of Land Management, DFG or a designee of the agency.

N. "USBR" means the United States Bureau of Reclamation.

O. "USFWS" means the United States Fish & Wildlife Service.

Section 4 (Uncodified): Findings. The Board of Supervisors hereby makes the following findings of fact and declares them to be the basis upon which this Ordinance is enacted:

For the reasons set forth below, the establishment and maintenance of a fully funded system of five rare plant preserves is a legitimate state interest; the requirements of Ecological Preserve Mitigation or a fee in lieu thereof in the Mitigation Areas substantially furthers that interest; and the requirements of Ecological Preserve Mitigation or a fee in lieu thereof are reasonably related to impacts of development and the cost of establishing and maintaining the preserve system.

A. There are eight rare, threatened, or endangered plant species found in western El Dorado County: El Dorado bedstraw, Laynes butterweed, Pine Hill ceanothus, Pine Hill flannelbush, Stebbins' morning glory, Bisbee Peak rush rose, El Dorado County mule ears, and Red Hills soaproot. Habitat for these plant species is on gabbroic and serpentine soils areas.

B. Protecting rare, threatened, or endangered species and their habitat is required by law. Under CEQA, a development project is considered to have a significant effect on the environment if it would substantially affect a rare or endangered species or its habitat. (CEQA Guidelines, App. G, subd. (c).) A lead agency for a project is required to make all feasible changes in a project to lessen or avoid significant adverse effects on the environment. (Pub. Resources Code §§ 21002; 21002.1, subd. (b); 21081, subd. (a).)

The California Endangered Species Act provides that it is the policy of the state to conserve, protect, restore, and enhance any endangered or threatened species and its habitat, and generally outlaws the "take" of such species. (Fish & Game Code §§ 2052, 2080.)

The Federal Endangered Species Act provides that it is the policy of Congress that all federal departments and agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of those purposes, and generally outlaws the "take" of any such species from areas under federal jurisdiction or in violation of state law. (16 U.S.C. § 1538, subd. (a)(2).)

C. The El Dorado County General Plan provides that the County shall protect state and federally recognized rare, threatened, or endangered species and their habitat consistent with federal and state laws. The policies include coordination with DFG and other appropriate agencies, development of mechanisms for the establishment of preserves, development of programs to fund the purchase of property and easements and to maintain preserve sites, and the establishment of guidelines for management of preserve sites. (Conservation and Open Space Element, Goal 7.4, Objective 7.1.) The County has legal authority to impose such regulations to promote the public welfare. (Cal. Const. art. XI, § 7.)

D. Generally, before development occurs in Mitigation Areas 0 and 1, a property owner must undergo and pay for an evaluation of whether or not there are rare, threatened, or endangered plants on the property. If there are, mitigation measures to protect the plants may be imposed as conditions of approval to development. Currently, mitigation is done primarily through the establishment of "non-building areas" on subdivision or parcel maps, thereby setting aside a portion of the property to sustain some protected habitat area. Such mitigation has been on a localized, project-by-project basis, often focusing on a single species. In Mitigation Area 2, the need for mitigation for direct or indirect impacts to rare plants and their habitat may not have been recognized in all cases.

E. There are two difficulties in the current approach. First, it results in a fragmented and sometimes ineffective means of protecting the species because the protected habitat areas are too small, piecemeal, and geographically isolated from one another. Because of their small size and isolation from other patches of habitat, they are vulnerable to loss of the rare plant populations they are established to protect. Management and monitoring of such small areas with the limited state and local government resources available is difficult and sometimes impractical. Second, for the landowner, the current process is often frustrating and uncertain.

There are significant costs and delays. Plant surveys must be done on individual parcels, and conducted according to established protocols by a professional botanist. There are additional delays and costs associated with developing and implementing mitigation plans for each development project. Extensive coordination is required among County staff, DFG, USFWS and the landowner.

F. In 1993, the El Dorado Rare Plant Technical Advisory Committee recommended, and the board of supervisors approved, a more effective, coordinated approach: to focus mitigation for impacts to rare plants by establishing and providing for management of a preserve system. The advantages of establishing preserves are threefold: ensuring that rare plant species within the gabbro and serpentine soils area are preserved; reducing the costs, delay, and uncertainty for landowners seeking approval for development activities; and reducing the need for DFG to recommend non-building, non-grazing, non-landscaping areas on individual properties. Further, by identifying the best preserve areas and protecting multiple species over these larger areas, the species are more likely to survive and be protected and long-term maintenance and monitoring of the areas is more efficient and effective.

G. On February 26, 1993, the board of supervisors unanimously approved in concept a plan to create preserve areas and directed the staff to develop funding mechanisms.

H. The preserve areas, the Ecological Preserve Mitigation including the Rare Plant Off-Site Mitigation Program, and the fee in lieu of such mitigation are all based upon the following studies, which are incorporated herein by reference:

"Preserve Sites and Preservation Strategies for Rare Plant Species in Western El Dorado County," prepared for El Dorado County by EIP Associates, November 1991;

Planning department agenda transmittal memorandum to board of supervisors entitled "Rare Plant Preserve Program," dated February 26, 1993;

The Economic Feasibility Study for the El Dorado County Ecological Preserves, dated February 3, 1997, prepared by Economic and Planning Systems, Inc. (EPS);

Addendum and Update to the Economic Feasibility Study for the El Dorado County Ecological Preserves, dated July 1997, prepared by EPS;

Memorandum to El Dorado County board of supervisors, dated March 16, 1998, prepared by EPS.

I. In addition to the regulations in this Ordinance, there are proposed separate and supplemental local funding mechanisms for the acquisition and maintenance of the preserve sites. These include contributions from private, non-profit organizations and from other agencies (including EID, El Dorado County Water Agency, CalTrans, the Wildlife Conservation Board of DFG, USBR, and the U.S. Bureau of Land Management). The federal and state funding agencies require local matching funds in order to authorize grants for the acquisition of rare plant habitat lands, and have not offered sufficient funding to fully fund the preserve system in any event.

J. This Ordinance partially implements Goal 7.4 of the county General Plan as to protection of rare, threatened, and endangered plant species and their habitats.

K. With respect to all of the Mitigation Areas, there is a reasonable relationship between the need for the preserve areas and the type of development project on which the fee can be paid in lieu of Ecological Preserve Mitigation, because the development projects potentially subject to the fee create a demand for water supplies that cannot be met unless the full ecological preserve system is established. There is a reasonable relationship between the fee's use and the type of development project on which the fee can be paid in lieu of Ecological Preserve Mitigation, because the fee will be used to establish and maintain the full ecological preserve system.

L. The development projects subject to the fee are all associated with land uses that require water. Those water demands are expected to be satisfied via public water service, because all lands within Mitigation Areas 0 and 2 are also within the EID service area, and all lands within Mitigation Area 1 are within the service area of a public water purveyor, primarily EID.

M. As set forth in more detail in EID's *1997 and 1998 Updates to the Water Supply and Demand Report* and El Dorado County's *Approved 1996 Update Water Supply and Demand Report* and *1996 Public Water Availability Evaluation,* each of which documents are incorporated

herein by this reference, EID can satisfy current levels of water demand, and a limited amount of future additional demands, from its existing water supplies. The majority of those existing supplies are obtained through water supply contracts with USBR for water from the Sly Park Reservoir unit of the Central Valley Project (CVP) and water from the Folsom Reservoir unit of the CVP. Without both of these USBR contracts, EID could not supply current demand, much less additional future demand from new development projects.

N. EID plans to supply a substantial amount of additional future water demand within Mitigation Areas 0, 1, and 2 from a proposed water supply contract between El Dorado County Water Agency (EDCWA) and USBR for other water from the Folsom Reservoir unit of the CVP. Without this EDCWA/USBR contract, EID's ability to supply additional future water demand is likely to be limited.

O. Thus, it is necessary for EID both to maintain its existing USBR contracts, and to obtain the benefits of the proposed EDCWA/USBR contract, for there to be sufficient water supplies available to meet the demands of new development projects within the Mitigation Areas.

P. The purpose of the ecological preserve system for which Ecological Preserve Mitigation or a fee in lieu thereof will be required is to sustain the eight rare plant species. Virtually all known occurrences of the rare plants are within Mitigation Areas 0 and 1. Five of the eight species are listed as rare or endangered under the California Endangered Species Act, and listed as endangered or threatened under the Federal Endangered Species Act (FESA).

Q. Pursuant to the FESA, USFWS has duly identified the past and ongoing destruction of the rare plants and their habitat as adverse environmental impacts of the CVP in a memorandum to the USBR Regional Director in Sacramento dated February 27, 1995, which memorandum and all attachments are incorporated herein by this reference. By virtue of that determination, neither interim nor long-term renewals of both of EID's existing USBR contracts can proceed unless actions are taken to avoid jeopardy to the rare plants and to ensure their long-term survival. By inference, the EDCWA/USBR contract will not be executed unless actions are taken to avoid jeopardy to the rare plants and to ensure their long-term survival.

R. EID's USBR contract for Sly Park is presently due for renewal. EID's USBR contract for Folsom Reservoir is due

for renewal in the near future. The EDCWA/USBR contract is authorized by federal legislation, upon the completion of environmental studies. Thus, the issue of CVP impacts on the rare plants has immediate consequences for both the maintenance and expansion of EID's existing water supplies.

S. Based upon statements by authoritative representatives of the California Department of Fish & Game in prior public hearings before the El Dorado County Board of Supervisors and the EID Board of Directors, upon the November 1991 report entitled *Preserve Site and Preservation Strategies for Rare Plan Species in Western El Dorado County*, upon the recommendation of the County Planning Department dated February 26, 1993 and considered by the Board of Supervisors on March 9, 1993, and upon the applicable policies and provisions of the County General Plan, all of which are incorporated herein by this reference, the County hereby finds and determines that a fully-funded program for the establishment and operation of the full rare plant preserve system is necessary and sufficient to avoid jeopardy to the rare plants and to ensure their long-term survival.

T. Therefore, it is necessary for the County to impose an Ecological Preserve Mitigation requirement or a fee in lieu thereof to alleviate the adverse impacts that development projects in the Mitigation Areas impose upon needed existing and future water supplies, as a result of jeopardy to the rare plants and their habitat from the use of those water supplies.

U. With respect to Mitigation Areas 1 and 2, there is also a reasonable relationship between the need for the preserve areas and the type of development project on which the Ecological Preserve Mitigation requirement or fee in lieu thereof is imposed, because the development projects subject to the requirement or fee create direct and indirect adverse impacts upon the rare plants and their habitat. There is a reasonable relationship between the imposition of the Ecological Preserve Mitigation requirement or fee in lieu thereof and the type of development project on which they are imposed, because the lands acquired or fees paid will be used to establish and maintain the full ecological preserve system.

V. As demonstrated by the traffic analyses performed for the County General Plan, which analyses are incorporated herein by this reference, the development projects subject to Ecological Preserve Mitigation or fee in lieu

thereof are all associated with land uses that increase demands on road capacity within the fee area and countywide. As a consequence, road improvements will be required within the Mitigation Areas that will adversely impact the rare plants and their habitat. Establishment of the full ecological preserve system will mitigate those adverse impacts.

W. As demonstrated by the air quality analyses performed for the County General Plan, which analyses are incorporated herein by this reference, the development projects subject to Ecological Preserve Mitigation or fee in lieu thereof are all associated with land uses that will increase air pollution within the Mitigation Areas and countywide. This degradation in air quality has a demonstrated adverse impact on plant vegetation generally. Establishment of the full ecological preserve system will mitigate those adverse impacts on the rare plants.

X. The development projects subject to Ecological Preserve Mitigation or the fee in lieu thereof are all associated with land uses that convert land from open-space uses. The conversion of land within the habitat of the rare plants has obvious and direct adverse impacts on the rare plants and their habitat. Even the conversion of land nearby the habitat of the rare plants has an indirect adverse impact on the rare plants and their habitat in the following ways: the presence of more intensive neighboring land uses has "edge effects" that degrades habitat by subjecting remaining open space lands to increased informal, unauthorized, and/or incompatible uses such as animal invasion, vehicular travel, and rubbish dumping; neighboring development increases the difficulty of carrying out appropriate management activities, such as prescribed burning, within the remaining open space.

Y. With respect to Mitigation Areas 1 and 2, there is a reasonable relationship between the amount of the fee and the portion of the cost of the preserve areas attributable to the development upon which the fee can be paid in lieu of Ecological Preserve Mitigation, and the fee does not exceed the estimated reasonable cost of providing the ecological preserve system for which it is imposed, as established by the documents previously incorporated herein by reference.

Section 5: Sections 17.71.200-17.71.300 are hereby added to the El Dorado County Ordinance Code as follows:

17.71.200 Ecological Preserve Mitigation and Fee in Lieu of Mitigation. There 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 of supervisors and shall be based on the formula set forth in this Ordinance.

17.71.210 On-site Mitigation in Mitigation Area 0. Development within Mitigation Area 0 will continue to address mitigation for impacts to rare plants on an individual basis. Within Mitigation Area 0, on-site mitigation is strongly encouraged. Developments within Mitigation Area 0 shall mitigate impacts by exercising one of the following three options:

A. Set aside a part of the property and dedicate a perpetual conservation easement for habitat protection; or

B. Cluster development in the least environmentally sensitive portion of the property according to the Implementation Strategy adopted by the County in March 1993 and receive in appropriate cases a density bonus in return for dedication of a perpetual conservation easement over the remainder of the property; or

C. Provide an independent mitigation plan that meets CEQA requirements, such as the purpose of long-term protection of an amount of habitat in the same Ecological Preserve and as close to the development site as feasible, equal to at least 1.5 times the acreage developed.

Option B, above, shall apply only to properties greater than five (5) acres in area.

17.71.220 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 the Rare Plant Off-Site Mitigation Program.

17.71.230 Ecological Preserve Fee; Formula. The amount of the fee is based on the following formula: Mitigation Areas 1 and 2 are each assigned 50% of the total local cost of the Rare Plant Mitigation Program, based upon the probability that 50% of the total adverse impact of development on rare plant habitat will be caused by future development within each Mitigation Area. The fee is then charged on a per dwelling unit equivalent basis, where one single-family unit equals one dwelling unit equivalent, one multi-family unit equals 0.75 dwelling unit equivalent, and 1,500 sq. ft. of commercial space equals one dwelling unit equivalent. The actual amount of the fees per dwelling unit equivalent in Mitigation Areas 1 and 2 are as set forth in the then-current board of supervisors resolution establishing the actual fee amounts.

17.71.240 Annual Fee Review. The 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.

17.71.250 Time of Fee Payment. The fee is due at the time of final inspection or certificate of occupancy, whichever is first, unless the board of supervisors in adopting the fee resolution establishes that the fee may be collected at any earlier time.

17.71.260 Exemption or Credits. If the county planning director in consultation with DFG and USFWS finds that a development project which has already received all needed discretionary approvals at the effective date of this Chapter has already met its mitigation obligations in whole or in part, such project will be exempted or credited against its Rare Plant Mitigation Obligation or fee in lieu thereof to a degree equivalent to the mitigation already provided. No other exemptions or credits to the Rare Plant Mitigation or fee in lieu thereof shall be allowed.

17.71.270 Accounting. The county shall maintain a separate rare plant ecological preserve account for fees collected, and provide an accounting within sixty (60) days of the close of each fiscal year. Any person may request an audit of the fund. In addition, the county shall make findings each fifth fiscal year following the first deposit into the fund with respect to unexpended portions of the fund, in which the county: identifies the purpose to which the fee is to put; demonstrates a reasonable relationship between the fee and the purpose for which it is charged; identifies all sources and amounts of funding anticipated to complete financing; and designates the approximate dates on which the funding is expected to be deposited.

17.71.280 Handling. The fee shall be collected by the county building department. The county treasurer shall maintain the account. The county planning department, in consultation with DFG

and USFWS, shall make recommendations to the board of supervisors regarding the expenditures of funds from the account to acquire or maintain designated preserve land.

17.71.290 Appeals. An appeal from a decision made pursuant to this Ordinance shall be in accordance with the appeals procedures set forth in chapter 17.08 of the county ordinance code, expect that DFG shall also be notified of the appeal hearing in writing at least five (5) days in advance of the hearing.

17.71.300 Termination of Mitigation Requirement or Fee in Lieu of Mitigation. The requirements of mitigation or payment of a fee in lieu of Ecological Preserve Mitigation shall terminate at such time as the board of supervisors finds, and DFG and USFSWS concur, that a fully funded system of five (5) rare plant preserves has been established in the on-going operation and maintenance of said preserves is fully funded.

Section 6 (Uncodified): Severability. The board of supervisors hereby declares that it would have passed this ordinance notwithstanding any partial invalidity, and that if any portion of this ordinance is finally held by a court of competent jurisdiction to be unlawful, unconstitutional, invalid, void, or unenforceable, the remaining provisions will continue in full force and effect without being impaired or invalidated in any way.

Section 7 (Uncodified): Effective Date. This ordinance shall be effective and take effect 60 days from and after the date of its final passage.

PASSED AND ADOPTED by the Board of Supervisors of the County of El Dorado at a regular meeting of said Board, held on the 28TH day of JULY, 1998 by the following vote of said Board:

Ayes: SUPERVISORS:SUPERVISORS: WILLIAM S. BRADLEY, J. MARK NIELSEN, WALTER L. SHULTZ, JOHN E. UPTON

Noes: SUPERVISOR:RAYMOND J. NUTTING

Absent: NONE

ATTEST
DIXIE L. FOOTE
Clerk of the Board of Supervisors

By Margaret E. Mooney
Deputy Clerk

John E. Upton
Chairman, Board of Supervisors

I CERTIFY THAT:
THE FOREGOING INSTRUMENT IS A CORRECT COPY OF THE ORIGINAL ON FILE IN THIS OFFICE

Date _____
ATTEST: DIXIE L. FOOTE, Clerk of the Board of Supervisors of the County of El Dorado, State of California.

By _____
Deputy Clerk

TDC:sln
preserveord.wpd
7-9-98

OBJECTIVE 7.4.1: RARE, THREATENED, AND ENDANGERED SPECIES

The County shall protect State and Federally recognized rare, threatened, or endangered species and their habitats consistent with Federal and State laws.

Policy 7.4.1.1 The County shall continue to provide for the permanent protection of the eight sensitive plant species known as the Pine Hill endemics and their habitat through the establishment and management of ecological preserves consistent with County Code Chapter 17.71 and the USFWS's *Gabbro Soil Plants for the Central Sierra Nevada Foothills Recovery Plan* (USFWS 2002).

Policy 7.4.1.2 Private land for preserve sites will be purchased only from willing sellers.

Policy 7.4.1.3 Limit land uses within established preserve areas to activities deemed compatible. Such uses may include passive recreation, research and scientific study, and education. In conjunction with use as passive recreational areas, develop a rare plant educational and interpretive program.

Policy 7.4.1.4 Proposed rare, threatened, or endangered species preserves, as approved by the County Board of Supervisors, shall be designated Ecological Preserve (-EP) overlay on the General Plan land use map.

Policy 7.4.1.5 Species, habitat, and natural community preservation/conservation strategies shall be prepared to protect special status plant and animal species and natural communities and habitats when discretionary development is proposed on lands with such resources unless it is determined that those resources exist, and either are or can be protected, on public lands or private Natural Resource lands.

Policy 7.4.1.6 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).

The County Agricultural Commission, Plant and Wildlife Technical Advisory Committee, representatives of the agricultural community, academia, and other stakeholders shall be involved and consulted in defining the important habitats of the County and in the creation and implementation of the INRMP.

Policy 7.4.1.7 The County shall continue to support the Noxious Weed Management Group in its efforts to reduce and eliminate noxious weed infestations to protect native habitats and to reduce fire hazards.

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.

Policy 7.4.2.1 To the extent feasible in light of other General Plan policies and to the extent permitted by State law, the County of El Dorado will protect identified critical fish and wildlife habitat, as identified on the Important Biological Resources Map maintained at the Planning Department, through any of the following techniques: utilization of open space, Natural Resource land use designation, clustering, large lot design, setbacks, etc.

Policy 7.4.2.2 Where critical wildlife areas and migration corridors are identified during review of projects, the County shall protect the resources from degradation by requiring all portions of the project site that contain or influence said areas to be retained as non-disturbed natural areas through mandatory clustered development on suitable portions of the project site or other means such as density transfers if clustering cannot be achieved. The setback distance for designated or protected migration corridors shall be determined as part of the project's environmental analysis. The intent and emphasis of the Open Space land use designation and of the non-disturbance policy is to ensure continued viability of contiguous or interdependent habitat areas and the preservation of all movement corridors between related habitats. The intent of mandatory clustering is to provide a mechanism for natural resource protection while allowing appropriate development of private property. Horticultural and grazing projects on agriculturally designated lands are exempt from the restrictions placed on disturbance of natural areas when utilizing "Best Management Practices" (BMPs) recommended by the County Agricultural Commission and adopted by the Board of Supervisors when not subject to Policy 7.1.2.7.

Policy 7.4.2.3 Consistent with Policy 9.1.3.1 of the Parks and Recreation Element, low impact uses such as trails and linear parks may be provided within river and stream buffers if all applicable mitigation measures are incorporated into the design.

Policy 7.4.2.4 Establish and manage wildlife habitat corridors within public parks and natural resource protection areas to allow for wildlife use. Recreational

EXHIBIT C

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RESOLUTION No. 205-98

OF THE BOARD OF SUPERVISORS OF THE COUNTY OF EL DORADO

WHEREAS, concurrently with this Resolution, the Board of Supervisors of El Dorado County is adopting Ordinance No. 4500, adding Chapter 17.71, "Ecological Preserves," to the El Dorado County Ordinance Code and establishing a Rare Plant Mitigation requirement or fee in lieu thereof for certain development projects in western El Dorado County;

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of the County of El Dorado hereby finds:

A. The ecological preserve fee for 1998 within Mitigation Area 1 shall be $885 per dwelling unit equivalent, as those terms are defined in Chapter 17.71 of the El Dorado County Ordinance Code.

B. The ecological preserve fee for 1998 within Mitigation Area 2, excluding those parcels served by wells, shall be $386 per dwelling unit equivalent, as those terms are defined in Chapter 17.71 of the El Dorado County Ordinance Code.

C. The foregoing fee amounts are set in accordance with the calculations included in the memorandum dated March 16, 1998 to El Dorado County Board of Supervisors from Economic and Planning Systems, Inc., Walter Kieser and Sonia Jacques, attached hereto and incorporated herein by this reference.

D. All fees shall be due and payable in full upon issuance of a building permit.

E. This Resolution shall take effect and be effective upon the effective date of Ordinance No. 4500.

PASSED AND ADOPTED by the Board of Supervisors of the County of El Dorado at a regular meeting of said Board, held on the 28TH day of JULY, 1998, by the following vote of said Board:

Ayes: SUPERVISORS: WILLIAM S. BRADLEY, J. MARK NIELSEN, WALTER L. SHULTZ, JOHN E. UPTON

Noes: SUPERVISOR: RAYMOND J. NUTTING

Absent: NONE

ATTEST
DIXIE L. FOOTE
Clerk of the Board of Supervisors

By Margaret E. Moody
Deputy Clerk

John E Upton
Chairman, Board of Supervisors

I CERTIFY THAT:
THE FOREGOING INSTRUMENT IS A CORRECT COPY OF THE ORIGINAL ON FILE IN THIS OFFICE
Date _____
ATTEST: DIXIE L. FOOTE, Clerk of the Board of Supervisors
of the County of El Dorado, State of California.
By _____
Deputy Clerk

ECONOMIC & PLANNING SYSTEMS
Real Estate Economics / Regional Economics / Public Finance / Land Use Policy

MEMORANDUM

To:	El Dorado County Board of Supervisors
cc:	Conrad Montgomery, Steven Hust, and Tom Cumpston
From:	Walter Kieser and Sonia Jacques
Subject:	El Dorado County Ecological Preserve Fee Estimate; EPS #6170
Date:	March 16, 1998

BACKGROUND

In July 1997, Economic & Planning Systems (EPS) completed the *Addendum and Update to the Economic Feasibility Study for the El Dorado County Ecological Preserves* for the County of El Dorado. This report established a decision framework and presented five alternative cost sharing scenarios for the acquisition and management of between four and five ecological preserves in the County. On July 22, 1997, the El Dorado County Board of Supervisors (BOS) approved in concept the proposed funding *Scenario 5* - which protects all five preserves and agreed upon a local contribution towards the mitigation costs of acquiring and protecting the five preserves.

On October 21, 1997, the El Dorado County BOS approved the County's participation in the purchase of Phase I (117 acres) of the Cameron Park acquisition for purposes of rare plant habitat protection. Phase I of the purchase, a total of 315 acres in Cameron Park also known as the Fifth Preserve, required that the County contribute $843,000 towards the purchase price. Additional acquisition funds are being contributed by the US Fish and Wildlife Service (USF&WS), the US Bureau of Reclamation (USBR), the El Dorado Irrigation District (EID), and the National Fish and Wildlife Foundation. Phase II of the acquisition of lands in the Cameron Park Preserve will require an additional contribution of $500,000 from County funds. It is the intention of the El Dorado County BOS that the County's contribution towards the Cameron Park Preserve acquisition costs are an advance on mitigation costs that will be the responsibility of new development as it occurs and thus will be recovered from the development community through the payment of in-lieu fees.

Also on October 21, 1997, the El Dorado County BOS approved in concept adoption of a rare plant mitigation in-lieu fee that would include all new development within the EID Sphere of Influence (SOI) excluding the City of Placerville. The BOS also approved a financing scenario whereby the County funds contributing towards the purchase of the Cameron Park Preserve would be repaid within 20 years, plus six percent annual

BERKELEY 1815 Fourth Street, Suite B Berkeley, CA 94710-1910 www.epsys.com Phone: 510-841-9190 Fax: 510-841-9208
SACRAMENTO Phone: 916-649-8010 Fax: 916-649-2070

interest, by collecting in-lieu fees from new development. The financing scenario approved was represented in **Table 9** of the Memorandum *El Dorado County Ecological Preserve Fee Estimates - Alternative Financing Scenarios*, prepared on September 19, 1997, by EPS.

FEE ASSUMPTIONS AND CALCULATION

GEOGRAPHY AND NEXUS

In a previous study prepared for the California Department of Fish and Game (DFG), *Economic Feasibility Study for the El Dorado County Ecological Preserves* (by EPS, February 1997), a Rare Plant Overlay Zone and Ecological Preserve Fee was recommended as the principal financing method for protecting the rare plant habitat. The report recommended that a Rare Plant Overlay Zone be established over the entire area currently described as the Rare Soils Study Area. There are several geographic areas that will be responsible for contributing towards the cost of mitigating the loss of rare plant habitat (Mitigation Areas). These Mitigation Areas and their respective mitigation requirements are described below (**Figure 1**):

- The Five Designated Preserves (Ecological Preserve EP-Overlay Zones) (Mitigation Area 0)
- The Rare Soils Study Area (Proposed Rare Plant Overlay Zone) (Mitigation Area 1)
- The EID Service Area and Sphere of Influence (SOI) (Mitigation Area 2)

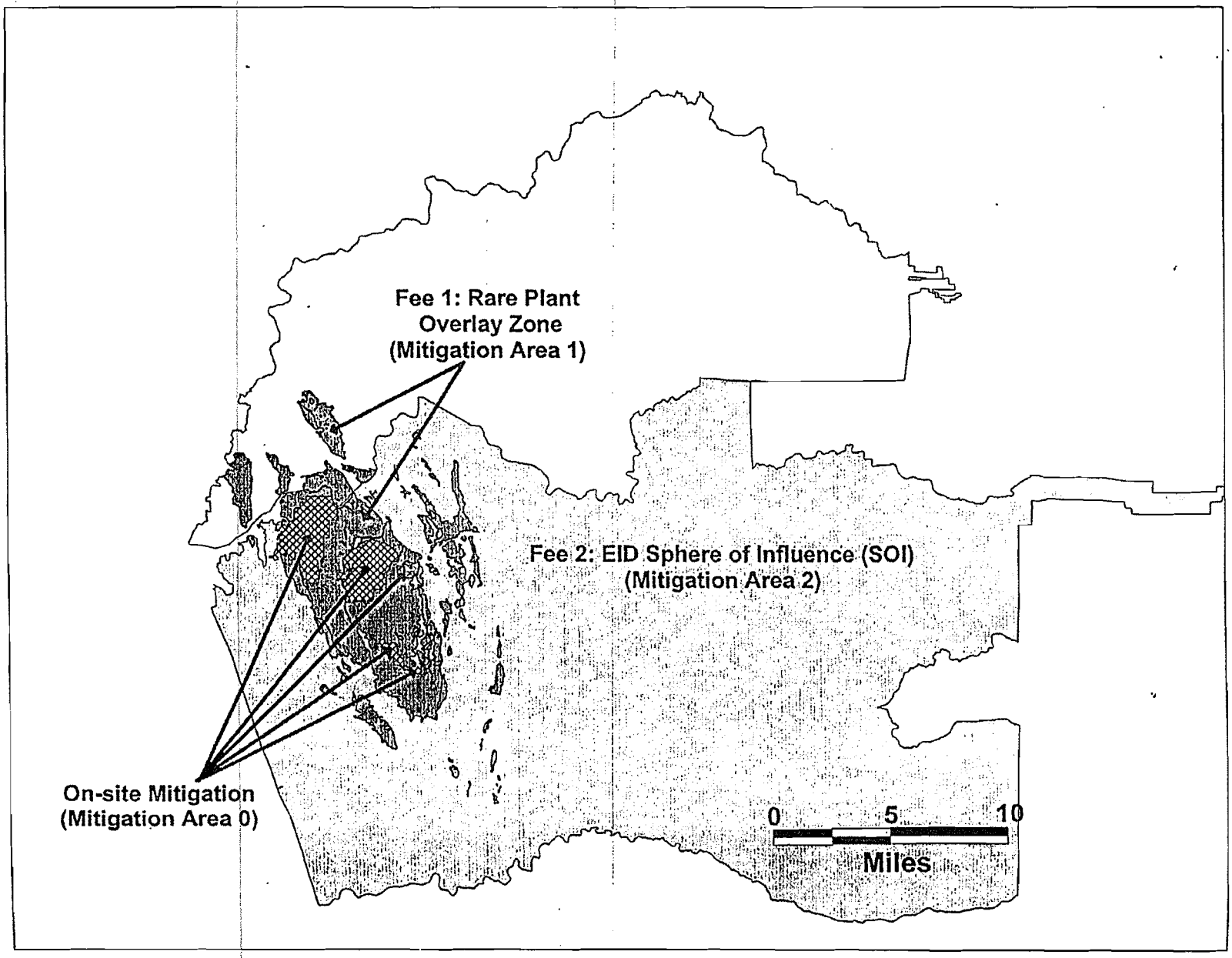
Five Designated Preserves (Ecological Preserve-EP Overlay Zones)- Mitigation Area 0

Development within the designated Ecological Preserves would continue to address mitigation for impacts to rare plants on an individual basis. This does not represent a large proportion of development projects, but they are potentially more detrimental to the rare plant species because they are within the only remaining areas that contain unfragmented habitat and a greater concentration of rare species. Within the Ecological Preserves, on-site mitigation should be encouraged. Developers within the Ecological Preserves would have three choices:

A. Set aside a part of the property and dedicate a perpetual conservation easement for habitat protection; or

B. Cluster development in the least environmentally sensitive portion of the property according to the Implementation Strategy adopted by the County in March 1993 and receive a density bonus in return for dedication of a perpetual conservation easement over the remainder of the property (should apply only to properties greater than 5 acres); or

Figure 1: Proposed Ecological Preserve Fee Mitigation Areas.
El Dorado County Ecological Preserves



Economic & Planning Systems, Inc.

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C. Provide an independent mitigation plan that meets California Environmental Quality Act (CEQA) requirements, such as the purchase and long-term protection of an amount of habitat in the same Ecological Preserve equal to at least 1.5 times the acreage developed.

The Rare Soils Study Area Outside of EP Overlay Zones (Proposed Rare Plant Overlay Zone) - Mitigation Area 1

It is proposed that a Rare Plant Overlay Zone be established over the entire area currently described as the Rare Soils Study Area. The Zone would include approximately 36,000 acres on gabbro and serpentine soils in western El Dorado County. The Rare Plant Overlay Zone would exclude the approximately 3,450 acres within the five designated Ecological Preserve sites.

Off-site mitigation through the payment of the Ecological Preserve Fee should be encouraged outside of the Ecological Preserves. If a landowner wishes to develop in the Rare Plant Overlay Zone, but not in a designated Ecological Preserve, the owner has two options to choose from.

A. Pay the Ecological Preserve Fee as in-lieu mitigation for the impacts caused by development on the rare plant habitat; or

B. Participate in the *El Dorado County Rare Plant Off-Site Mitigation Program* and in so doing reduce the impacts of development on rare plants and their habitat to a less than significant level. If mitigation for significant effects are not incorporated into the project description, an EIR must be prepared (CEQA Section 15063).

The El Dorado County Rare Plant Off-Site Mitigation Program

Off-site mitigation must be conducted according to the guidelines established by the County and the regulating agencies and will be subject to review by representatives of the USF&WS and the DFG. All off-site mitigation must be accomplished by acquiring and restoring rare plant habitat through the purchase of fee interests in habitat land or conservation easements within the designated Ecological Preserves. Acquisition and restoration of rare plant habitat must be equal to 1.5 times the number of acres developed within the Rare Plant Overlay Zone. The land or development rights purchased in the Ecological Preserves as off-site mitigation must be dedicated to a designated resource protection agency, such as the Bureau of Land Management, the DFG, or a designee of the agencies such as the American River Conservancy.

The EID Service Area and Sphere of Influence (SOI) - Mitigation Area 2

The findings supporting the proposed El Dorado County Ecological Preserve Fee indicate the following connections between the ongoing destruction of the eight rare plant species, known collectively as the "Pine Hill endemics" and the provision of water within the El Dorado Irrigation District (EID) Sphere of Influence (SOI).

- Development projects in western El Dorado County are all associated with land uses that require water. Those water demands are expected to be satisfied via public water service from El Dorado Irrigation District (EID).

- EID plans to supply a substantial amount of future water demand from proposed water supply contracts between El Dorado County Water Agency (EDCWA) and the USBR for water from the Folsom Reservoir Unit and the Sly Park Reservoir Unit of the Central Valley Project (CVP).

- The USF&WS have determined that the past and ongoing destruction Pine Hill endemics and their habitats are an adverse environmental impact of the CVP. The EDCWA/USBR contract is authorized by federal legislation and subject to completion of environmental studies and review. Therefore, the CVP impacts on the Pine Hill endemics have direct consequences for the maintenance and expansion of EID's existing water supplies.

Based on these findings therefore, it is expected that all future development using EID water, or with the right to use EID water, will need to share the cost of mitigating for impacts on rare plant habitat. All future development within the EID Sphere of Influence (SOI) can be assumed to have either direct or secondary impacts on rare plant habitat in western El Dorado County. Additional secondary impacts on the Pine Hill endemics and their habitat are expected to result from development in the EID SOI. Future development and resulting changes in land use are expected to have adverse impacts on traffic congestion, air quality, and open space uses.

In summary, a landowner wishing to develop in unincorporated El Dorado County may fall into three different habitat categories and two different water service categories depending on whether they will receive water (or have the future right to receive water) from EID, or will receive water from another water service provider. Depending on a landowner's/developer's location he or she will have the following options described below (Table 1).

Table 1
Ecological Preserve Fee Mitigation Areas
El Dorado County Ecological Preserves

Habitat Status /	In EID SOI	Outside EID
Mitigation Areas		
Mitigation Area 0 In an Ecological Preserve (EP) Overlay Zone	On-site mitigation	On-site mitigation
Mitigation Area 1 In Rare Plant Overlay Zone and outside an EP Overlay Zone	Pay in-lieu Fee 1 or off-site mitigation* inside designated Ecological Preserves	Pay in-lieu Fee 1 or off-site mitigation* inside designated Ecological Preserves
Mitigation Area 2 Outside the Rare Plant Overlay Zone and an EP Overlay Zone	Pay in-lieu Fee 2 or off-site mitigation* inside designated Ecological Preserves	N/A

* Off-site mitigation must be conducted to the specifications described in the *El Dorado County Rare Plant Off-Site Mitigation Program.*

ECOLOGICAL PRESERVE MITIGATION COST ALLOCATION

Since it is reasonable to expect development within Mitigation Area 1 - the Rare Plant Overlay Zone to have a greater impact on the rare plant habitat than development in Mitigation Area 2 - EID SOI a two tiered Ecological Preserve Fee is recommended. It is probable that at least 50 percent of the total adverse impact of development on rare plant habitat in Western El Dorado County will be caused by future development within Mitigation Area 1. Therefore, Mitigation Area 1 and Mitigation Area 2 are each assigned 50 percent of the total local cost of the rare plant mitigation program. Fee 1, paid by future development in Mitigation Area 1, will be higher than Fee 2 paid by future development in Mitigation 2, because the same amount of costs are spread over fewer Dwelling Unit Equivalents (D.U.E.s). This cost allocation is illustrated in Table 2 below.

Table 2
Ecological Preserve Cost Allocation
El Dorado County Ecological Preserves

Use of Funds	Cost Type	Cost Allocation Fee 1	Cost Allocation Fee 2
Cameron Park Preserve Acquisition	Debt-funded over 20 years at 6% annual interest	50%	50%
Martel Creek and Pine Hill Acquisitions	Pay-as-you-go	50%	50%
Administrative Fee 3% of capita costs	Pay-as-you-go	50%	50%
Maintenance Endowment Fund?	Pay-as-you-go	50%	50%

FEE CALCULATION

Over the past year the County has reached an agreement with several participating agencies regarding a cost sharing of the acquisition and protection of the Ecological Preserves (mitigation costs). The EID, the Water Agency, and several state and federal agencies and foundations are sharing the cost of acquiring Cameron Park. The remaining mitigation costs must be made up by local contributions from new development through the payment of in-lieu fees (the Ecological Preserve Fee) see Table 3 below.

Table 3
Local Share of Ecological Preserve Costs
El Dorado County Ecological Preserves

Use of Funds	Local Share
Cameron Park Phase I	$843,000 paid in October 1997
Cameron Park Phase II	$500,000 to be paid in July 1998
Cameron Park Phase III (1)	$0
Martel Creek and Pine Hill (50% of costs)	$1,754,000
Total Local Share (2)	$3,097,000

(1) It is assumed that Phase III of the Cameron Park purchase will be accomplished by BLM land exchanges.
(2) Total cost before interest and administrative fees.

Some of the mitigation requirements, specifically the acquisition of conservation easements in the Martel Creek and Pine Hill Preserves, can be funded on a pay-as-you-go basis as Ecological Preserve Fees are collected and funds become available. Other mitigation requirements, specifically the purchase of the core properties in the Cameron Park Preserve, are tied to a phased purchase option agreement with legally binding payment dates. The County has already advanced significant funds for Phase I of the Cameron Park purchase and has agreed to fund Phase II, which will require another payment in July 1998.

The Cameron Park mitigation costs, because they are advanced from County reserves, are treated as debt funding which must be repaid over a 20-year period at six percent interest. It is the responsibility of future development in the Mitigation Areas to reimburse the County's contribution towards the mitigation costs and pay the local contribution of the pay-as-you-go portion. The estimated total mitigation costs will then be spread over projected future development through 2017 in each Mitigation Area as described in Table 4 below.

Table 4
Ecological Preserve Fee Calculation
El Dorado County Ecological Preserves

Fee Type	Who Pays?	Fee Formula
Fee 1	Future development in Rare Plant Overlay Zone excluding development in the designated Ecological Preserves	Allocated cost divided by projected future development through 2017 in Mitigation Area 1.
Fee 2	Future development in the EID Sphere of Influence (SOI) outside Rare Plant and EP Overlay Zones	Allocated cost divided by projected future development through 2017 in Mitigation Area 2.

Ecological Preserve Fee Amounts

The Ecological Preserve Fee will be calculated by summing the County's contribution towards the local share of the cost, plus interest, of acquiring Cameron Park Preserve (315 acres) with the local share of the cost of acquiring conservation easements in the Martel Creek and Pine Hill Ecological Preserves; then adding a three percent

administrative fee[1] and applying the appropriate cost allocation factor as described above. Ecological Preserve Fee 1 to be paid by all future development within Mitigation Area 1 is estimated to be $518 per D.U.E. and Ecological Preserve Fee 2 to be paid by all future development in Mitigation Area 2 is estimated to be $226 per D.U.E. (see Table 5 and Table 6).

Operating and Maintenance Endowment Option

At this point it is uncertain how the preserves will be maintained and which agency will be responsible for their ongoing operations. The Wildlife Conservation Board (WCB) has recently expressed a willingness to make a significant grant towards the purchase of Phase II of the Cameron Park Preserve with the condition that the County provide a maintenance and operations plan for the Preserve which identifies specific funding sources. It is estimated that the annual cost of maintaining the Cameron Park Preserve (all 315 acres) will be about $43,000 annually.[2] Assuming an annual interest rate of six percent, it would require an endowment fund equal to about $717,000 to generate annual interest income equal to $43,000 annually. The American River Conservancy has agreed to contribute about $70,000 towards an endowment fund for Cameron Park, therefore, the net endowment amount would be about $647,000. If this amount were added to the other rare plant mitigation costs and included in the Ecological Preserve Fee this would result in a revised Ecological Preserve Fee 1 of $623 per D.U.E and a revised Ecological Preserve Fee 2 of $272 per D.U.E. Under this scenario, the operating and maintenance costs for the Martel Creek, Pine Hill, and Salmon Falls Preserves would need to be financed on a pay-as-you-go basis from annual operation budgets.

Alternatively, the County could choose to ensure that there would be sufficient funds available for covering the ongoing operations and maintenance of all the Ecological Preserves by creating a full endowment fund. It is estimated that the ongoing annual costs of operating and maintaining all four preserves (excluding the Penny Lane Ridge Preserve which is managed by the BLM) will be about $140,000 annually after all the targeted acres have been acquired.[3] Assuming an annual interest rate of six percent, it would require an endowment fund equal to $2.3 million to generate annual interest income equal to $140,000 annually. If this amount were added to the other rare plant mitigation costs and included in the Ecological Preserve Fee this would result in a revised Ecological Preserve Fee 1 of $885 per D.U.E and a revised Ecological Preserve Fee 2 of $386 per D.U.E. While adding an operations and maintenance endowment increases the Ecological Preserve Fee quite significantly, it is the most prudent method for ensuring that the Ecological Preserves are adequately maintained in the future.

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[1] A three percent administrative fee is deemed adequate to cover the County's costs in collecting and monitoring the Ecological Preserve Fee Program. However, this fee amount does not include funds for a Land Manager role. Subsequent negotiations between the County, the DFG, the USF&WS, the BLM and other appropriate agencies and entities, will need to determine who has the responsibility implementing the rare plant mitigation program by negotiating acquisitions and managing future habitat lands.

[2] Telephone conversation with Alan Erghott, American River Conservancy, March 12, 1998.

[3] *Economic Feasibility Study for the El Dorado County Ecological Preserves Final Report*, February 1997, by Economic & Planning Systems, page VII-19.

Table 5
Estimated Ecological Preserve Fee 1
El Dorado County Ecological Preserves

Item	Units/ Sq. Ft. (1)	D.U.E.s (2)	Pay-as-You-Go	Debt-Funded Amount	Total
Estimated Land Costs (for Martel Creek/Pine Hill and Cameron Park) (3)			$1,754,000	$1,343,000	$3,097,000
Administration Fee of 3% (4)			$52,620	$40,290	$92,910
Amount to be funded over 20 Years			$789,300	$1,343,000	$2,132,300
Administration Fee of 3% (4)			$23,679	$40,290	$63,969
Interest @ 6% over 20 years (5)			$0	$998,777	$998,777
Endowment Fund for O&M			$0	$0	$0
Total Costs for First 20 Years of Program			**$812,979**	**$2,382,067**	**$3,195,046**
Costs Allocated to Mitigation Area 1			$406,490	$1,191,034	$1,597,523
Proj. New Single Family Units in Mitigation Area 1 @ Buildout (6)	3,933	3,933			
Proj. New Multi-Family Units in Mitigation Area 1 @ Buildout (6)	2,070	1,553			
Proj. New Commercial Square Feet in Mitigation Area 1 @ Buildout (6)	2,976,567	1,984			
Total D.U.Es. at Buildout		7,470			
In-lieu Fee 1 per D.U.E. at Buildout					na
Estimated D.U.Es at 2017 (7), (8)		3,084			
In-lieu Fee 1 per D.U.E. at 2017					$518

(1) Based on the El Dorado County General Plan, adopted January 23, 1996.
(2) One single-family unit = one Dwelling Unit Equivalent (D.U.E)
One multi-family unit = 0.75 D.U.E.
1,500 square feet of commercial space = one D.U.E.
(3) Assumes that Salmons Falls habitat land is acquired using on-site mitigation and external funding sources. Assumes that 50% of costs for Preserves 1:4 are covered by EID (water connection fees). Assumes that approximately 62% of Cameron Park costs are covered by private, State and federal Grants. The remaining 38% of the $7.5 million acquisition price is split equally between the County and EID.
(4) Administrative fee revenues will be used to cover the cost of collecting and administering the Ecological Preserve Fee.
(5) A finance charge is included for the Cameron Park acquisition. The Martel Creek and Pine Hill conservation easement acquisitions are assumed to occur on a pay-as-you go basis.
(6) Mitigation Area 1 includes all of the Rare Plan Overlay Zone excluding the five designated Ecological Preserves (EP Overlay Zone).
(7) Assumes that approximately 45% of the projected new residential development and 31% of the projected new commercial development will occur by 2017.
(8) Excludes new development in the Ecological Preserve Overlay Zone.

Sources: Economic & Planning Systems, Inc., El Dorado County Planning Department.

Table 6
Estimated Ecological Preserve Fee 2
El Dorado County Ecological Preserves

Item	Units/ Sq. Ft. (1)	D.U.E.s (2)	Pay-as-You-Go	Debt-Funded Amount	Total
Estimated Land Costs (for Martel Creek/Pine Hill and Cameron Park) (3)			$1,754,000	$1,343,000	$3,097,000
Administration Fee of 3% (4)			$52,620	$40,290	$92,910
Amount to be funded over 20 Years			$789,300	$1,343,000	$2,132,300
Administration Fee of 3% (4)			$23,679	$40,290	$63,969
Interest @ 6% over 20 years (5)			$0	$998,777	$998,777
Endowment Fund for O&M			$0	$0	$0
Total Costs for First 20 Years of Program			**$812,979**	**$2,382,067**	**$3,195,046**
Costs Allocated to Mitigation Area 2			**$406,490**	**$1,191,034**	**$1,597,523**
Proj. New Single Family Units in Mitigation Area 2 @ Buildout (6)	7,266	7,266			
Proj. New Multi-Family Units in Mitigation Area 2 @ Buildout (6)	4,314	3,236			
Proj. New Commercial Square Feet in Mitigation Area 2 @ Buildout (6)	11,358,845	7,573			
Total D.U.Es. at Buildout		18,074			
In-lieu Fee 2 per D.U.E. at Buildout					na
Estimated D.U.Es at 2017 (7), (8)		7,073			
In-lieu Fee 2 per D.U.E. at 2017					$226

(1) Based on the El Dorado County General Plan, adopted January 23, 1996.
(2) One single-family unit = one Dwelling Unit Equivalent (D.U.E)
One multi-family unit = 0.75 D.U.E.
1,500 square feet of commercial space = one D.U.E.
(3) Assumes that Salmons Falls habitat land is acquired using on-site mitigation and external funding sources. Assumes that 50% of costs for Preserves 1:4 are covered by EID (water connection fees). Assumes that approximately 62% of Cameron Park costs are covered by private, State and federal Grants. The remaining 38% of the $7.5 million acquisition price is split equally between the County and EID.
(4) Administrative fee revenues will be used to cover the cost of collecting and administering the Ecological Preserve Fee.
(5) A finance charge is included for the Cameron Park acquisition. The Martel Creek and Pine Hill conservation easement acquisitions are assumed to occur on a pay-as-you go basis.
(6) Mitigation Area 2 is equal to the EID Sphere of Influence (SOI) excluding Mitigation Area 1. However, in order to be conservative the fee is estimated using only projected development within the EID Service Area.
(7) Assumes that approximately 45% of the projected new residential development and 31% of the projected new commercial development will occur by 2017.
(8) Excludes new development in the Ecological Preserve Overlay Zone and incorporated Placerville.

Sources: Economic & Planning Systems, Inc., El Dorado County Planning Department.

Ideally, the operations and maintenance of the Ecological Preserves could be shared between several local, state, and federal agencies, including the EDCWA, EID, DFG, BLM, and possibly the USF&WS. In particular some of the local costs could be covered by the local fire prevention districts. As noted in previous reports, the Pine Hill endemic plant species require periodic controlled burning in order to regenerate. It would be advisable to incorporate the rare plant habitat maintenance with fire prevention efforts in Western El Dorado County such as through controlled brush burns conducted and monitored by the local fire prevention districts and possibly the California Department of Forestry. This approach would achieve two public policy goals in one, by reducing the risk of uncontrolled wildfires in Western El Dorado County, and promoting the healthy regeneration of the rare plants.

NEXT STEPS/IMPLEMENTING AGREEMENT

After the adoption of the Ecological Preserve Fee Ordinance (the Ordinance) and the General Plan Amendment (GPA), which expands the Ecological Preserve -EP overlay zone to include the Cameron Park as the fifth preserve, an "implementing agreement" involving all the participating jurisdictions will need to be negotiated. The County will need to adopt an implementing agreement and maintain the habitat mitigation efforts over time consistent with the implementing agreement. If is decided later to prepare a comprehensive countywide Habitat Conservation Plan (HCP) the implementing agreement prepared for the rare plant mitigation program could serve as the basis for a subsequent HCP implementing agreement.

The rare plant mitigation program implementing agreement will most likely drafted as a Memorandum Of Understanding (MOU) between the participating agencies (including the County of El Dorado, the EID, the County Water Agency, the DFG, the USF&WS, the Bureau of Reclamation, and the Bureau of Land Management) and should contain the following elements:

- A Recitals Section. Recitals will describe the intention and the purposes of the Agreement.
- A Definitions Section. Definitions will be provided for the key terms used in the Agreement.
- Term and Renewal Section. The life span of the agreement will be defined and provisions for extending it provided.
- Obligations of the Parties Section. The responsibilities of the County as an urban development permittee in requiring mitigation for loss of rare plant habitat must be described. This section includes the definition of the El Dorado County Rare Plant Off-Site Mitigation Program, the mitigation ratio, the Ecological Preserve In-lieu Fee which includes components for habitat acquisitions (conservation easements), fee administration, and mechanisms for fee adjustments.

- Habitat Management and Protection Section. This section describes how the rare plant mitigation program will be administered; how mitigation conservation easements will be selected and acquired; how the Ecological Preserves will be managed and operated (the Land Manager role); how habitat enhancement, if required, will be conducted; and how all these management and operations functions will be funded. This section will describe the responsibilities of the regulating and resource agencies in implementing the rare plant mitigation program.

- Mutual Assurances Section. This section describes what the agreement does and does not assure the parties regarding compliance with the provisions of the Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and CEQA.

EXHIBIT D

FOURTH DRAFT

IMPACT ANALYSIS OF PLANNED FUTURE DEVELOPMENT ON GABBRO RARE PLANT SUITABLE AND OCCUPIED HABITAT IN EL DORADO COUNTY

Prepared for

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January 2014

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
A	Agricultural
ac	acres
AE	Agricultural Exclusive
AL	Agricultural Lands
APN	Assessor's Parcel Number
C	Commercial
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CDFW	California Department of Fish and Wildlife
cm	centimeters
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
DFG	California Department of Fish and Game (now California Department of Fish and Wildlife)
DU	dwelling unit
EDCGP	*El Dorado County General Plan*
ESA	Endangered Species Act
FE	Endangered under the federal Endangered Species Act
FP	footprint
FT	Threatened under the federal Endangered Species Act
GR	growth ratio
GIS	geographic information system
HDR	High Density Residential
HP	habitat proportion
I	Industrial
KHA	Kimley-Horn and Associates
LDR	Low Density Residential
m^2	square meters
MDR	Medium Density Residential
MFR	Multi-family Residential
MR	Mineral Resources
NC	not calculated
NPPA	Native Plant Protection Act
NR	Natural Resource
NRCS	Natural Resources Conservation Service
OS	Open Space
PA	Planned Agricultural
PF	Public Facility
RA	Residential Agricultural
RD	Research and Development
RE	Residential Estate
RR	Rural Residential

SA	Select Agricultural
SE	Endangered under the California Endangered Species Act
SR	Rare under the Native Plant Protection Act
TAZ	traffic analysis zone
TPZ	Timber Preserve
TR	Tourist Recreation
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

CHAPTER 1. INTRODUCTION

This document provides a first draft of an impact analysis of planned future development in El Dorado County on rare plant species (also referred to as "gabbro" rare plants). This draft impact analysis is the initial step in the development of a mitigation plan in support of an application for a permit under Section 2081 of the California Endangered Species Act (CESA) and an analysis for compliance with the California Environmental Quality Act (CEQA) and Native Plant Protection Act (NPPA).[1]

The following species of rare plants are addressed in this analysis (federal and state listing status):[2]

- Stebbins' morning-glory (*Calystegia stebbinsii*) (FE/SE)
- El Dorado bedstraw (*Galium californicum* ssp. *sierrae*) (FE/SR)
- Pine Hill ceanothus (*Ceanothus roderickii*) (FE/SR)
- Pine Hill flannelbush (*Fremontodendron californicum* ssp. *decumbens*) (FE/SR)
- Layne's butterweed (*Senecio layneae*) (FT/SR)
- Red Hills soaproot (*Chlorogalum grandiflorum*) (not listed)
- El Dorado mule-ears (*Wyethia reticulata*) (not listed)
- Bisbee Peak rush-rose (*Helianthemum suffrutescens*) (not listed)[3]

The development of the impact analysis included the gathering of existing, available information on the ecological requirements, status, and distribution of the rare plants and the gathering of existing geographic information system (GIS) data on vegetation, soils, rare plants distributions, and planned future development in El Dorado County. Ecological conditions that support habitat for these plants and ecological profiles of each species were developed from this existing information to provide the ecological context for the assessment of impacts on each species by planned future development (see Appendix A.2, *Biological Background Information*). The impact analysis relied heavily on the GIS data and the intersection of the planned future development footprints with modeled suitable habitat and known occupied habitat of the plant species.

[1] The authority of the U.S. Fish and Wildlife Service to regulate federally listed plant species on private property is limited. As such, El Dorado County does not intend to seek take authorizations under the ESA from the USFWS.

[2] Listing status: FE = endangered under ESA; FT = Threatened under ESA; SE = Endangered under CESA; SR = Rare under NPPA.

[3] Note that Bisbee Peak rush-rose (*Helianthemum suffrutescens*) has been recently taxonomically reclassified as peak rush-rose (*Helianthemum scoparium*) (Jepson Flora Project 2012).

The Plan Area for which these impacts were assessed was determined by the combined extent of potential suitable habitat for all eight rare plants as shown in Figure 1-1. The land use designations in the Plan Area under the 2009 amendments to the County's general plan (*El Dorado County General Plan* [*EDCGP*] 2009a, 2009b) are shown in Figure 1-2 and the vegetation cover (Klein et al. 2007) within the Plan Area is shown in Figure 1-3.

The impact analysis is presented in Chapter 2, *Impact Analysis*, and the supporting ecological information on each of the eight species is provided in Appendix A, *Biological Background Information*. Cited references are provided in Chapter 3, *References*.

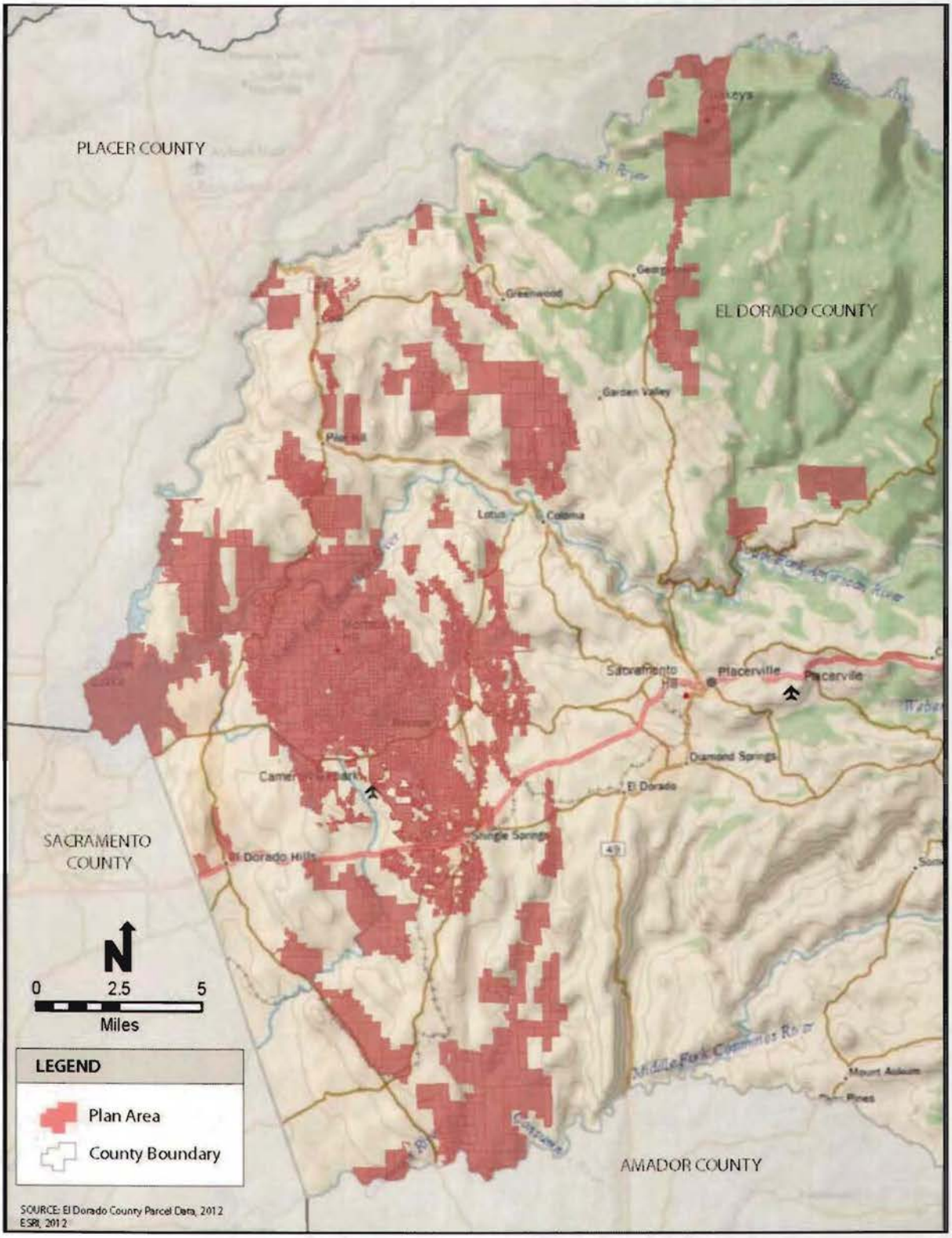

Figure 1-1. El Dorado County Rare Plant Plan Area

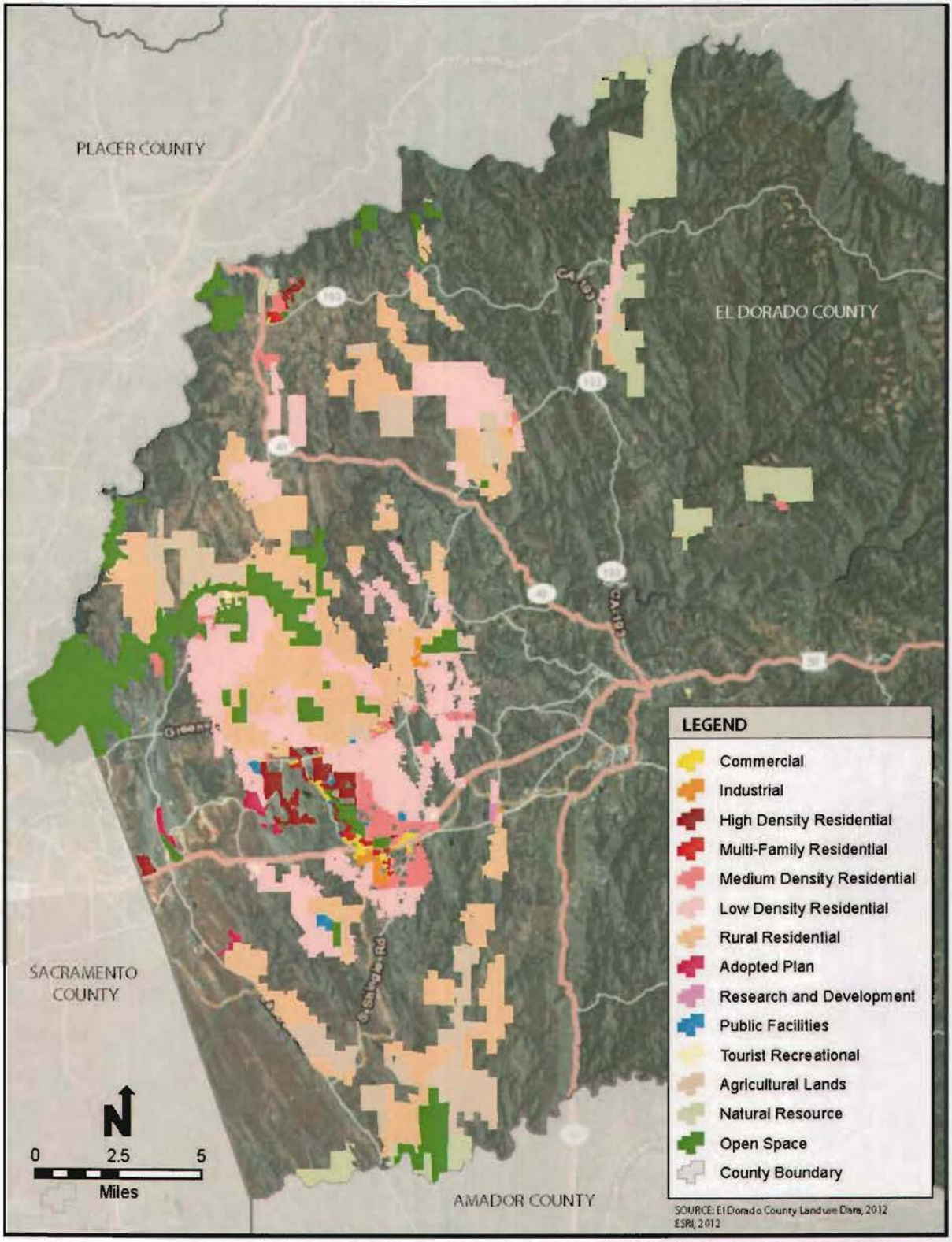

Figure 1-2. County Land Use Designations in the Plan Area (County General Plan)

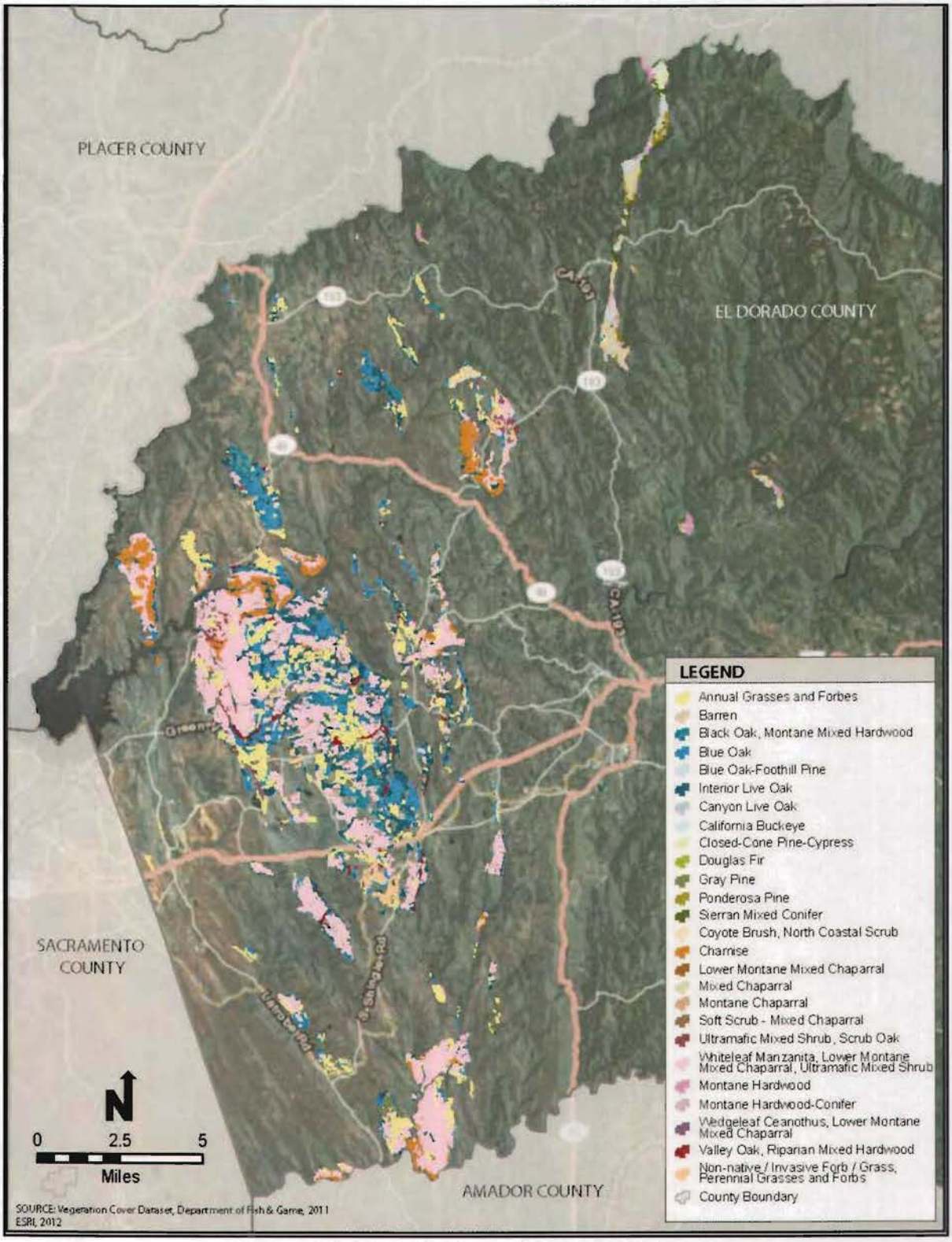

Figure 1-3. Vegetation Cover in the Plan Area

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CHAPTER 2. IMPACT ANALYSIS

2.1 CHARACTERIZATION OF HABITAT

2.1.1 Characterization of Suitable Habitat

Leidos developed a habitat model using GIS data to create a map of the estimated distribution of potential suitable habitat for the rare plant species. The components of the habitat model were chosen based on the results of research by Gogol-Prokurat (2009, 2011) who found that soil type (within gabbro and serpentine categories) is the best regional predictor for the occurrence of the eight rare plant species at a particular site and that vegetation community composition was the strongest predictor of the abundance of each species where it occurs.

GIS polygons of soils in the Argonaut, Rescue, and Serpentine Rockland series[4] (USDA NRCS 2012) in El Dorado County were used to develop the model of composite suitable habitat for all of the rare plant species (Figure 2-1). Using vegetation data developed by the California Department of Fish and Wildlife (CDFW) and the California Native Plant Society (CNPS), the habitat model was refined by removing vegetation associations that are typical of wetland and riparian areas that do not support the rare plants and by removing agriculture and developed areas that are not suitable rare plant habitat (Klein et. al 2007). The results of the rare plant suitable habitat model are depicted in Figure 2-2. The California Natural Diversity Database (CNDDB) (California Department of Fish and Game [DFG] 2012) records of occurrences were mapped for all eight rare plant species and overlaid on a model of composite suitable habitat for all of the species (figures with occurrences and suitable habitat are provided for each plant species in Appendix A, *Biological Background Information*). Occurrence data for the rare plant species indicate a good fit with the soils- and vegetation-based composite suitable habitat model.

Research by Wilson et al. (2009) suggests that the distribution of one of the plant species, El Dorado bedstraw, is generally found within the interior live oak (*Quercus wislizeni*) and black oak (*Quercus kelloggii*) vegetation association. CNDDB data, however, indicate occurrences of El Dorado bedstraw in other vegetation associations. Although mostly found in live oak and black oak woodlands, the suitable habitat model was not limited to this vegetation type and is therefore expected to substantially overestimate El Dorado bedstraw suitable habitat. Pine Hill flannelbush is only known from Pine Hill; but there were no additional vegetation or physical parameters to refine the model for this species, except its known locations, so the model substantially overestimates the extent of Pine Hill flannelbush suitable habitat. Because some of the rare plant species are found on both gabbro soils and serpentine soils (e.g., Red Hills soaproot and Layne's butterweed) or have the potential to occur on both soils, and because there are no additional parameters to further refine the modeled habitat for these species (e.g.,

[4] These soil series contain the gabbro and serpentine soil types that support the rare plant species.

vegetation associations), it was assumed that this modeled habitat reflects the combined extent of all potential suitable habitat for all eight rare plant species for purposes of the impact assessment. For more detail on soils and plant ecological requirements see Appendix A, *Biological Background Information.* Information provided in Appendix A on the distribution of each species' occurrences and habitat describes the baseline conditions for the rare plant species.

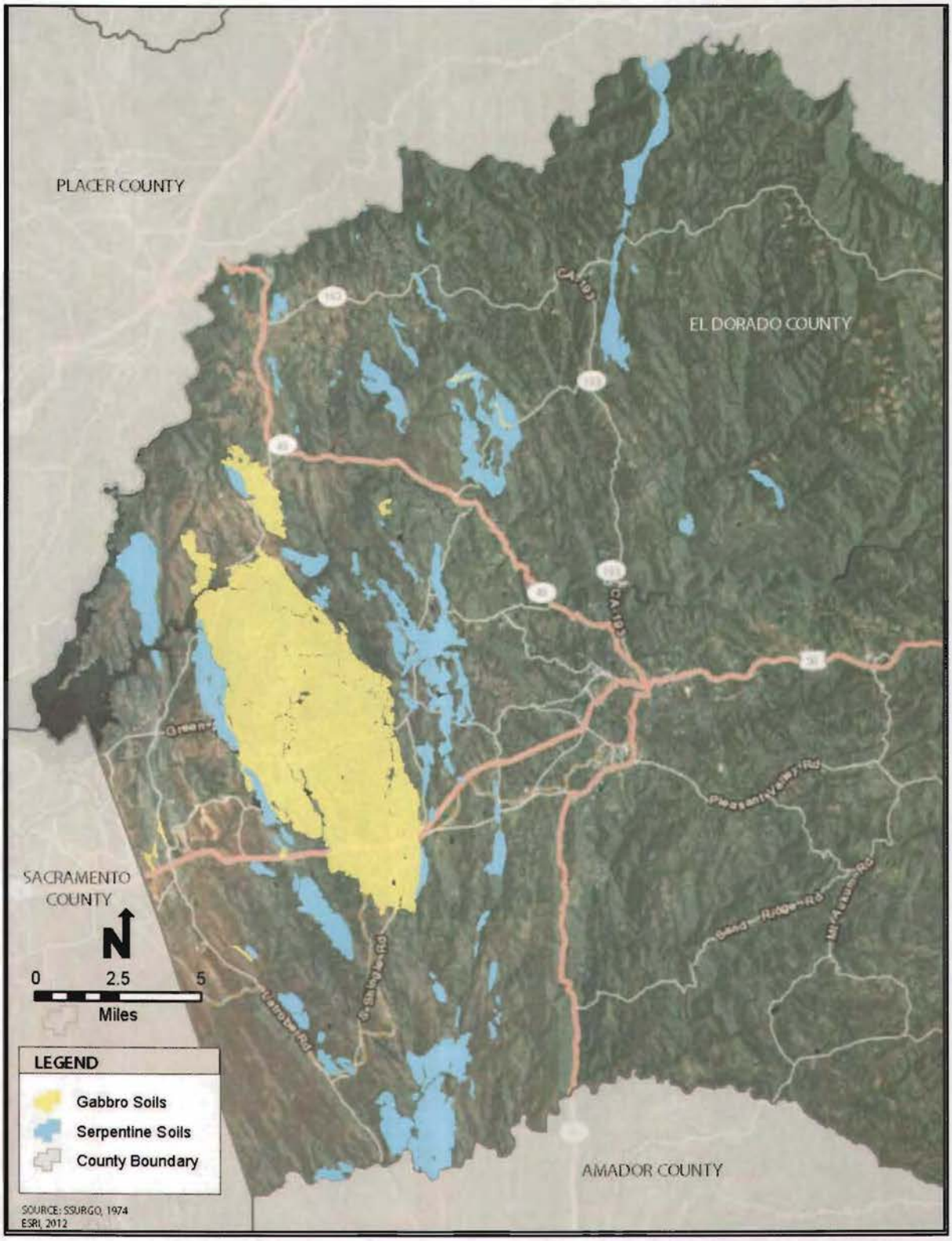

Figure 2-1. Gabbro and Serpentine Soils in the Plan Area

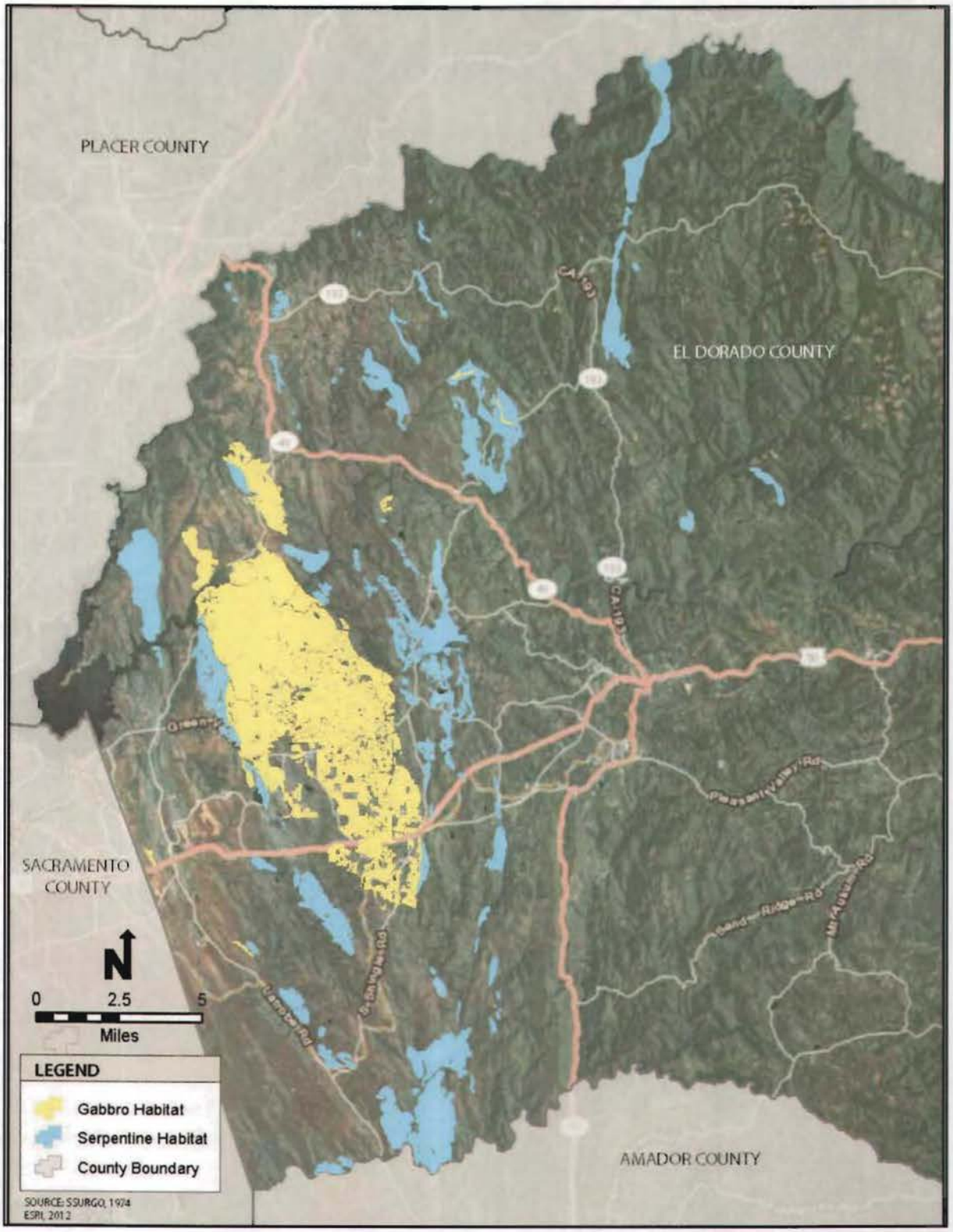

Figure 2-2. Modeled Rare Plant Suitable Habitat in the Plan Area

2.1.2 Characterization of Occupied Habitat

CNDDB GIS rare plant occurrence data (DFG 2012) were combined with other GIS rare plant occurrence data from various field surveys provided by the County to Leidos and overlaid on modeled suitable habitat to develop occupied habitat distributions for each of the eight species (see figures for individual species in Appendix A, *Biological Background Information*). The plant occurrence data is in polygon format, but some polygons are directly mapped boundaries by field biologists and others are circles based on accuracy estimates around a point (e.g., "within ¼-mile radius"). The area of overlap between an occurrence polygon and modeled suitable habitat is considered occupied habitat.

2.2 METHODS FOR ASSESSING IMPACTS ON HABITAT

2.2.1 Approach to Impacts on Modeled Suitable Habitat

The methods used to calculate the impacts of planned future development on modeled suitable habitat were adapted from that used by Economic & Planning Systems, Inc. (2002) to calculate the development build-out of the 1996 General Plan alternative that was adopted in the 2004 General Plan by the Board of Supervisors (Resolution No. 235-2004). A development growth ratio (GR) was generated and applied to the General Plan development build-out scenario to reflect 2035 household estimates. The GR was provided by the El Dorado County Development Services Department. Current land use designations, zoning districts, and maximum dwelling unit (DU) densities were obtained from the *EDCGP* (2009a, 2009b).

All parcels that intersected modeled suitable habitat were selected and parcels that are currently protected as part of the Pine Hill Preserve or under conservation easements were removed from the analysis. The parcels were then classified using the El Dorado Parcel GIS dataset as either undeveloped (vacant or unassigned) or developed for purposes of calculating maximum impacts at full build-out. The methods used in the impact analysis to estimate the potential loss of habitat on parcels of various land use designations and zoning are depicted in Figure 2-3.

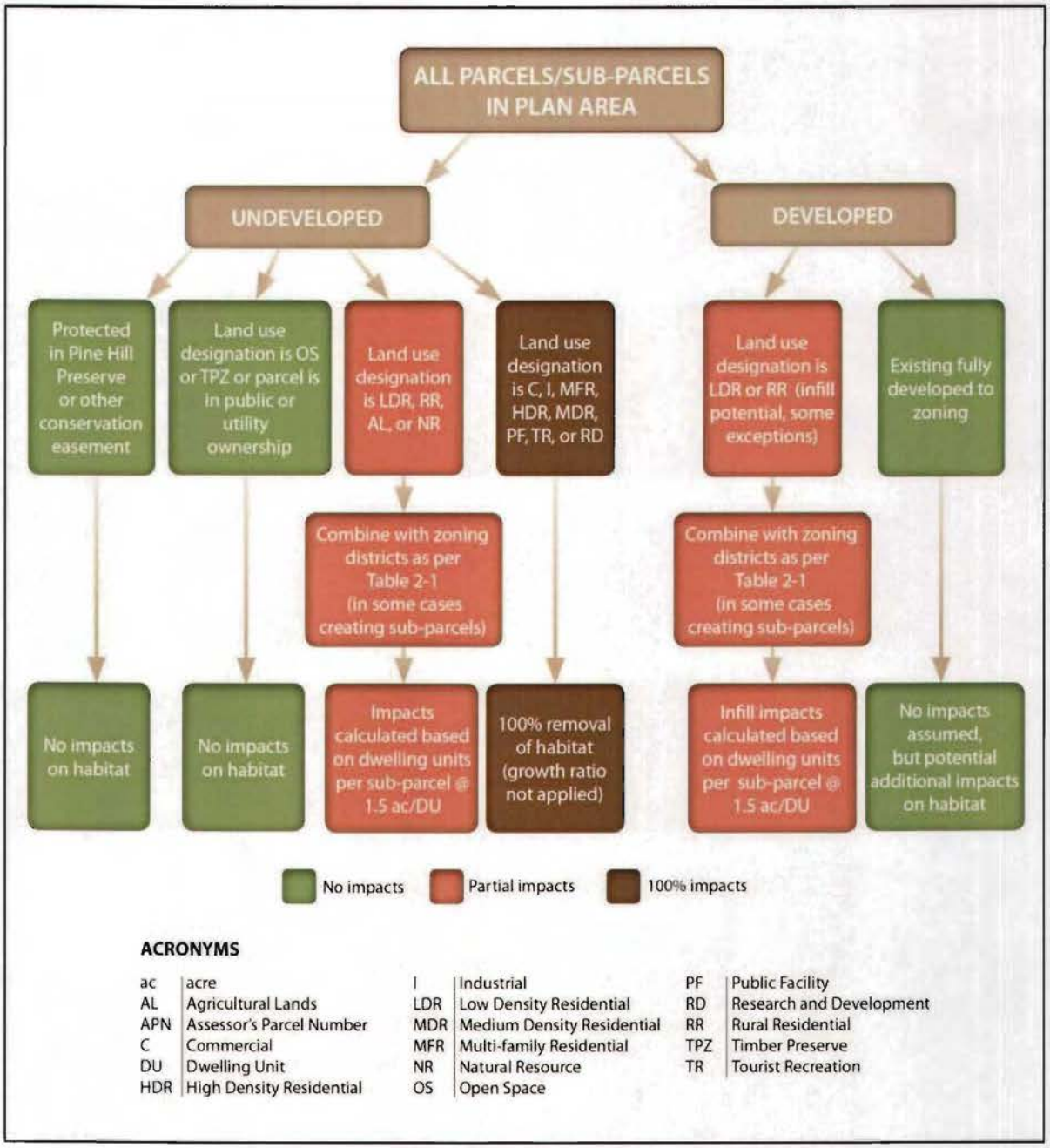

Figure 2-3. Methods Flow Diagram

For undeveloped parcels, no impacts on habitat were assumed for parcels with land use classifications of Open Space (OS) and Timber Preserve (TPZ); parcels in public (e.g., U.S. Forest Service, Bureau of Land Management, State of California, and El Dorado County) or regulated utility (e.g., Pacific Gas & Electric) ownership; and parcels with existing roads because minimal future development is anticipated on these parcels.

Undeveloped parcels with land use designations of Commercial (C), Industrial (I), Public Facility (PF), Tourist Recreation (TR), Research and Development (RD), Multi-family Residential (MFR), High Density Residential (HDR), and Medium Density Residential (MDR) were assumed to result in 100 percent removal of habitat because these types of development typically cover the entire or nearly the entire parcel surface with buildings, pavement, and landscaping, or are susceptible to other types of disturbances. The development GR was not applied to these parcels as these land use designations were assumed to cover the full parcel.

Impacts for undeveloped parcels with land use designations of Low Density Residential (LDR), Rural Residential (RR), Agricultural Lands (AL), and Natural Resource (NR), were assessed for habitat within parcels using a combination of these land use designations with the appropriate zoning districts (see Table 2-1). Larger parcels are often bisected by land use designations and zoning districts that do not necessarily follow parcel boundaries, thus creating smaller areas within the legal parcel boundaries, which were defined as "hypothetical sub-parcels" ("sub-parcels"). The sub-parcels are the unit of analysis for this impact analysis and, because the actual locations of plots and development footprints within the sub-parcels is unknown until development occurs at some time in the future, the potential impacts are non-spatial at the scale of the sub-parcel. For sub-parcels, both the development footprints and modeled suitable habitat extents were converted into non–spatially explicit extents using a weighting formula. Future development impacts to undeveloped sub-parcels were calculated as follows (X = acreage specified in Table 2-1):

1. If the sub-parcel is less than X acres (ac), it is assumed to have a maximum of 1 DU, while if it is greater than or equal to 2 times X acres it can have more than 1 DU as well as the fractional part of a DU (e.g., 7.76 DUs).
2. The acreage of habitat on the sub-parcel is divided by the acreage of the sub-parcel to distribute the amount of habitat proportion (HP) across the entire sub-parcel.
3. A structure, infrastructure, and landscaping footprint (FP) of 1.5 acres[5] per DU is assumed.
4. The impact on modeled suitable habitat on a particular sub-parcel is then calculated as the product of DUs, habitat proportion, and footprint (DU x HP x FP = habitat impact).

[5] Footprint acreage of 1.5 acres per DU is a conservative value (i.e., a high estimate of footprint impact) to estimate impacts. This 1.5 acres/DU was recommended by the El Dorado County Development Services Department. Included in the 1.5 acres are the footprints of the house, landscaping, outbuildings, driveway, walkways, patios, pools, devegetated animal corrals, etc.

Table 2-1. Maximum Dwelling Unit Density per Acre by Land Use Designation and Zoning District

General Plan Land Use Designation and Zoning District Maximum Density (1 dwelling unit per X acres) [2]				
Zoning Districts[1]	**Land Use Designations**			
	Low Density Residential	***Rural Residential***	***Agricultural Lands***	***Natural Resource***
RE-5	5	-	-	-
RE-10	10	10	-	-
RA-20	20	20	20	-
RA-40	-	-	40	40
RA-60	-	-	60	60
RA-80	-	-	80	80
RA-160	-	-	160	160
A	10	-	10	-
SA-10	10	-	10	-
PA	20	20	20	-
AE	20	20	20	20
MR	-	40	40	-

[1] Residential Estate (RE), Residential Agricultural (RA), Agricultural (A), Select Agricultural (SA), Planned Agricultural (PA), Agricultural Exclusive (AE), Mineral Resources (MR).
[2] Values in the table are minimum acreage per DU and equal X for purposes of the impact calculation formulas.

Developed parcels with land use designations of LDR and RR that were within Residential Estate (RE) zoning districts RE-5 and RE-10 and Residential Agricultural (RA) district RA-20 were identified as parcels with infill development potential in order to calculate impacts for fully developed parcels to the maximum number of allowable dwelling units per acre (DU/ac). For developed sub-parcels, infill development potential impacts on habitat for sub-parcels with land use designations of LDR and RR that are within zoning districts RE-5, RE-10 and RA-20 were calculated as described above for undeveloped sub-parcels; then the amount of impact on habitat equivalent to 1 DU was subtracted from the total impact to calculate the adjusted impact for the potential infill development.

Developed parcels with all other land use designations (not LDR or RR) were assumed built to the full zoning allowable, therefore no additional impacts on habitat remaining in these parcels was assumed.

The 2035 GR was generated to reflect realistic growth estimates for 2035 relative to full build-out under the General Plan. The El Dorado County Development Services Department provided county-wide DU growth estimates for 2035, which were spatially related to traffic analysis zone studies conducted by the County traffic engineering contractor, Kimley-Horn and Associates (KHA). The GR represents the proportion of full General Plan build-out that would result by 2035 based the analysis conducted by KHA. In addition to the 2035 growth projections, theoretical full build-out household projections were provided by the County Development

Services Department that were related to the *EDCGP* Land Use Plan. A spatially explicit 2035 GR was derived between the 2035 growth projections and full build-out projections by assigning each of the County's comprehensive land use designations a DU build-out ratio value (Table 2-2).

The theoretical build-out ratios were assigned to the County's land use GIS layer and multiplied by the layer's associated acreage values to calculate a theoretical number of DUs reflective of the plan's build-out capacity. All calculated theoretical DU estimates were then assigned to a traffic analysis zone (TAZ) region and summed to generate a total number of dwellings per TAZ. The GR was finally derived by dividing the 2035 DU estimate by the theoretical DU build-out value. The GR value was then applied to DU estimates included within the impact calculations described in Section 2.2.3, *GIS Methodology*.

Table 2-2. County General Plan Theoretical Build-Out Ratios

Land Use Code	Theoretical Build-Out Ratio (1 dwelling unit/X acres)
Low Density Residential	0.200
Agricultural Lands	0.050
Open Space	NC
Rural Residential	0.100
Natural Resource	0.025
Public Facility	NC
Adopted Plan	NC
Tourist Recreation	NC
Research and Development	NC

NC – not calculated

2.2.2 Approach to Impacts on Occupied Habitat

Impacts on occupied habitat were calculated using the same methods as those described above for modeled suitable habitat. Where impacts are identified on occupied habitat, it was assumed that the plant occurrences in that habitat were adversely affected.

2.2.3 GIS Methodology

The approach described in Section 2.2.1, *Approach to Impacts on Modeled Suitable Habitat* was implemented using GIS. To assess impacts on rare plants, a geospatial analysis was conducted using the following four steps:

1. Development of rare plant suitable habitat model,
2. Development of parcel impact extents,

3. Calculation of potential impacts on rare plant suitable habitat, and
4. Calculation of impacts on rare plant species occupied habitat.

2.2.3.1 Development of Rare Plant Suitable Habitat Model

The rare plant suitable habitat GIS layer was developed in two stages. First, the El Dorado County SSURGO soils GIS dataset (U.S. Department of Agriculture [USDA] Natural Resources Conservation Service [NRCS] 1974) was used to extract all soils classified in the map units listed in Table 2-3.

Table 2-3. Soils Units that Represent Gabbro and Serpentine Soils

Map Unit Name
Argonaut Clay Loam, 3 to 9 Percent Slopes[1]
Rescue Clay, Clayey Variant
Rescue Extremely Stony Sandy Loam, 3 to 50 Percent Slopes, Eroded
Rescue Sandy Loam, 15 to 30 Percent Slopes
Rescue Sandy Loam, 2 to 9 Percent Slopes
Rescue Sandy Loam, 9 to 15 Percent Slopes
Rescue Very Stony Sandy Loam, 15 to 30 Percent Slopes
Rescue Very Stony Sandy Loam, 3 to 15 Percent Slopes
Rescue Very Stony Sandy Loam, 30 to 50 Percent Slopes
Serpentine Rock Land

[1] This soil unit is not reported as being derived from gabbro or serpentine soil, but in the Plan Area it occurs in small drainages immediately downslope from gabbro soils and El Dorado bedstraw occurrences are reported on this particular soil unit.

Second, a combination of soil map units and vegetation cover was analyzed to further refine the gabbro/serpentine soil units that would be potential suitable habitat. The soils in Table 2-3 were intersected with CDFW's California Northern Sierra Nevada Foothills Vegetation Project vegetation land cover GIS dataset (DFG 2011). There was no CDFW vegetation coverage in the Georgetown and Volcano areas, so to address these areas the California Vegetation datasets were used that included vegetation tile 20-05 and vegetation tile 20-00 (USDA Forest Service 2009a, 2009b). Land cover types that do not function as suitable habitat because they are typical of wetland and riparian areas; in agricultural use or developed areas; or streams, lakes, or ponds were excluded from the model (Table 2-4).

Table 2-4. Vegetation Types Excluded from Gabbro/Serpentine Rare Plant Habitat

Vegetation Unit Name
Agriculture, excluding fallow and irrigated pasture
Alnus rhombifolia
Arid west freshwater emergent marsh
Built-up and urban disturbance

Table 2-4. Vegetation Types Excluded from Gabbro/Serpentine Rare Plant Habitat, Cont'd

Vegetation Unit Name
California warm temperate marsh/seep group
Irrigated pasture lands
Juglans hindsii
Perennial stream channel
Populus fremontii
Reservoirs
River and lacustrine flats and streambeds
Salix exigua
Salix laevigata
Salix lasiolepis
Small earthen dam ponds and natural lakes
Undefined areas with little or no vegetation
Urban window
Vernal pools and California annual and perennial grassland matrix

Source: USDA Forest Service 2012

2.2.3.2 Development of Parcel Impact Extents

Planned future development impacts on rare plant suitable habitat were estimated by selecting parcels from the El Dorado County Parcel GIS dataset that spatially overlapped the rare plant suitable habitat GIS layer. The selected parcels were then intersected with the El Dorado County Land Use and Zoning GIS datasets to provide additional information on the development potential of each parcel. A particular parcel's development status and future development potential were identified by a combination of parcel vacancy/development, structural improvements, land use classification and zoning classification data. Frequently on larger parcels (typically greater than 10 acres), individual parcels could have multiple land use classifications and zoning district overlays which, from a land use perspective, divided the parcels into smaller components. These smaller components were designated as sub-parcels for purposes of the impact analysis (see explanation in Section 2.2.1, *Approach to Impacts on Modeled Suitable Habitat*). The assumptions used to assess the development status and future potential development are also described in Section 2.2.1.

2.2.3.3 Calculation of Potential Impacts on Rare Plant Suitable Habitat

To estimate the potential maximum acreage of impact on modeled rare plant suitable habitat resulting from planned future development, the selected parcels that overlapped with habitat were assigned the numerical codes that represent the development status and potential for future development (Table 2-5).

Table 2-5. Parcel Development Types and Associated Codes

Development Type	Development Code
Pine Hill Preserve and other conservation lands	-9999
Open Space and parcels in public/utility ownership[1]	-9999
Existing built-out parcels	-99
Existing development with infill potential	1
Future development on land use/zoning types that allow for future subdivision	10
Future development on land use/zoning types that are assumed will be fully built out	100

[1] In the County Parcel GIS database, the parcels identified with Assessor's Parcel Number (APN) Status of 1, 2, 6, and 11 were included as public and utility ownership, including federal, state, and county lands; PG&E land; existing roads in residential developments; and other similar uses.

Sub-parcels that had been assigned a development code of -9999 or -99 were assumed to have no future development impacts. Sub-parcels assigned a development code of 1 were considered to be existing development but still had development infill potential based on zoning regulations and associated parcel acreage. Parcels less than 5 acres with existing development were assumed to be built out. The acreage of habitat within each sub-parcel was distributed based on the following equation:

Impacts (acres) = ((DU-Existing DU)*GR) * FP *(HP/SP)

Where

DU = total number of potential dwelling units on the sub-parcel
Existing DU = Existing dwelling units on the sub-parcel (assumed to be 1)
GR = 2035 growth ratio
FP= Development footprint acreage per DU (assumed to be 1.5 acres)
HP = Proportion of acreage of modeled suitable habitat or occupied habitat
SP= Sub-parcel acreage

The existing DU (Existing DU) was subtracted from the total number of DUs to calculate impacts resulting from infill potential, because impacts from existing DUs have already occurred.

Sub-parcels assigned a development code of 10 were considered to have future development potential based on land use and zoning descriptions. These sub-parcels do not currently have any development. The acreage of habitat that fell within each sub-parcel was distributed based on the following equation:

Impacts (acres) = (DU*GR) * FP * (HP/SP)

Sub-parcels assigned a development code of 100 were considered to have future development potential based on land use and zoning descriptions. These sub-parcels were assumed to be fully built out in future years, thus future development would completely remove all habitat.

2.2.3.4 Calculation of Potential Impacts on Rare Plant Occupied Habitat

Impacts on rare plant occupied habitat were assessed in the same manner as modeled rare plant suitable habitat. However, instead of using the suitable habitat acreage (HP) in the equations, the acreage of occupied habitat was substituted. Information to identify occupied habitat was compiled for each of the rare plant species from GIS datasets from CNDDB records, Bureau of Land Management plant surveys, and various data compiled by the U.S. Fish and Wildlife Service (USFWS) and provided to the County (for more detail see Section A.2, *Plant Species Ecological Accounts*).

2.3 RESULTS OF THE IMPACT ANALYSIS

2.3.1 Potential Impacts on Modeled Suitable Habitat

Potential future maximum impacts on modeled suitable habitat by soil type are the same for each of the eight rare plant species because a composite habitat model was used to represent suitable habitat for all of the species (Table 2-6).

Table 2-6. Potential Future Impacts on Rare Plant Suitable Habitat and Amount of Habitat in Protected Status

Type of Suitable Habitat	Total Existing Suitable Habitat (acres)	Habitat Within Existing Protected Lands (acres)	Habitat Not within Protected Lands (acres)	Potential Future Impacts (acres) [1]	Percent Potential Impact on Total Habitat
Gabbro habitat	18,297	4,614	13,683	1,662	9.1
Serpentine habitat	16,017	43	15,974	648	4.0
Total habitat	**34,314**	**4,657**	**29,657**	**2,310**	**6.7**

[1] Assuming an impact footprint of 1.5 acres per DU.

Impacts identified in Table 2-6 for gabbro habitat (1,662 acres) reflect potential future impacts on rare plants that appear to be wholly or mostly restricted to gabbro habitat in El Dorado County. These species are Stebbins' morning-glory, El Dorado bedstraw, Pine Hill ceanothus, Pine Hill flannelbush, El Dorado mule-ears, and Bisbee Peak rush-rose. Impacts identified in Table 2-6 for the total habitat (both gabbro and serpentine habitat) (2,310 acres) reflect potential future impacts on rare plants that are frequently found on both gabbro and serpentine habitat in El Dorado County. These species are Layne's butterweed and Red Hills soaproot.

2.3.2 Potential Impacts to Known Occupied Habitat

Potential impacts on known occupied habitat are provided in Table 2-7.

Table 2-7. Potential Future Impacts on Known Occupied Habitat by Species

Species	Total Known Occupied Habitat (acres)	Potential Future Impacts on Known Occupied Habitat (acres)[1]	Percent Potential Impact on Total Habitat
Stebbins' morning-glory	962	62.8	6.5
El Dorado bedstraw	636	138.0	21.7
Pine Hill ceanothus	1,902	117.4	6.2
Pine Hill flannelbush	248	5.1	2.1
Layne's butterweed	1,530	103.9	6.8
Red Hills soaproot	579	100.2	17.3
El Dorado mule-ears	2,142	133.9	6.3
Bisbee Peak rush-rose	784	109.0	13.9

[1] Assuming an impact footprint of 1.5 acres per DU.

2.4 DISCUSSION OF RESULTS

The results of this analysis indicate that future development in El Dorado County as projected in the *EDCGP* (2004 with 2009 amendments) and estimated through 2035 would result in the removal of approximately 2,310 acres of potentially suitable habitat for the eight rare plant species, assuming 1.5 acres of impact per DU (Table 2-6). Impacts on known occupied habitat are over 100 acres each for six of the eight species and 62.8 acres for the state-listed endangered Stebbins' morning-glory (Table 2-7). These impact estimates are likely high as the assumptions used in the analysis likely over estimate the extent of occupied and suitable habitat. In addition the build-out scenario assumes a higher amount of removal of habitat for development of each parcel than is likely to result.

It is not clear if a sufficient portion of the remaining area (currently unprotected habitat not affected by potential future development) within the modeled suitable habitat (Table 2-6) is of suitable quality, patch size, and distribution to be used as part of a mitigation program designed to offset impacts of future development on the rare plants. Much of this remaining 27,347 acres (29,657 existing acres less 2,310 acres of impact) of modeled gabbro and serpentine habitat is on parcels with existing development or on relatively small parcels (less than 10 acres) which may not be available or suitable for use in mitigation. Ledios will develop a mitigation plan to determine the extent of suitable mitigation lands available and the extent of habitat mitigation necessary to address these impacts. More evaluation is necessary before any conclusions can be reached.

CHAPTER 3. REFERENCES

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APPENDIX A
BIOLOGICAL BACKGROUND INFORMATION

APPENDIX A. BIOLOGICAL BACKGROUND INFORMATION

A.1 GEOLOGY, SOILS, AND FIRE DISTURBANCE–DRIVEN PLANT COMMUNITIES

A.1.1 Geology and Soils

The plant communities in which the eight rare plant species are found are generally restricted to soils that have developed over specific geological formations. In particular, they are generally found on either gabbro or serpentinite geological formations, although some of the species are also found on soils developed from various types of metamorphic rock. Except for the Pine Hill intrusive complex, gabbro in the Sierra Nevada foothills is rare (Springer 1980, 1989; Alexander et al. 2007). Gabbro has a variable chemical composition and the Pine Hill intrusive complex is a spatially layered heterogeneous mixture (imagine an onion on its side cut in half from leaves to roots) and in some areas has been significantly thermally altered. Unaltered and altered gabbro weather differently and therefore form slightly different soils. Additionally, the Pine Hill intrusive complex lies between two north-to-south trending ribbons of ultramafic serpentinized rock. The serpentinized rock along the west wall of the complex was metamorphosed by the heat of the intrusive complex while the ribbon lying to the east was not (Springer 1980, 1989). Serpentinite geological formations are not extensive in the Sierra Nevada and run sporadically from Tulare County to El Dorado County as a single ribbon, diverging at the southern end of the Pine Hill intrusive complex into two sporadic bands (lower elevation and higher elevation) that continue northward to Plumas and Butte counties. Serpentinite north of those counties is part of the Cascade Range (Alexander et al. 2007).

Soils derived from serpentinite and other similar minerals are known for their infertility, which is thought to be due to a low ratio of calcium to magnesium (Alexander et al. 2007). Similarly, soils developed from gabbro are known to be very infertile (Alexander et al. 2007). Gabbro soils appear to be infertile because of their low phosphorous and high iron contents, as no other causes are readily apparent (Hunter and Horenstein 1992). Additionally, gabbro soils tend to be coarse-textured, which limits their water-holding capacity (Hunter and Horenstein 1992; Alexander 1993, 2008). Alexander (2008) sampled three sites with three different vegetation types in the immediate vicinity of Pine Hill and found that 1) all had loamy surface textures with the first two being very stony, 2) all three had clay loams immediately above bedrock, and 3) the chaparral site dominated by re-sprouting species (explained below) had a thick organic soil horizon and abundant surface organic matter.

Alexander (1993) explains that gabbro soil texture is finer than that of granite because gabbro lacks biotite. Gabbro soils are more friable and less erodible because of their high iron content and dispersed humus. The high iron content also prevents phosphorus from being available to

plants, resulting in low fertility. The nutrient balance is only slightly less favorable than that of other igneous rocks such as diorite, and much better than serpentine (Alexander 1993).

The effects of infertile gabbro soils are most apparent where wet season precipitation is low (10–20 inches) and plants growing on gabbro under those conditions appear stunted compared to other rock types (Oberbauer 1993).

A.1.2 Black Oak Woodland Vegetation and Ecological Factors

Black oak woodland vegetation (with associated chaparral shrub species) is generally found in the Plan Area on north-facing slopes and in shallow drainages (Griffin 1988, Stephens 1997, Wilson et al. 2009). This vegetation type has been formally described as the "*Quercus kelloggii/ Pinus ponderosa/ Arctostaphylos viscida* association" (Klein et al. 2007). This vegetation type is determined by fire return interval which from 1850 to 1952 averaged eight years in areas adjacent to oak woodlands with nearly continuous grass fuel continuity (Stephens 1997). The fire patterns since fire suppression began in the 1950s have shifted from frequent low- to mid-intensity fires to infrequent high-intensity fires (Stephens 1997). This change has fundamentally altered pyrodiversity (intensity, frequency, seasonality, and patchiness of fire events) (Stephens 1997), and the structure and species composition of black oak woodlands are changing in response to the altered fire dynamics.

A.1.3 Chaparral Vegetation and Ecological Factors

General

The chaparral vegetation of southern California has been studied for over 100 years and intensively studied for the last 40 years. Unfortunately, those studies are not directly applicable to the chaparral in El Dorado County because of its substantially lower soil productivity that significantly affects fire dynamics, the dominant disturbance regime of chaparral vegetation. Pyrodiversity and its resultant effects on vegetation are dependent on climate, weather patterns, fuel loads, and fuel distribution. Fuel loads and fuel distribution are dependent on soil characteristics, plant species characteristics, the responses of the plant species to soil characteristics, and weather patterns. Following a fire event there are a number of different vegetative outcomes (seral stages) that can occur as post-fire vegetation reestablishes. Each potential outcome is the result of pre-fire conditions, conditions during the fire, and post-fire conditions; and the combined effects of all of those factors vary spatially across a landscape at different scales, adding another level of complexity.

The fact that the general pattern of chaparral response to fire in southern California is dependent on soil fertility has only been very recently acknowledged. Keeley et al. (2008) found that fire severity across 250 sites in southern California after the extensive 2003 fire season was not correlated with any site environmental parameters except soil texture (sand content) and soil fertility (total nitrogen and phosphorus). The sites spanned sedimentary, granitic, gabbroic, and

volcanic geology. As noted in Section A.1.1, *Geology and Soils*, gabbro and volcanic rock weather to finer texture soils and gabbro is low in phosphorus. Vegetation cover in the first year (biomass) was weakly correlated with fire intensity but more strongly correlated with elevation and substrate (soil texture) (Keeley et al. 2008). Essentially, Keeley et al. (2008) found that vegetation on infertile soils burned differently and recovered differently than vegetation growing on more fertile soils, and did not fit the general pattern described for southern California chaparral. There is only one study (Safford and Harrison 2004, 2008) comparing chaparral growing on low-fertility soil (serpentine) and higher-fertility soils (sandstone) that describes some of the vegetation differences driven by soil fertility differences, and their findings are discussed in the *Infertile Soils* section below.

Fire

Fires, under natural conditions in southern California chaparral, occur predominately during Santa Ana foehn winds[6] in the autumn, are of large extent, are stand-replacing, and do not produce a fine-grain age patch vegetation structure (Keeley and Zedler 2008, Keeley et al. 2012). The initial flame front passes rather quickly and may be patchily distributed, but secondary ignitions from downed burning branches create a hot surface fire that burns and smolders for hours afterwards (Odion and Davis 2000). In essence, the flame front flash-burns the leaves and twigs and heats the whole area rather uniformly but briefly. The ignited larger branches of the shrubs soon fall to the ground, and the piles of downed coarser fuels that are spatially distributed under pre-fire shrubs create a patchwork of superheated soil that determines the post-fire pattern of survival of plants that can re-sprout from underground tissues and the survival and germination responses of seeds lying dormant in the soil seed bank.

These types of fires are not expected in the gabbro chaparral of El Dorado County under historical fire regime as discussed in the *Infertile Soils* section below. However, it is unclear how 60 years of fire suppression has altered the historical fire regime and how a return to that historical fire regime can be accomplished.

Plant Species' Responses to Fire

While all plant species in chaparral vegetation ultimately originate from seed, there are a number of different responses to fire. Some species persist for very long periods, perhaps centuries, by re-sprouting, and only very infrequently establish from seed during the long intervals between fires; other species persist only as dormant seed during the long intervals between fires, and many species are some complex combination of those two endpoints (Keeley et al. 2006, Keeley and Davis 2007, Keeley et al. 2012). Two types of chaparral have been recognized: sprouting chaparral (mesic) and seeding chaparral (xeric) (Wilson et al. 2009; Gogol-Prokurat 2009, 2011).

Odion and Davis (2000) have conducted the most precise study of the effects of fine-scale fire heterogeneity on chaparral vegetation. They found that there are three factors that control the

[6] Foehn winds are warm, dry winds that flow down mountain slopes and create critical fire-weather conditions.

location and densities of seedlings after a fire: 1) fire intensity (primary and secondary), 2) seed dispersal, and 3) seed burial depth. Their primary finding was that the pattern of heating due to secondary heating (smoldering branches that had fallen to the ground after the initial flame front passed) determined the spatial distribution of surviving seed and re-sprouting tissue regardless of their pre-burn distribution.

In their survey of the chaparral literature, Keeley and Davis (2007) concluded that populations of post-fire obligate seeders are at risk of extirpation from short fire return intervals, because they have insufficient time to establish a soil seed bank of a large enough size to persist during the high-seedling-mortality period and replace the population of adults that were present on the site. Post-fire seeding *Ceanothus* species appear to require fire return intervals of at least 20 years while post-fire seeding *Arctostaphylos* species require return intervals of much greater than 20 years. Post-fire sprouting species such as species of *Heteromeles*, *Rhamnus*, and *Cercocarpus* produce only short-lived seed and when fire occurs there is essentially no seedling recruitment; these species persist through re-sprouting and sporadic seedling recruitment during fire-free intervals (Keeley and Davis 2007).

The chaparral vegetation in the Plan Area generally falls into two categories: post-fire sprouters on north aspects and in drainages, and post-fire seeders elsewhere (Wilson et al. 2009; Gogol-Prokurat 2009, 2011). These categories are defined by the dominant shrubs in each vegetation type but the subdominant species, such as all of the rare plant species, tend to be complex combinations of the two endpoints. Additionally, there is no clear demarcation between sprouting and seeding syndromes (Keeley and Zedler 2008, Keeley et al. 2012). Finally, as discussed in *Infertile Soils*, the response of the vegetation and species on infertile soils is different from the general patterns described for southern California and the dynamics of the seral stages are largely unknown.

Herbivory

Species in the genus *Ceanothus* appear to be especially susceptible to herbivory at the seed and seedling stages compared to other species such as chamise (Mills 1986). O'Neil and Parker (2005) found that *Ceanothus* seed banks are dynamic, and high levels of post-dispersal seed predation and reduced seed viability with age keep seed numbers in the seed bank relatively constant instead of increasing through time. Some of the seed predation is likely due to selective harvesting by harvester ants (*Pogonomyrmex subnitidus*) (Zammit and Zedler 1988).

Soil Depth, Bedrock, and Rooting Patterns

Sprouting species in multiple genera (*Archtostaphylos*, *Ceanothus*, *Heteromeles*, and *Quercus*) and species that combine sprouting and seeding (*Adenostoma*) root extensively in the soil as well as deeply into fractured rock. In contrast, seeding species (*Archtostaphylos* and *Ceanothus*) produce only extensive and shallow roots in the soil that do not root into fractures in rock (Hellmers et al. 1955).

Frost Heave

Frost heave–caused mortality of chaparral seedlings has the potential to greatly alter the post-fire vegetation dynamics and is much more pronounced on burned sites and areas without shrub cover. In an early study of frost heave effects in areas of chaparral in the Kern River watershed (cleared and bare, cleared and grass, and undisturbed), it was found that bare soil froze at air temperatures of 31 degrees Fahrenheit (°F), grass-covered soils at 29°F, and the authors estimated that shrub-covered soils would freeze at 14°F, as the soil did not freeze under shrubs during the period of the study (Anderson 1947). In another early study, south aspects suffered frost heaving more than other aspects and seedlings in the cotyledon stage were more vulnerable than seedlings in the two-leaf stage (Biswell et al. 1953). Chamise germinated earlier and seedling survival was 14 percent by February 6 on a northeast exposure. *Ceanothus* began germinating on February 6 and by March 28, survival was 23 percent. Overall, of the approximately 230 seedlings followed, only seven survived to the end of the frost period on March 28 for a survival rate of approximately 5 percent, and those plants survived through June 25. On a southeast aspect both species suffered approximately equally; there was a 57 percent survival through March 28 and survival declined to 25 percent by June 25. In the following season survival was 39 percent on the south aspect and 19 percent averaged across the other aspects (Biswell et al. 1953).

The Plan Area is in California Climate Zone 9 (University of California Cooperative Extension [UCCE] 1989), with typical winter lows between 26°F and 35°F and extreme cold snaps between 0°F and 18°F. Snow cover is very infrequent and of very short duration, and the coldest low temperatures occur on clear, cloudless nights. Because the majority of the rare plants establish seedlings during the first post-fire winter, they will experience the most severe frost heave conditions and seedlings will likely suffer significant mortality.

Infertile Soils

Chaparral species growing on highly infertile gabbro soils are likely to have experienced a very different fire regime because growth rates and fuel structure ultimately determine the intensity, frequency, and patchiness of fire disturbances. In effect, low-productivity chaparral is likely to be a higher-light environment (i.e., have more open canopy) with fewer fast-growing, short-lived species than in higher-productivity chaparral. This is exactly what Safford and Harrison (2004, 2009) found in serpentine chaparral. In their study, pre-fire shrub cover was higher on non-serpentine and more spatially heterogeneous on serpentine soil. The mean time to the last fire was much greater on serpentine (74 years versus 19 years) and fire severity was much less on serpentine. Post-fire recovery of serpentine shrub biomass was 18 percent of that of non-serpentine. The contribution of post-fire seeder species to pre-fire shrub cover was more than twice as high in serpentine. The best explanation for the difference in fire response between serpentine and non-serpentine chaparral is that lower soil fertility leads to more open vegetation and lesser release from above-ground competition following fire. Annual forbs were sparsely present on serpentine before it burned but were not present as adults on pre-burn non-serpentine.

Ceanothus species, whose seeds required fire to germinate on non-serpentine soils, were able to maintain low but constant levels of recruitment on serpentine soils. Non-serpentine chaparral also recovered most of its pre-fire biomass in three years, but serpentine biomass recovered very slowly (Safford and Harrison 2004, 2008).

The patterns that Safford and Harrison (2004, 2008) observed for serpentine chaparral appear to apply to the gabbro soils chaparral of the Plan Area. Boyd (2007) found that chaparral that had been cut for fuel breaks in 1969 had not recovered enough to burn by 1984 (15 years) (Boyd 2007). Burge and Manos (2011) found that Pine Hill ceanothus occurs on the less fertile soils of the slopes, while the closely related but widely distributed buckbrush (*Ceanothus cuneatus* var. *cuneatus*) occurs in more fertile gabbro soils and (possibly more mesic) soils at the bottom of slopes (Burge and Manos 2011).

Safford and Harrison (2004, 2008) found a mean fire return interval for serpentine chaparral of 74 years, which from anecdotal evidence appears to be similar to chaparral in the Plan Area that has recently burned. Long fire return intervals were probably the natural condition of chaparral as Keeley et al. (2005) found that fire return intervals of mature stands in the Sierra Nevada are at least 50–60 years and that fire return intervals of at least 92 years do not appreciably change the species diversity of post-fire seeding *Ceanothus*. The finding of Stephens (1997) that the black oak woodland in the Plan Area experienced a mean fire return interval of eight years between 1850 and 1952 suggests that both soil infertility and spatial heterogeneity control the fire return intervals in the chaparral, and that the pyrodiversity Stephens described has shifted from frequent low- to mid-intensity fires to infrequent high-intensity fires (Stephens 1997). If this is the case for the gabbro chaparral as well, then gabbro chaparral under historical fire regimes likely had a fine-grain age patch structure, which is very different from the processes in southern California chaparral (Keeley and Zedler 2008, Keeley et al. 2012).

A.2 PLANT SPECIES ECOLOGICAL ACCOUNTS

A.2.1 Stebbins' Morning-Glory

Description

Stebbins' morning-glory (*Calystegia stebbinsii*) is a trailing or climbing (less than 1 meter) herbaceous perennial from a rhizome or woody caudex with creamy yellow flowers that are produced from April through July (Jepson Flora Project 2012).

Distribution

Stebbins' morning-glory occurs on the gabbro soils in the Pine Hill area in both chaparral types (Gogol-Prokurat 2009, 2011) and on serpentine soils in Nevada County (California Department of Fish and Game [DFG] 2012). See Figure A-1 for its distribution in the Plan Area.

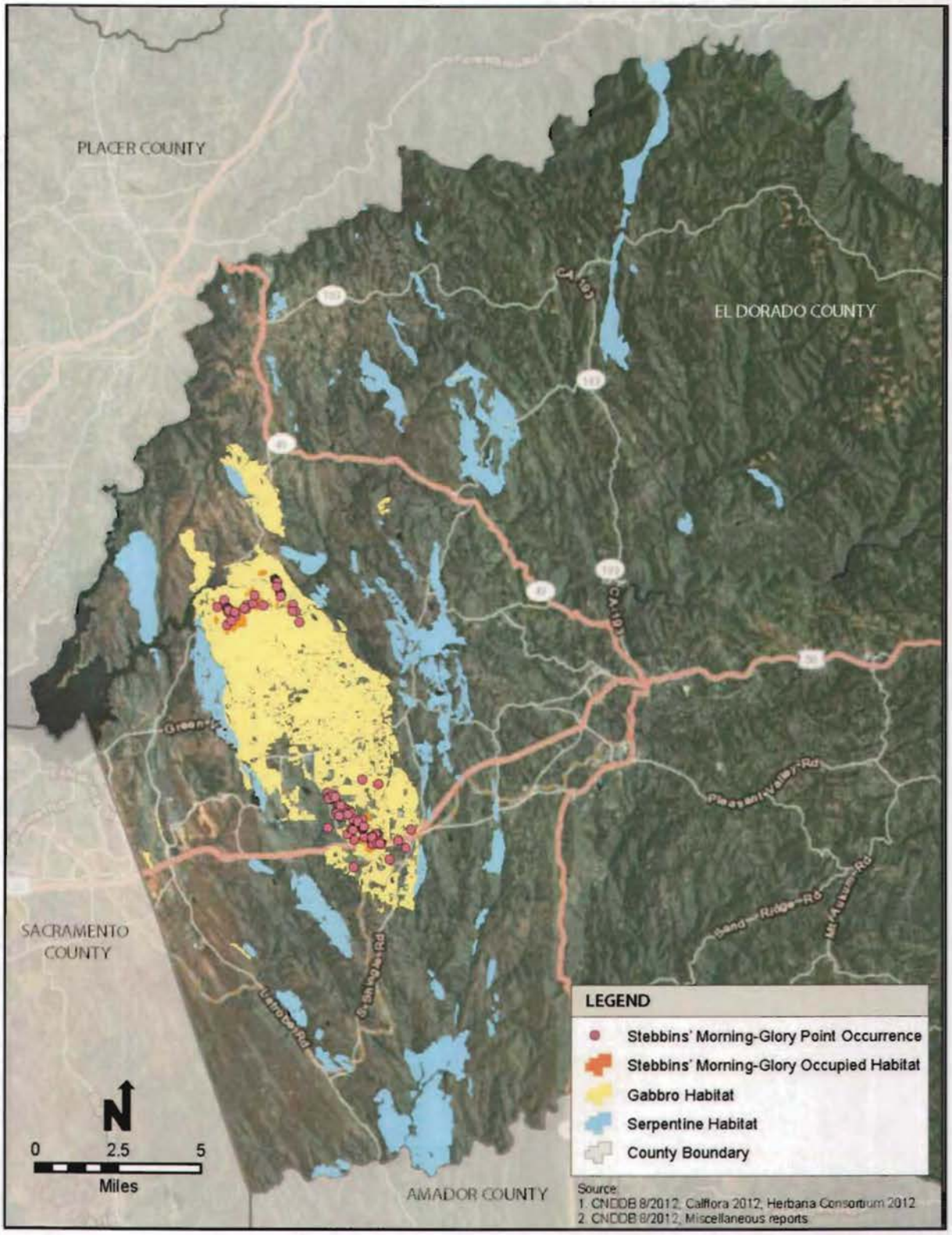

Figure A-1. Stebbins' Morning-Glory Recorded Occurrences and Occupied Habitat within the Plan Area

Demography and Ecology

Nosal (1997) conducted studies of Stebbins' morning-glory in which data were collected on the number of flowering plants, number of non-flowering plants, number of stems per flowering plant, and number of seed capsules produced on stems within each plot sampled. Seed production ranged from an average of 20.6 seeds per square meter (m^2) at Grass Valley to 380 seeds/m^2 at Salmon Falls. Plant density ranged from an average of 1.09 plants/m^2 at Grass Valley to 12.1 plants/m^2 at Salmon Falls. The average number of stems per plant ranged from 1.59 to 2.07. Recruitment (the number of non-flowering plants) varied from 0.038 plants/m^2 per year at Grass Valley to 0.97 plants/m^2 per year at Shingle Springs (Nosal 1997). Nosal also found that Stebbins' morning-glory seed germinated readily only after either scarification or heat treatments.

Ayers (2011) also studied Stebbins' morning-glory and found that while it was not present as vegetative plants in Salmon Falls Site C and Salmon Falls Site D prior to burning, but post-fire seedling densities the first spring were 25 seedlings/m^2. Ayers found that 75 percent of the seedlings had died by the end of the second spring, and by 2006 plant densities had dropped to about 0.02 plants/m^2. In the third year, the surviving plants began spreading vegetatively and over half the surviving plants were flowering (Ayers 2011).

In studies in southern California, Keeley (2007) found that native perennials such as morning glory (*Calystegia macrostegia*), deer weed (*Lotus scoparius*), and rock rose (*Helianthemum scoparium*) are widespread in the early seral post-fire stage of chaparral (Keeley 2007). This suggests that Stebbins' morning-glory may also be an early seral post-fire specialist and persist at a site through a long-lived dormant seed bank.

A similar species, serpentine hillside morning-glory (*Calystegia collina*) has a sporophytic self-incompatibility breeding system with few mating-type alleles.[7] In that study, the availability of pollinators was not responsible for seed set differences between large and small populations (Wolf et al. 2000). Instead, it was likely that the availability of genetically compatible pollen (mating-type alleles) was more important and it was independent of other measures of genetic diversity. The abundance of other populations of serpentine hillside morning-glory within the foraging distance of its pollinators appeared to be more important (Wolf et al. 2000). The combination of a population structure that persists primarily as a dormant seed bank, the self-incompatibility, and variable pollinator identity and behavior in response to vegetation changes will lead to complex pollination and seed production dynamics (Essenberg 2012a, 2012b) in both serpentine hillside morning-glory and Stebbins' morning-glory. Nosal observed that Stebbins' morning-glory is pollinated by insects and that 80 percent of visits were made by Hymenoptera (bees and wasps) with the Halictidae (solitary bees) and the Apidae (honey bees and bumble bees) being the most important families (Nosal 1997). Additionally, Gogol-Prokurat

[7] In sporophytic self-incompatibility, if the pollen grain (male tissue) is genetically incompatible (allele type) with the pistil (female tissue), the pollen grain cannot grow and fertilize an ovule (egg), so no seed is produced.

found that seed set in Stebbins' morning-glory pollen was limited in small populations (Gogol-Prokurat 2009, 2011).

A.2.2 El Dorado Bedstraw

Description

El Dorado bedstraw (*Galium californicum* ssp. *sierra*) is a small, perennial herbaceous plant (7–14 centimeters [cm]) with weak, slender, and cushion-like to weakly tufted non-woody stems (Jepson Flora Project 2012). The species is dioecious (separate male and female plants), produces very small, yellowish flowers in May and June, and its seed are contained in tiny berries (Hickman 1993, Soza and Olmstead 2010, Calflora 2012).

Distribution

El Dorado bedstraw is endemic to El Dorado County in the immediate vicinity of the Pine Hills gabbro soils area and is found in black oak woodland and in the transition from black oak woodland to obligate sprouting chaparral (Wilson et al. 2009, DFG 2012). See Figure A-2 for its distribution in the Plan Area.

Demography and Ecology

Very little is known about El Dorado bedstraw. In general, the small, fragrant flowers of the genus *Galium* are pollinated by a variety of butterflies, moths, beetles, flies, ants, wasps, and short- or long-tongued bees (Batra 1984). The tiny berries are most likely eaten by small animals (possibly lizards or rodents), which function as seed dispersal agents (Soza and Olmstead 2010). Dispersal of fleshy fruit-like berries by animals can target patches of isolated habitat very effectively, but the distance and rates of dispersal depend on the movement and dispersal patterns of the animals (Matlack 1994).

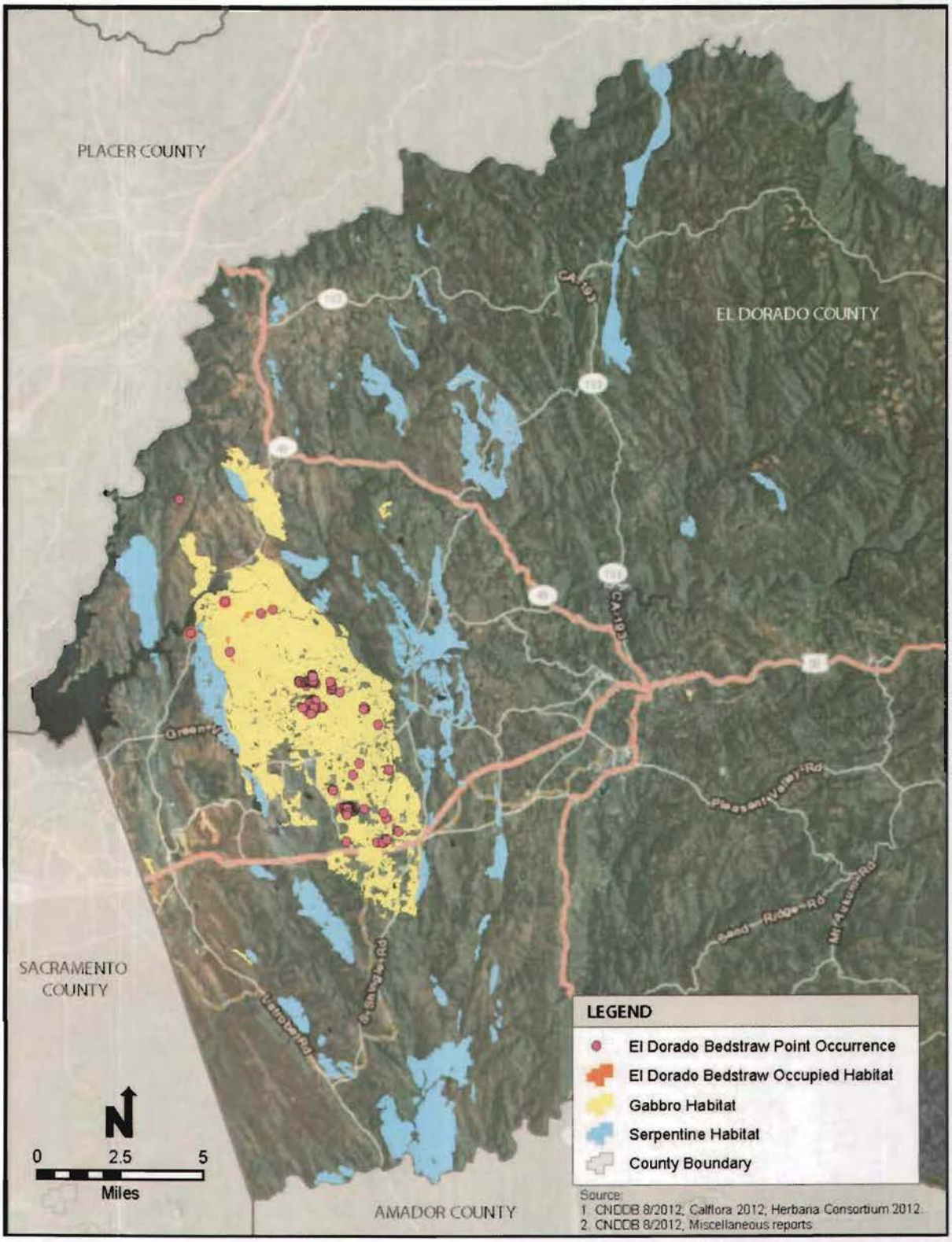

Figure A-2. El Dorado Bedstraw Recorded Occurrences and Occupied Habitat within the Plan Area

A.2.3 Pine Hill Ceanothus

Description

Pine Hill ceanothus (*Ceanothus roderickii*) is a small (less than 0.5 meter tall) mat- to mound-like shrub with spreading (to 3 meters), arched branches that often root where their tips touch the soil (Jepson Flora Project 2012). Its white flowers are tinged with blue and are produced from April through June (Jepson Flora Project 2012).

Distribution

Pine Hill ceanothus has only been reported from the gabbro soils in the Pine Hill area and it occurs in both types of chaparral (Wilson et al. 2007; Gogol-Prokurat 2009, 2011; DFG 2012). Pine Hill ceanothus and the closely related but widely distributed buckbrush (*Ceanothus cuneatus* var. *cuneatus*) both occur on gabbro soils in the Pine Hill area, but buckbrush occurs in more fertile (and possibly more mesic) soils at the bottom of slopes while Pine Hill ceanothus occurs on the less fertile soils of the slopes (Burge and Manos 2011). See Figure A-3 for its distribution in the Plan Area.

Demography and Ecology

Boyd (2007) conducted burn experiments on Pine Hill in a stand of chaparral that had been cut for fuel breaks in 1969 and had not recovered enough to burn by 1984 (15 years). There wasn't sufficient fuel on the site to carry a burn, so cut branches from other sites were piled 0.75 meter deep on the 2-meter-by-2-meter plots and ignited. Boyd cites Odion and Davis (2000) as finding that fire causes seed death but does not mention that his burning method was exactly the type of burn Odion and Davis (2000) described as causing the highest seed mortality. For this reason, it is likely that Boyd's reported post-burn seedling numbers do not reflect natural fire responses.

Insect herbivory caused high seedling mortality but clonal spread through stem layering (beginning four years post-burn) increased the number of individuals in the plots after the post-fire flush of seedlings had died (Boyd 2007). Flowering began in the plots six years after the burn.

Ayers' 2011 study found that Pine Hill ceanothus was present at low density on all sites before fire and suffered complete mortality from the burns. Seedlings germinated during the wet season after the burn and suffered high mortality (3–7/m^2 as Boyd found) during the first year. At the Salmon Falls site, all seedlings were dead by the end of the second post-fire season. Pine Hill ceanothus cover increased gradually over time through branch layering. Approximately 7 percent of the branches were flowering eight years after the burns. Ayers (2011) noted that plants growing under a mature canopy of tall chaparral flower sparsely. Seed germination required heat and cold stratification although 5 percent of the seed germinated without the heat treatment (Ayers 2011).

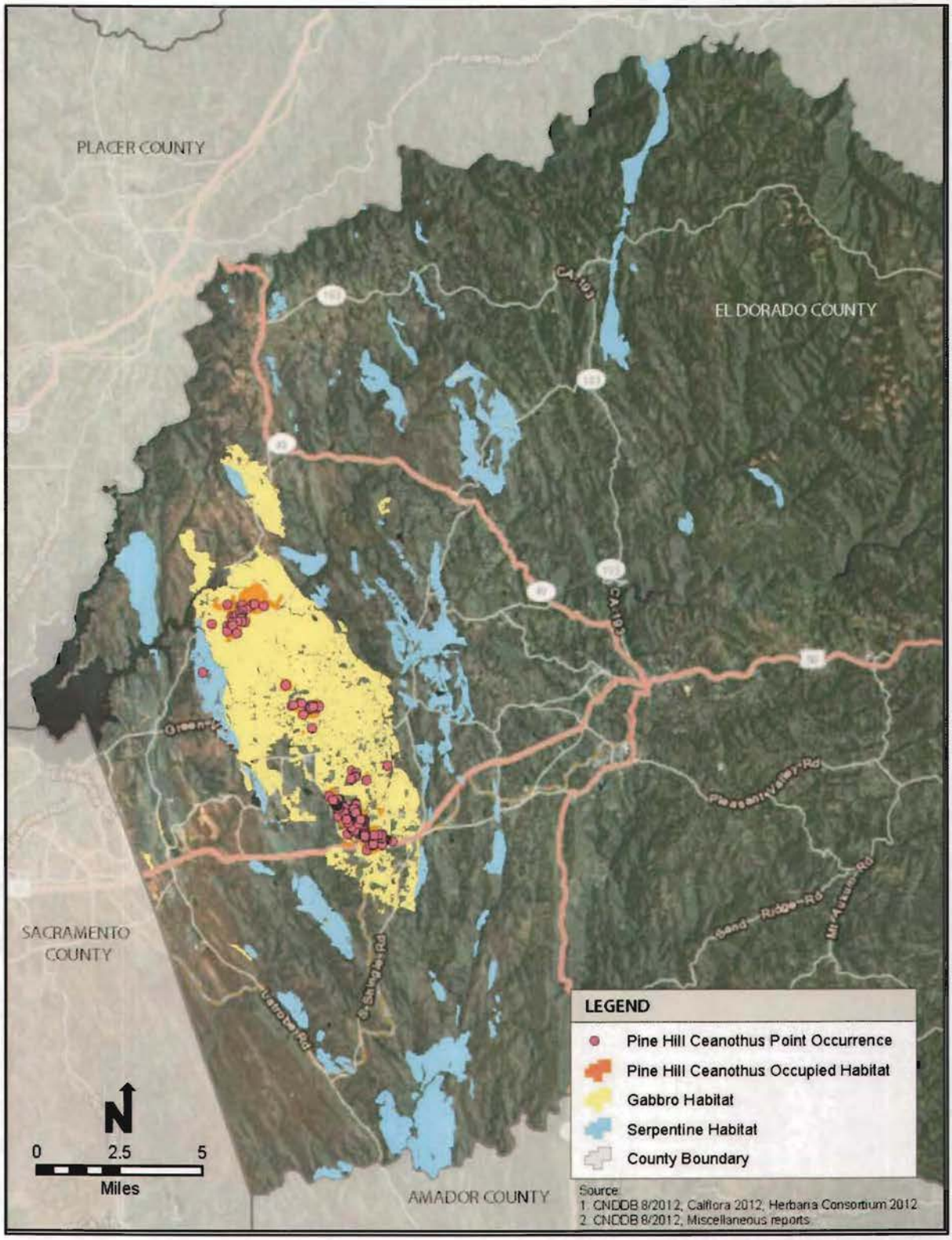

Figure A-3. Pine Hill Ceanothus Recorded Occurrences and Occupied Habitat within the Plan Area

In a germination experiment, seeds treated with a combination of heat and cold had the best germination rate (86.6 percent germination) while seeds treated only with cold had a 20 percent germination rate (James 1996). One-year-old seeds germinated at a rate significantly lower than two-year-old seeds (James 1996). Species in the genus *Ceanothus* produce explosive seed capsules that shoot seeds several feet from the parent shrub as the capsules dry and rupture (Keeley and Davis 2007).

Species in the genus *Ceanothus* are generally self-incompatible (Raven 1973), but plant breeding systems of self-incompatible species are not necessarily constant and respond to a number of factors, including flower age and environmental conditions (Richards 1997, Karron et al. 2012). The pollination of Pine Hill ceanothus is primarily by flies, gnats, bees, and wasps that were not specific to Pine Hill ceanothus and were observed visiting other plants (James 1996).

A.2.4 Pine Hill Flannelbush

Description

Pine Hill flannelbush (*Fremontodendron decumbens*) is a decumbent to upright shrub (less than 2 meters) with coppery-orange flowers that are produced from April to July and which produce seed with an orange appendage (elaiosome) that is attractive to harvester ants (Boyd and Serafini 1992, Boyd 2001, Jepson Flora Project 2012).

Distribution

Pine Hill flannelbush occurs on the gabbro soils of Pine Hill and adjacent areas and on lower elevation serpentine soil in Nevada County (CCH 2012, DFG 2012). (See Alexander et al. 2007 for a description of the Sierra Motherlode serpentine belt.) See Figure A-4 for its distribution in the Plan Area.

Demography and Ecology

In 1982, Boyd and Serafini (1992) conducted a demographic study of Pine Hill flannelbush in a 70-meter-wide swath that was cut through the population in 1969 for a fire break across the ridges. They found that moth larvae attack flower buds, flowers, and fruits. Only 1.8 percent of flower buds survived to produce seeds and 90 percent of the seeds produced were eaten by rodents. Insects killed most of the seedlings and water stress apparently killed the seedlings that the insects and rodents did not kill. The plants that had been cut when the fire break was made produced root sprouts at various distances from the adults (Boyd and Serafini 1992).

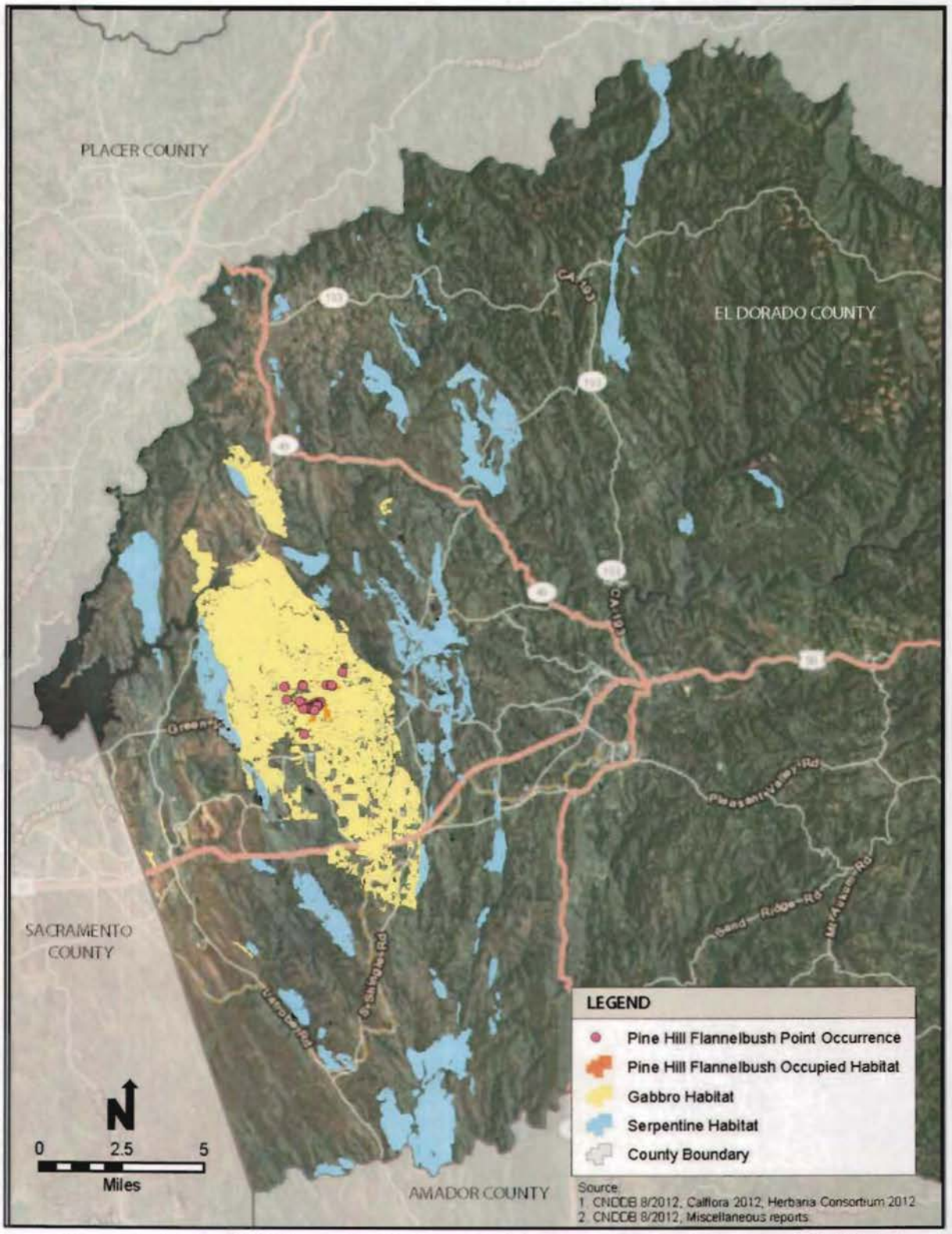

Figure A-4. Pine Hill Flannelbush Recorded Occurrences and Occupied Habitat within the Plan Area

Harvester ants (*Messor andrei*) are attracted to elaiosomes of seeds and disperse seed to their nests where they remove the elaiosomes and discard the seed. Boyd (1996) found that the ants do not affect germination rates and seeds at nests are subjected to higher levels of herbivory by rodents. Only heat and cold stratification were necessary to cue germination in the field despite laboratory tests that indicated that smoke was also required (Boyd and Serafini 1992).

Boyd did not test for breeding system type but found that pollen transfer by insects is required for seed set (Boyd 1994). Primary pollinator was *Tetralonia stretchii*, a native, solitary, ground-nesting bee (Boyd 1994).

A.2.5 Layne's Butterweed

Description

Layne's butterweed (*Packera layneae*) is a herbaceous perennial with stout, erect stems (40–70 cm) from a taproot (Jepson Flora Project 2012). It produces yellow flowers from April to August (Calflora 2012).

Distribution

Occurrences are sporadic but widespread in the central and northern Sierra Nevada foothills on the gabbro soils of the Pine Hills area and on lower elevation serpentine soils of Butte, El Dorado, Placer, Tuolumne, and Yuba counties in the Motherlode serpentine belt (Alexander et al. 2007, CCH 2012, DFG 2012). See Figure A-5 for its distribution in the Plan Area.

Demography and Ecology

Reported occurrences of Layne's butterweed vary from 10 to over 1,000 individuals (DFG 2012). It is restricted to chaparral and adjacent open woodlands (DFG 2012, Calflora 2012) and has been reported from both sprouting and seeding chaparral (Klein et al. 2007; Wilson et al. 2007; Gogol-Prokurat 2009, 2011). A related species, Gander's Ragwort (*Packera gander*), is a rare gabbro endemic species (Alexander et al. 2007, DFG 2012) from San Diego County that Keeley found to be growing (with a cover of 25 percent) and flowering beneath a mature chaparral canopy (Keeley 1974).

Layne's butterweed is insect-pollinated (Marsh 2000, Marsh and Ayers 2002).

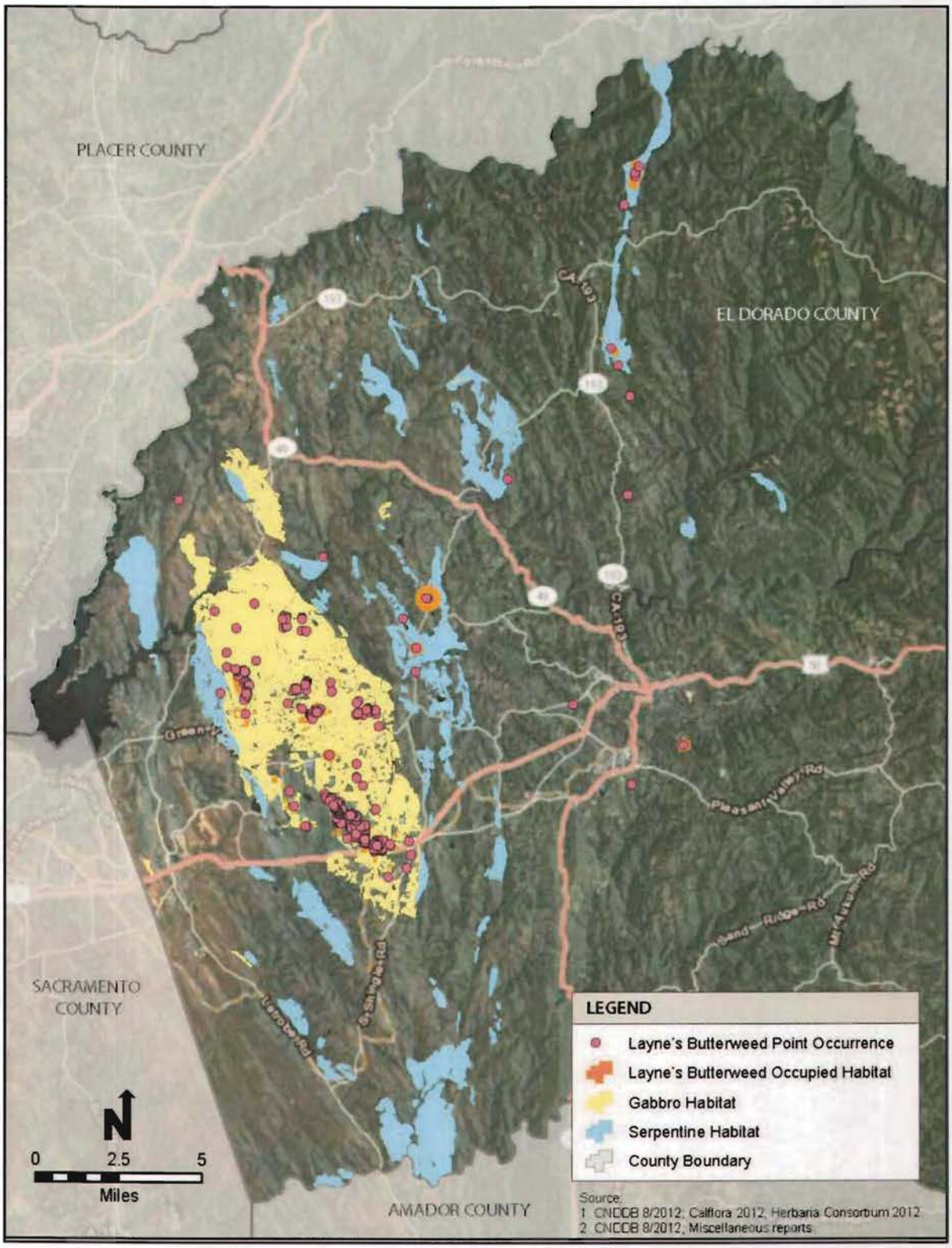

Figure A-5. Layne's Butterweed Recorded Occurrences and Occupied Habitat within the Plan Area

A.2.6 Red Hills Soaproot

Description

Red Hills soaproot (*Chlorogalum grandiflorum*) is a herbaceous perennial from a large bulb (5–7 cm) that produces a tall (1 meter) flowering stalk with white flowers that open in the evening from May to June (Jepson Flora Project 2012).

Distribution

Red Hills soaproot is widely distributed on soils derived from gabbro, serpentinite, mixed metamorphic rocks, and Tuscan lahars from Butte, Placer, El Dorado, Amador, Calaveras, and Tuolumne counties; and it occurs in chaparral, blue oak woodlands, mixed conifer forests and canyon live oak forests (DFG 2012). See Figure A-6 for its distribution in the Plan Area.

Demography and Ecology

Reported occurrences vary from 10 to over 1,000 individuals (DFG 2012). Red Hills soaproot has not been studied but is morphologically similar to common soap plant (*Chlorogalum pomeridianum*), which has been studied in chaparral vegetation in southern California. Soap plant only flowers in gaps in mature chaparral or in post-fire chaparral and produces non-dormant seed. All soap plant seeds germinate or are eaten by seed predators within the first two wet seasons, and to a lesser extent the third, post-fire.

The plants then persist and grow under the canopy until the next fire which may be at least 30 to 70 years (Tyler and Borchert 2007). In southern California, when herbaceous perennials similar to Red Hills soaproot flower beneath the chaparral canopy, they are subjected to intense herbivory (Keeley et al. 1981).

Because the flowers of Red Hills soaproot open at night (Jepson Flora Project 2012), they are likely moth-pollinated.

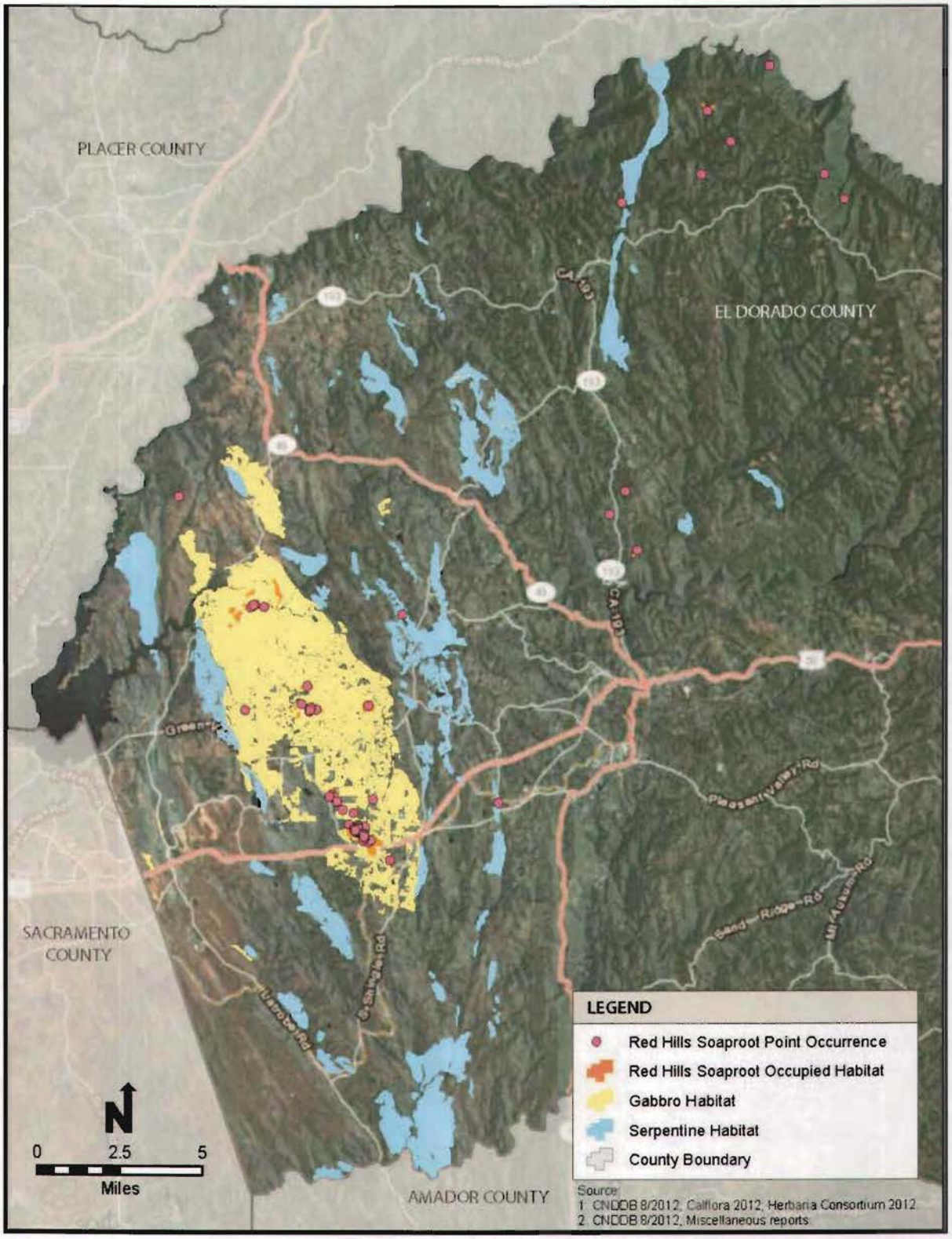

Figure A-6. Red Hills Soaproot Recorded Occurrences and Occupied Habitat within the Plan Area

A.2.7 El Dorado Mule-Ears

Description

El Dorado mule-ears (*Wyethia reticulata)* is a herbaceous perennial with erect stems (40–70 cm) from deep taproots and spreading rhizomes and produces yellow flowers from May through August (Hickman 1993, Ayers 1997, Jepson Flora Project 2012).

Distribution

Occurrences have been primarily reported on the gabbro soils of El Dorado County with additional records, one from each of Yuba and Shasta counties, on serpentine soils (Consortium of California Herbaria [CCH] 2012, DFG 2012). It is found in black oak woodland and both seeding and sprouting chaparral (Gogol-Prokurat 2009, 2011). See Figure A-7 for its distribution in the Plan Area.

Demography and Ecology

In chaparral, El Dorado mule-ears flowers profusely the spring after a fire (twentyfold increase); flowering drops by about 75 percent the following year, and in subsequent years drops to very low levels (Ayers 2011). In areas where the vegetation transitions to black oak woodland, flowering drops off more slowly (Ayers 2011). Seedling density increased dramatically two wet seasons after the fire, apparently in response to seed production during the first post-fire spring bloom (Ayers 2011). Its seed do not require heat or smoke to germinate and are killed at relatively low soil temperatures (65 degrees Celsius [°C]) (Ayers 2011). Seedlings experience great mortality during their first season and their density drops to very low levels in the second season. Occurrences of El Dorado mule-ears consist of a relatively small number of clones, each of which covers tens to hundreds of square miles (Ayres and Ryan 1997).

El Dorado mule-ears has a self-incompatible breeding system and is pollinated primarily by bees (Ayers 1997). The self-incompatibility is most likely sporophytic self-incompatibility[8] with an unknown number of mating-type alleles. Plant breeding systems of self-incompatible species are not necessarily constant and respond to a number of factors, including flower age and environmental conditions (Richards 1997, Karron et al. 2012). The combination of a clonal population structure that flowers sporadically in response to fire, self-incompatible breeding system, and variable pollinator type and behavior will lead to complex pollination and seed production dynamics (Essenberg 2012a, 2012b).

[8] In sporophytic self-incompatibility, if the pollen grain (male tissue) is genetically incompatible (allele type) with the pistil (female tissue), the pollen grain cannot grow and fertilize an ovule (egg), so no seed is produced.

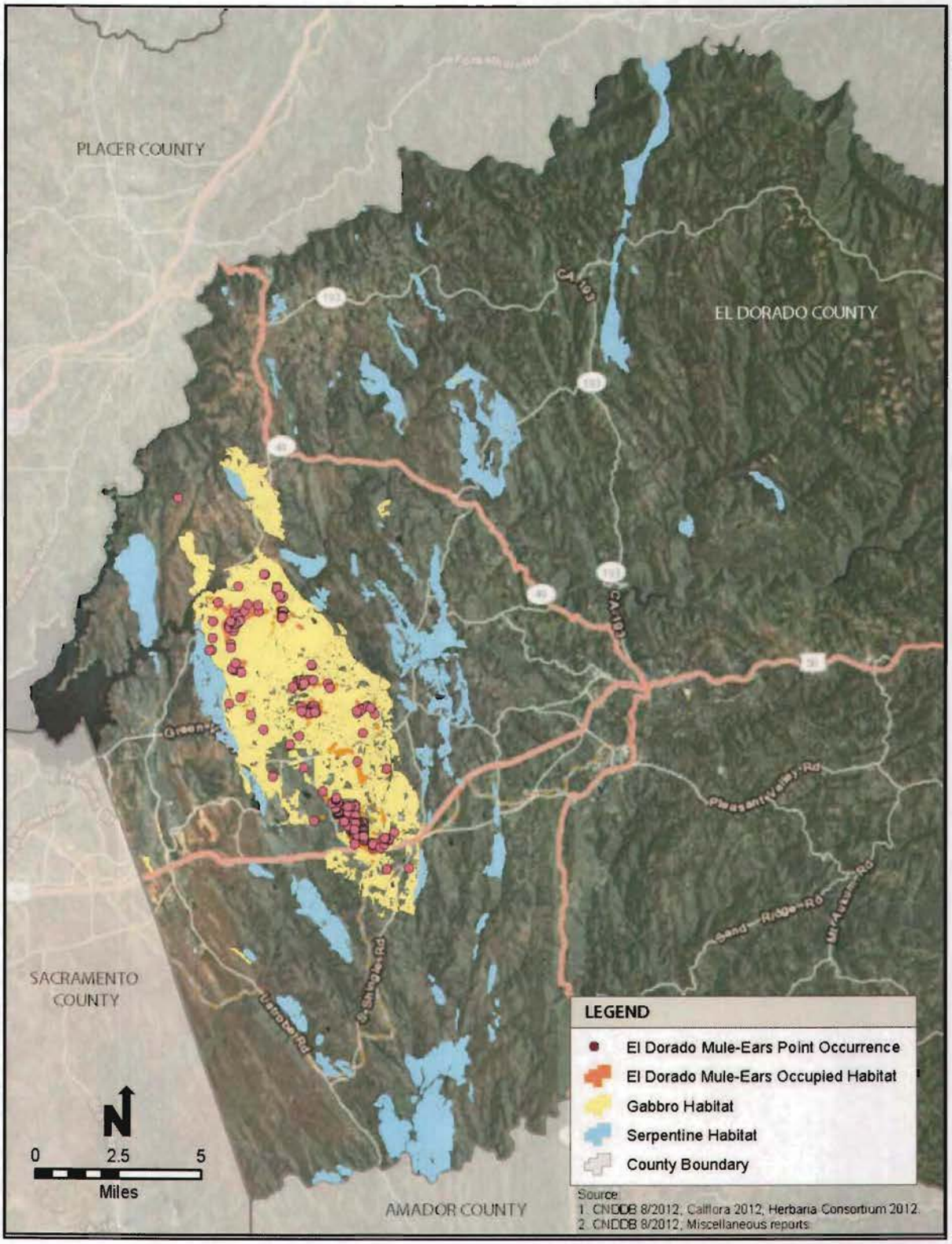

Figure A-7. El Dorado Mule-Ears Recorded Occurrences and Occupied Habitat within the Plan Area

A.2.8 Bisbee Peak Rush-Rose (Peak Rush-Rose)

Description

Bisbee Peak rush-rose (*Helianthemum suffrutescens*) has recently been taxonomically reclassified into peak rush-rose (*Helianthemum scoparium*) (Jepson Flora Project 2012), resulting in a greatly expanded distribution and change in characterization from a rare species to a common species. This account describes peak rush-rose. Peak rush-rose is an evergreen perennial with erect stems (12–65 cm) that are slightly woody at their bases (suffrutescent) and sparsely leaved under dry conditions (Hickman 1993, Jepson Flora Project 2012). The flowers have yellow petals and bloom from April through June (Calflora 2012).

Distribution

Peak rush-rose is found on dry sandy or rocky soil of hills, slopes, ridges below 1,500 meters in elevation in the North Coast ranges, the northern Sierra Nevada foothills, the northern high Sierra Nevada, the San Joaquin Valley, central western California, and southwestern California. See Figure A-8 for its distribution in the Plan Area.

Demography and Ecology

Peak rush-rose produces a dormant soil seed bank that is cued to germinate by the heat of fires, but some seeds germinate during exceptional rainfall years long after fire (Keeley and Davis 2007, Odion and Davis 2000). It has very small seeds that do not emerge from depths below 2.5 cm and are killed by fire-heating of the soil when near the surface (Odion and Davis 2000). Native perennials such peak rush-rose, deer weed (*Lotus scoparius*), and morning glory (*Calystegia macrostegia*) are widespread in the early seral post-fire stage of chaparral (Keeley 2007). In particular, suffrutescents like peak rush-rose are weakly woody species with dormant buds aboveground that generally recruit from a seed bank and are short-lived (5–10 years) (Keeley and Davis 2007). During the first year after a burn it is small, but by the third year it greatly increases in size and becomes a dominant species (Keeley et al. 1981, Keeley et al. 1985). It is considered a "fire perennial" and is normally absent under mature chaparral, although it occurs on rock outcrops and in openings between shrubs (Keeley et al. 1981, Keeley et al. 1985). Peak rush-rose seedlings establish 60/m^2 in cleared chaparral without fire and only two seedlings/m^2 in uncleared chaparral (McPherson and Muller 1969). Peak rush-rose persists on dry rocky ridges as stems with few leaves and flowers and is not frequent in dense chaparral until after a fire, when it occurs as dense populations of leafy and abundantly flowering plants (Dittman 2009).

Pollination biology and plant breeding system are often determinants of plant population size and the spatial distribution of populations, but these characteristics have not been studied for peak rush-rose. However, a related species, island rush-rose (*Helianthemum greenei*), is self-compatible and capable of producing seed without pollinators, but seed set is significantly higher

with pollen transfer among flowers of the same plants suggesting that insect pollination would also significantly increase seed set (McKeachern et al. 1997).

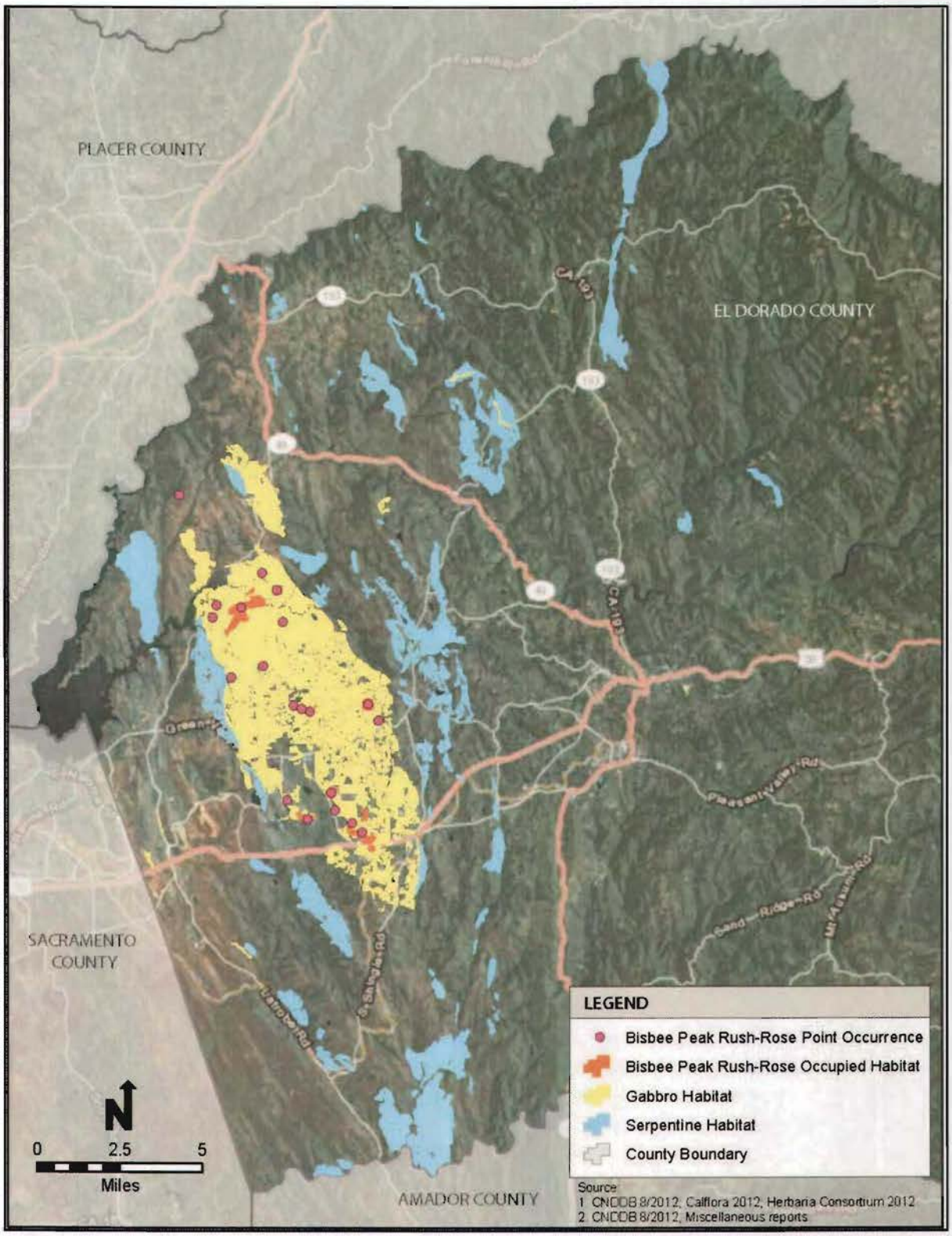

Figure A-8. Bisbee Peak Rush-Rose Recorded Occurrences and Occupied Habitat within the Plan Area

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EXHIBIT E

COOPERATIVE AGREEMENT
between
Bureau of Land Management
and
El Dorado County

RELATING TO THE ANNUAL FUNDING OF A PRESERVE MANAGER POSITION FOR THE PINE HILL PRESERVE.

AUTHORITY

THIS COOPERATIVE AGREEMENT is entered into as of _____, by and between EL DORADO COUNTY and the UNITED STATES DEPARTMENT OF INTERIOR acting by and through the Bureau of Land Management, Mother Lode Field Office, (hereinafter "BLM"), pursuant to the Federal Land Policy Management Act, 1976: Section 307 (b) and (c). This agreement supplements the renewal of the Cooperative Management Agreement for the Pine Hill Preserve (Cooperative Management Agreement) signed by El Dorado County September 28, 2006 and signed by BLM July 7, 2006.

PURPOSE

THE PURPOSE OF THIS AGREEMENT is to provide funding for a Preserve Manager for the Pine Hill Preserve to meet the goals and objectives of the General Plan Policy 7.4.1.1: "to provide for the permanent protection of eight sensitive plant species know as the Pine Hill endemics through the establishment and management of ecological preserves consistent with the County Code Chapter 17.71 and the USFWS's *Recovery Plan for Gabbro Soils Plants for the Central Sierra Nevada Foothills (USFWS 2002)."*

IT IS HEREBY AGREED AS FOLLOWS:

I. The BLM shall:

A. Employ a full time Preserve Manager for the Pine Hill Preserve working out of the Mother Lode Field Office to manage the Preserve and coordinate management, monitoring, and research activities between the County, EID, USFWS, CDFW, BOR, and BLM.

B. Supervise and direct the employee's work.

C. Provide necessary vehicle, equipment and office space for the employee to conduct the job.

D. Use the funds provided by El Dorado County to fund the Preserve Manager position established by this agreement and any administrative costs associated with this cooperative agreement and the position.

II. El Dorado County shall:

A. By September 1,2015 transfer to the BLM seventy-five thousand dollars ($75,000) for use by BLM in partial funding for the 2013, 2014 and 2015 annual costs of the Preserve Manager position, and related management activities, for the Pine Hill Preserve.

B. Provide to BLM twenty-five thousand dollars ($25,000) annually for two more years for the Preserve Manager position by February 28 of each year

C. Funding from El Dorado County will be solely from the County rare plant mitigation funds collected pursuant to Ordinance 4500 and Resolution 205-98, or their successors.

III. TERM OF THE AGREEMENT

THIS COOPERATIVE AGREEMENT IS EFFECTIVE COMMENCING WITH THE 2014 FEDERAL FISCAL YEAR, which began October 1, 2013 and will expire on September 30, 2018. Although this agreement represents the parties' intention to fund the Preserve Manager's position for multiple years, nothing in the agreement shall obligate either party to execute a new agreement for the funding of this position when this agreement expires. If there is mutual agreement to continue this funding mechanism for the Preserve Manager's position beyond the timeframe covered in this agreement, a new written agreement between the parties will be executed.

IV. AUTHORIZED OFFICERS

BLM Authorized Officer shall be:

William Haigh, Field Manager
Bureau of Land Management
Mother Lode Field Office
5152 Hillsdale Circle
El Dorado Hills, CA 95762

El Dorado County Authorized Officer shall be:

Steven M. Pedretti,
Community Development Agency Director
El Dorado County
2850 Fairlane Court
Placerville, CA 95667

V. AMENDMENTS

AMENDMENTS TO THIS AGREEMENT may be proposed by either party and shall become effective upon being reduced to a written instrument executed by both parties.

VI. TERMINATION

Either party hereunder may terminate this agreement for any reason or no reason upon thirty (30) days written notice: provided, however, that the terminating party has performed all of its obligations required hereunder. Either party may terminate this contract upon five (5) days written notice if the other party, for any reason whatsoever fails, refuses or is unable to perform its obligations under this agreement. If the agreement is terminated before the end of the term of the agreement, i.e., before December 31, 2018, payment from El Dorado County to BLM will be returned to El Dorado County on a prorated basis, based on that portion of the year that the agreement was in effect before termination.

VII. FISCAL CONSIDERATIONS

The parties to this Agreement recognize and acknowledge that County is a political subdivision of the State of California. As such, County is subject to the provisions of Article XVI, Section 18 of the California Constitution and other similar fiscal and procurement laws and regulations and may not expend funds for products, equipment, or services not budgeted in a given year. It is further understood that in the normal course of County business, County will adopt a proposed budget prior to a given fiscal year, but that the final adoption of a budget does not occur until after the beginning of the fiscal year.

Notwithstanding any other provision of this Agreement to the contrary, County shall give notice of cancellation of this Agreement in the event of adoption of a proposed budget that does not provide for funds for the services, products, or equipment subject herein. Such notice shall become effective upon the adoption of a final budget, which does not provide funding for this Agreement. Upon the effective date of such notice, this Agreement shall be automatically terminated and County released from any further liability hereunder.

In addition to the above, should the Board of Supervisors during the course of a given year for financial reasons reduce or order a reduction in the budget for any County department for which services were contracted to be performed, pursuant to this paragraph in the sole discretion of County, this Agreement may be deemed to be canceled in its entirety subject to payment for services performed prior to cancellation.

VIII. AUDIT BY CALIFORNIA STATE AUDITOR

Consultant acknowledges that if total compensation under this Agreement is greater than $10,000.00, this Agreement is subject to examination and audit by the California State Auditor for a period of three (3) years, or for any longer period required by law, after final payment under this Agreement, pursuant to California Government Code §8546.7. In order to facilitate these potential examinations and audits, Consultant shall maintain, for a period of at least three (3) years, or for any longer period required by law, after final payment under the Agreement, all books, records and documentation necessary to demonstrate performance under the Agreement.

IX. CONTRACT ADMINISTRATOR:

The County Officer or employee with responsibility for administering this Agreement is Steven M. Pedretti, Director, Community Development Agency, or successor.

IN WITNESS WHEREOF, each party hereto has caused this Cooperative Agreement to be executed by its authorized official on the day and year set forth below said official's signature.

BUREAU OF LAND MANAGEMENT

By:_____ Date:_____
William Haigh
Folsom Field Manager

EL DORADO COUNTY

By:_____ Date:_____
Steven M. Pedretti, Director
Community Development Agency

By:_____ Date:_____

Chair
Board of Supervisors

Attest:
James S. Mitrisin
Clerk of the Board of Supervisors

By:_____ Date:_____
Deputy Clerk