COUNTY OF EL DORADO
Procurement & Contracts

ATTN: Purchasing Agent
330 Fair Lane
Placerville, CA 95667

REQUEST FOR PROPOSAL #00-000-000
DUE: 3:00 PM – November xx, 2008
Sealed Proposals must be clearly marked on the outside of the package with:
"RFP #00-000-000 MAILROOM DO NOT OPEN"

Purchasing Agent

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN AND ENVIRONMENTAL DOCUMENT PREPARATION

The County of El Dorado Office of Procurement and Contracts, through its Development Services Department (also referred to as "County"), is requesting proposals from qualified consulting firms and institutions to prepare an Integrated Natural Resources Management Plan (also referred to as "INRMP") and an anticipated Initial Study/Negative Declaration environmental document with respect to the County's General Plan Policies 7.4.2.8, 7.4.2.9, 7.4.1.6, and Implementation Measures CO-M and CO-U.

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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"C"– General Plan Policies 7.4.2.8, 7.4.2.9, and 7.4.1.6 and associated policies and Implementation Measures
"D" – Oak Woodland Management Plan link
"E" – Pine Hill Preserve Program / Chapter 17.71 Ecological Preserve Overlay
"F" – The Potential Impacts of Development on Wildlands in El Dorado County, California by Saving, S.C. and G. B. Greenwood

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Notice to Proposers

The Procurement and Contracts Division does not mail out hard copy letters advising participating Proposers of RFP results. For RFP results, please visit our website at

http://www.co.el-dorado.ca.us/Contracts/bidresults.asp

RFP results will be posted within approximately fourteen business days after the RFP opening deadline date. The timeline for posting RFP results may vary depending on the nature and complexity of the RFP.

I. **Purpose:** The El Dorado County Development Services Department is seeking proposals from qualified consultants to conduct the development of the El Dorado County Integrated Natural Resources Management Plan (INRMP) for the west slope of the County at 4000' elevation and lower.

The County adopted a General Plan in 2004. Several of the Policies (7.4.2.8, 7.4.2.9, and 7.4.1.6) and Implementation Measures (CO-M and CO-U) are General Plan EIR mitigation measures that are intended to protect natural resources and are the focus of this RFP. These policies and measures direct the County to identify important habitat and to establish a program for habitat preservation, effective management, monitoring, and mitigation. This will include developing land conservation strategies that conserve and restore habitat connectivity to offset the effects of increased habitat loss and fragmentation elsewhere in the county. Habitat preservation areas, with preference given to large contiguous blocks of habitat and where possible, corridors to facilitate species movement among these blocks, are to be identified. Together, these areas will form a network of priority preservation lands in El Dorado County. The hope is that establishing such a network will provide proactive preservation planning at a landscape level that will reduce future endangered species listings, human-wildlife conflicts, and make El Dorado County more resilient to expected land-use and global climate change. El Dorado County's population is projected to reach 243,000 by 2025, an increase of over 80,000 new residents. This plan will compliment existing efforts by planners and developers to avoid or compensate for environmental impacts covered under CEQA by identifying receiving areas for investment in offsite mitigation. A preservation plan can also galvanize efforts to pursue state and federal funding to implement local land and water conservation projects. The County did consider a Habitat Conservation Plan and Natural Communities Conservation Plan initially, but has since chosen not to pursue an HCP/NCCP option, and rather, utilize the preservation efforts laid out by the General Plan.

II. **Background:**

A. Regional Location

El Dorado County is located in northern California and is bordered by Sacramento, Placer, Amador and Alpine counties in California, and Douglas County, Nevada. The County is located in the central Sierra Nevada, east of the Central Valley. The western border is flanked by the City of Folsom. The eastern-most border runs through Lake Tahoe, in the Sierra Nevada.

B. Physical Features

El Dorado County covers approximately 1,789 square miles (1,145,385 acres) ranging from the residential foothills of El Dorado Hills to the high Sierra Nevada mountain range. The Sierra

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Nevada, Middle Fork and South Fork American River, and Lake Tahoe are among the county's primary natural features. El Dorado County is traversed by several major roadways including US Highway 50 and State Routes 49, 88, and 89. Elevations range from 200 feet above sea level at the western most boundary of the county to 10,081 feet at the highest point of Freel Peak on the western edge of the Lake Tahoe Basin. The County has considerable topographic variation, with more than half of the land area having slopes in excess of 25%.

Agricultural land (AL), as designated on the 2004 General Plan Land Use Diagram, comprises approximately 60,000 acres. Approximately 50,000 acres of land in the county are designated as Agricultural Districts (GP DEIR 2003). These acreage amounts do not necessarily include all grazing land, or land in current agricultural production. The 2007 El Dorado County Crop Report calculates that approximately 4,600 acres are in agricultural production supporting fruit and nut crops, hay, irrigated pasture, and nursery products. Rangeland (dryland) comprises approximately 233,000 acres. The county is also a mining region, capable of producing a wide variety of mineral resources. Approximately 864,000 acres of El Dorado County are forestland; however, most forestland is at elevations higher than 4,000' and not within the scope of this study.

The county has a rich diversity of lakes and rivers, natural plant communities, and wildlife at elevations at or below the 4,000' elevation, within the study area. A unique soil type (gabbro soils) supports an array of plant species that are rare, endangered, or declining throughout their range. A substantial number of these plant populations are protected in the Pine Hill Ecological Preserve, located in five areas totaling approximately 3,550 acres in the Pine Hill area between Cameron Park and Salmon Falls.

C. Growth Patterns & Projections

The physical features and the environment of El Dorado County are an important influence on its land use and development patterns. The most important physical features affecting development are the Sierra Nevada range, US Highway 50, large areas of the county dominated by forestland, and Lake Tahoe.

The Sierra Nevada divides El Dorado County into two distinct topographic areas – the west slope and Lake Tahoe Basin. The west slope extends from the Sacramento County line on the west to the summit of the Sierra Nevada on the east and contains most of the developed land in the county. The 2004 General Plan directed development on the west slope to concentrate growth in areas with existing infrastructure, such as near the county line and along US Highway 50, with large scale residential and commercial developments in the process of building, including many approved plans for future additional development. The density of residential and commercial development gradually decreases and the amount of open space (agricultural fields and forestland) increases moving easterly from the foothills to the Sierra Nevada. Placerville, located approximately 20 miles from the western county line, is the only incorporated city on the west slope.

US Highway 50 bisects El Dorado County, traveling east-west from Sacramento County through Placerville and into the Lake Tahoe Basin just south of the lake. Historically, development in the county has closely followed this route, with the densest development in the west. Major cities, towns and developments along this corridor include El Dorado Hills, Cameron Park, Shingle Springs, Placerville, Pollock Pines, and South Lake Tahoe. In addition to being a development pathway, US

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Highway 50 is a major transportation corridor for residents living in El Dorado County who work in Sacramento County, and for recreational-related traffic generated from areas outside of the county.

Outside the US Highway 50 corridor, west-slope development follows the other main highways in the County: State Routes 49 and 193. SR 49 crosses the county from north to south and connects many of the original boom towns founded during the Gold Rush of 1848. This route is a prime tourist destination, and the towns of Cool, Pilot Hill, Coloma, Lotus, Placerville, Diamond Springs, and El Dorado promote the mining heritage of the region with museums, historic districts, and commercial areas. SR 193 crosses the northern part of the County from SR 49 to Greenwood and Georgetown, then turns south through Kelsey, and into Placerville.

El Dorado County has experienced rapid growth over the past 20 years. The countywide population increased from 85,212 in 1980 to approximately 163,585 in 2002. The county had approximately 73,791 dwelling units and 45,300 jobs in 2002. The majority of this development is focused in the area nearest to the Sacramento County line and along US Highway 50. The average annual growth rate for 1980-2002 was 3 percent.

D. Biological and Natural Resources

El Dorado County possesses a diversity of native flora and fauna. This diversity can be attributed to a combination of unique physical characteristics that have resulted in a wide range of habitats. These unique physical features include a wide range of elevations and varied terrain, diverse substrate material, large tracts of contiguous natural habitat, and a broad range of climatic conditions. Coniferous forest is dominant at higher elevations in the eastern half (primarily located above 4,000' elevation and not generally within the scope of this study); oak and hardwood habitats are found mostly in the central region, and annual grassland, chaparral, agriculture, and urban development is found primarily in the western third of the county.

A total of 29 special-status plant species have been documented in the county. Of these, six are state or federally listed as Threatened, Endangered, or Rare. The remaining 24 special-status plants are on CNPS (California Native Plant Society) List 1B or List 2. See Table 5.12-2 of the General Plan DEIR for a complete list (http://www.co.el-dorado.ca.us/Planning/Volume2/V2_512.pdf). Not all species occur in the study plan area (below 4,000' elevation).

Several special-status plants are restricted to the Pine Hill soil formation in western El Dorado County. These plants are of particular concern to state and federal agencies responsible for protection of natural resources because of the rarity of the plants and their limited range, and because of the high development pressure in the area.

The Pine Hill formation gabbroic soils support seven special-status plant species: Stebbins' morning-glory, Pine Hill ceanothus, Pine Hill flannelbush, El Dorado bedstraw, Layne's butterweed, El Dorado mule-ears, and Red Hills soaproot. An eighth plant, the Bisbee Peak rush-rose, is listed by CNPS as rare. Of these, three of these plants are endemic to the Pine Hill region. Another two species are nearly endemic, with only a few small colonies of the plants found elsewhere. A total of 740 plant species (10% of California's total) have been recorded in a 25,700-acre area within the Pine Hill formation.

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A total of 51 special-status wildlife species are known to occur in El Dorado County. Of these, ten species are state or federally listed as Threatened or Endangered: vernal pool fairy shrimp, valley elderberry longhorn beetle, Lahontan cutthroat trout, California red-legged frog, willow flycatcher, American peregrine falcon, bald eagle, bank swallow, California wolverine, and Sierra Nevada red fox. The remaining 41 species are considered as California Species of Special Concern by CDFG and/or federal Species of Concern by USFWS. See Table 5.12-3 of the General Plan DEIR for a complete list (http://www.co.el-dorado.ca.us/Planning/Volume2/V2_512.pdf). Not all species occur in the study plan area (below 4,000' elevation).

El Dorado County's Weber Creek watershed supports one of only six known populations of California red-legged frogs in the Sierra Nevada. The confirmed population was discovered in an impoundment along the North Fork of Weber Creek. The Spivey Pond impoundment and surrounding uplands were purchased as part of a cooperative effort between state and federal agencies and are currently managed by BLM to protect the frog and its habitat.

The effects of existing development and growth projected by the General Plan on the western slope are threats to biological diversity and sensitive biological resources. The impacts on biological resources are primarily the result of urbanization of the area, habitat fragmentation, water pollution, and conversions of natural habitats to agricultural uses. As a result of these existing and projected impacts, El Dorado County approved Mitigation Measure 5.12-1(d) in the 2004 General Plan DEIR: Develop and Implement an Integrated Natural Resources Management Plan, which further called for the adoption of General Plan Policy 7.4.2.8 that mandates the County to identify important habitat and to establish a program for effective management and habitat preservation.

Further information on El Dorado County's biological and natural resources is available from the General Plan DEIR at: http://www.co.el-dorado.ca.us/Planning/Volume2/V2_512.pdf .

III. **Scope of Services:** The successful Proposer will be consulting throughout the process of the INRMP with the Board of Supervisors, the Planning Commission, the Agricultural Commission, County Planning staff, PAWTAC, and ISAC. The Plant and Wildlife Technical Advisory Committee (PAWTAC) and the INRMP Stakeholders Advisory Committee (ISAC) were appointed and established by the Board of Supervisors for their specialized knowledge of El Dorado County. PAWTAC members were chosen for their technical and biological expertise relating to plant and wildlife issues. ISAC members were chosen for their specialized community experience representing various fields. PAWTAC and ISAC will provide the consultant input for review, critiques, and recommendations for habitat mapping, habitat protections strategy, mitigation assistance, habitat acquisition, habitat management, habitat monitoring, and Important Biological Corridor overlay, utilizing their specialized knowledge of El Dorado County.

The successful Proposer will be required to enter into an agreement for services with the County substantially similar in form to that attached hereto as Exhibit "A," marked "Sample Agreement for Services." Any reference in this Request for Proposal to specific terms of the agreement are for illustrative purposes only and shall not limit the scope of the obligations to be assumed by the successful Proposer under the agreement. In the event of any conflict between a provision of this Request for Proposal and the provisions of the agreement attached as Exhibit "A," the terms of the agreement shall govern. The Services to be provided shall include, but not be limited to, the following:

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Mapping Tasks:

1. Map Important Habitat and Connectivity:

   i. Facilitate discussions with PAWTAC, ISAC, and the Board of Supervisors to define "Important Habitat," "Large Expanses," and "Native Vegetation," as used in General Plan Policy 7.4.2.8.

   ii. Utilize (and update) INRMP Initial Inventory mapping layers (http://www.co.el-dorado.ca.us/Planning/genplan/Final_Initial_Composite_040408.pdf). Utilize existing literature and resources as available to identify core patches of continuous habitat to anchor the network analysis. Include Oak Woodland Management Plan (OWMP) Priority Conservation Areas (PCAs) and all lands in the Ecological Preserve (EP). Utilize the EIP Rare Plant Study. Analyze prior research studies, such as the county-specific study "The Potential Impacts of Development on Wildlands in El Dorado County, California" authored by S. C. Saving and G. B. Greenwood (USDA Forest Service Gen. Tech. Rep. PSW-GTR-184.2002.) and initial oak-corridor mapping conducted for the OWMP by EN2 Resources, Inc. (http://www.co.el-dorado.ca.us/Planning/genplan/OakDraftAugust2007_S-1.pdf). Consider whether assumptions of wildlife needs made by Saving & Greenwood and EN2 Resources regarding core patches and linkages are currently valid and should be utilized in order to avoid duplication of efforts and unnecessary expenditure of County funds. Utilize Saving & Greenwood and EN2 base mapping and update, as appropriate, for use in the INRMP analysis. The consultant will prepare an assessment of current studies and work with the County and PAWTAC to identify additional studies, if determined necessary.

   iii. Establish attributes for linkages, species movement, and permeability functions, etc., for use as a suite of decision-making tools and as points of discussion for advisory committees analyses.

   iv. Map a continuous connectivity surface using a landscape metrics approach, which illustrates multiple potential 'pathways' for conservation. Design a landscape permeability analysis (a technique that models the difficulty that species would have moving between large conserved areas), including oak woodland permeability for avian species. Factors could include vegetation types, elevation, slope, and road density, or others.

   v. Examine threat overlay (for example, density of roads, culverts, major barriers, housing density at a landscape level, etc.), other conservation planned priorities, critical endemic species habitats, rare soil types, parcel layer, and aerial photos for cores and linkage areas.

   vi. Prioritize linkages and core patches. This could include the use of optimization tools (such as Median Patch Size theory, MARXAN, FunConn, or other tools). Proposer should discuss assumptions of use of tools that they are proposing.

   vii. Policy 7.4.2.8 (A) specifics and PAWTAC/ISAC Meeting Comments on RFP – August 27, 2008 should be considered.

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viii. Deliverable: Compile information and prepare admin draft, public review draft, and final Important Habitat Inventory Report and Map.

2. Important Biological Corridor (IBC) Overlay:

   i. Update the IBC overlay (General Plan Policy 7.4.2.9). The IBC overlay applies to lands identified as having high wildlife habitat values because of extent, habitat function, connectivity, and other factors. Utilize information developed through Task 1 mapping, the General Plan EIR, and literature specific to El Dorado County authored by Saving and Greenwood (referenced in General Plan EIR). Facilitate discussions and consult with PAWTAC, ISAC, County staff, the public, Planning Commission, and Agricultural Commission. Consider the effect of Highway 50 on wildlife movement and habitat fragmentation. Review the validity of the potential north-south connectors discussed by Saving & Greenwood, and others including drainages, culverts, and crossings, and feasibility as compared to other alternatives such as Weber Creek.

   ii. Deliverable: Compile information and prepare admin draft, public review draft, and final Important Biological Corridor Report and Map.

Strategic Tasks:

3. Habitat Protection Strategy:

   i. Research prior studies and literature regarding habitat protection strategy, in particular, assess whether the protection strategy discussed by Saving & Greenwood is currently valid and pursuable. Explore habitat protection strategies that work for other entities, with a range of alternatives from regulatory to incentive-based programs, which are mutually beneficial.

   ii. Facilitate discussions of expectations of managed lands among PAWTAC, ISAC, and the Board of Supervisors.

   iii. Describe a strategy for protecting important habitats based on coordinated land acquisitions (see item 4, below, including mitigation banks), and management of acquired land. The goal of the strategy shall be to conserve and restore contiguous blocks of important habitat to offset the effects of increased habitat loss and fragmentation elsewhere in the planning area.

   iv. Describe how the Oak Woodland Management Plan and the Rare Plant (Pine Hill Plants) Cooperative Management Agreement (CMA) and Chapter 17.71 Ecological Preserve Overlay integrate into the INRMP.

   v. Describe how Policy 7.4.4.5 can be implemented to further protect oak woodlands.

   vi. Describe how Policy 7.4.2.2 can be implemented to further protect critical wildlife areas and migration corridors.

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vii. Using prioritization from Task 1 (v and vi) above, develop ranking system for prioritizing the most significant areas for conservation from the Important Habitat inventory mapping effort.

viii. Develop the provisions specified under Policy 7.4.2.9 in consultation with and by facilitation of meetings with the Board of Supervisors, with recommendations from PAWTAC, ISAC, staff, the public, Planning Commission, and Agricultural Commission.

ix. Policy 7.4.2.8 (B) specifics and PAWTAC/ISAC Meeting Comments on RFP – August 27, 2008 should be considered.

x. Deliverable: Compile information and prepare admin draft, public review draft, and final Habitat Protection Strategy Report.

4. Mitigation Assistance:

i. Develop strategies, in coordination with the County, to implement the INRMP not only for an overall, landscape-level program for habitat protection, but for project-by-project mitigation. Define a threshold of impact (size/acreage, area of impact, etc.) through facilitation of discussions with advisory groups and decision makers. Assist County staff in defining "trigger" mechanism for ordinance.

ii. Develop biological resource assessment standards to apply to all discretionary projects in areas identified as a priority for conservation and prepare a Biological Resources Study and Important Habitat Mitigation Plan outline with required content sections for project proponents, in consultation with PAWTAC and ISAC.

iii. Define lands that are deemed "Important Habitat" under General Plan Implementation Policy CO-U through facilitation of discussions with advisory groups and decision makers.

iv. Develop a program, through discussions with PAWTAC and ISAC, to facilitate mitigation of impacts to biological resources resulting from projects approved by the County that are unable to avoid impacts on important habitats. The program tools may include development of mitigation banks, maintenance of lists of potential mitigation options, transfer of development rights, and incentives for developers and landowner participation in the habitat acquisition and management components of the INRMP. Include onsite mitigation (mentioned in General Plan Implementation Measure CO-U). Development of an in-lieu fee program needs to be developed in its entirety including the mechanism for purchases and land acquisition and timelines to ensure funds will be used in a timely and meaningful method to mitigate the impacts for which the funds were collected. Land management program options need to not only address the management of fees but also include the monitoring and holding of conservation easements.

v. Develop a funding mechanism for acquisition, long-term enhancement/restoration, management, and monitoring, and include a fee adjuster. Evaluate and incorporate/update previous economic funding established for the OWMP.

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vi. Through facilitation of meetings with PAWTAC and ISAC, develop a matrix or system for project applicants and project planners to easily determine the amount and types of mitigation necessary to offset different levels of development on different categories of habitat. Utilize and incorporate the Oak Woodland Management Plan mitigation and the Rare Plant mitigation. Include the provisions developed under (3) viii above, for the IBC overlay.

vii. Policy 7.4.2.8 (C) specifics and PAWTAC/ISAC Meeting Comments on RFP – August 27, 2008 should be considered.

viii. Deliverable: Compile information and prepare admin draft, public review draft, and final Mitigation Assistance Program.

5. Habitat Acquisition:

i. Develop a program for identifying habitat acquisition opportunities involving willing sellers. Acquisition may be by state or federal land management agencies, private land trusts or mitigation banks, the County, or other public or private organizations. Lands may be acquired in fee title or protected through acquisition of a conservation easement designed to protect the core habitat values of the land while allowing other uses by the fee owner. The program should identify opportunities for partnerships between the County and other organizations for habitat acquisition and management. Discuss how easements of less than entire parcels could benefit or not benefit habitat, management, and monitoring.

ii. Develop land management program options, such as a management entity (land trust or conservancy) to manage Pine Hill Preserve fees, OWMP fees, and INRMP fees.

iii. Policy 7.4.2.8 (D) specifics and PAWTAC/ISAC Meeting Comments on RFP – August 27, 2008 should be considered.

iv. Deliverable: Compile information and prepare admin draft, public review draft, and final Habitat Acquisition Program.

6. Habitat Management:

i. Develop an evaluation matrix to be used on acquired properties to determine whether the biological resources would benefit from restoration, enhancement, or management actions. Include adaptive management practices common for the in-perpetuity management of protected habitats.

ii. Develop Best Management Practices and General Guidelines for Maintenance, Restoration, and Rehabilitation of habitats acquired by the INRMP program. Elucidate general habitat enhancement opportunities that may exist, such as dropping old fences to allow permeability, planting native species, etc. Review BMPs from other entities that might be applicable to habitat management. Discuss possible allowed uses in corridors and in important habitat, and look for positive illustrations of what landowners have been doing

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right, in order to take a proactive approach that is not overly restrictive. Discuss how habitat management will function within a fire management plan (especially for fuel modifications).

iii. Policy 7.4.2.8 (E) specifics and PAWTAC/ISAC Meeting Comments on RFP – August 27, 2008 should be considered.

iv. Deliverable: Compile information and prepare admin draft, public review draft, and final Habitat Management Program.

7. Habitat Monitoring:

   i. Develop a habitat monitoring program that covers all areas under the Ecological Preserve overlay together with all lands acquired as part of the INRMP. Include a method to evaluate habitat preservation efficiency at a landscape level as well as a site specific level. Incorporate existing recovery plans guidelines (Pine Hill plants, red-legged frog, etc.) into monitoring and a method to evaluate efficiency.

   ii. Policy 7.4.2.8 (F) specifics should be considered.

   iii. Deliverable: Compile information and prepare admin draft, public review draft, and final Habitat Monitoring Program.

8. Compile and integrate Tasks 1 through 7 into a draft and final Integrated Natural Resources Management Plan.

   i. Deliverable: Compile information and prepare admin draft, public review draft, and final Integrated Natural Resources Management Plan.

9. Prepare an initial study and environmental document as deemed necessary by the initial study (anticipated to be a Negative Declaration as this project is intended to be within the scope of the General Plan EIR). An economic analysis should be included to comply with Policy 10.1.2.5 of the 2004 General Plan which directs staff to prepare and present an analysis of the economic effect and taking implications of a proposed rule or regulation on private property and private property rights.

   i. Deliverable: Compile information and prepare admin draft, public review draft, and final Initial Study/environmental document.

10. Additional material to be considered in the preparation of the INRMP and environmental document includes
    i. Board of Supervisors policy direction; and
    ii. PAWTAC and ISAC recommendations.

11. Deliverables shall be in MS Word format and as GIS coverages. It is anticipated that the INRMP document will follow the format of the OWMP report (user-friendly implementation section as the document with executive summary of appendices information; all other reports and maps as appendices). Anticipated deliverables should include:

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Mapping Tasks:

i.	Admin Draft Important Habitat Inventory Report and Map	MS Word/ GIS coverages
ii.	Public Review Draft Important Habitat Inventory Report and Map	MS Word/ GIS coverages
iii.	Final Important Habitat Inventory Report and Map	MS Word/ GIS coverages
iv.	Admin Draft Important Biological Corridor Report and Map	MS Word/ GIS coverages
v.	Public Review Draft Important Biological Corridor Report and Map	MS Word/ GIS coverages
vi.	Final Important Biological Corridor Report and Map	MS Word/ GIS coverages

Strategic Tasks:

vii.	Admin Draft Habitat Protection Strategy	MS Word
viii.	Public Review Draft Habitat Protection Strategy	MS Word
ix.	Final Habitat Protection Strategy	MS Word
x.	Admin Draft Mitigation Assistance Program	MS Word
xi.	Public Review Draft Mitigation Assistance Program	MS Word
xii.	Final Mitigation Assistance Program	MS Word
xiii.	Admin Draft Habitat Acquisition Program	MS Word
xiv.	Public Review Draft Habitat Acquisition Program	MS Word
xv.	Final Habitat Acquisition Program	MS Word
xvi.	Admin Draft Habitat Management Program	MS Word
xvii.	Public Review Draft Habitat Management Program	MS Word
xviii.	Final Habitat Management Program	MS Word
xix.	Admin Draft Habitat Monitoring Program	MS Word
xx.	Public Review Draft Habitat Monitoring Program	MS Word
xxi.	Final Habitat Monitoring Program	MS Word
xxii.	Admin Draft INRMP	MS Word
xxiii.	Public Review Draft INRMP	MS Word
xxiv.	Final INRMP	MS Word
xxv.	Admin Draft Initial Study/ND or other	MS Word
xxvi.	Public Review Draft Initial Study/ND or other	MS Word
xxvii.	Final Initial Study/ND or other	MS Word

12. Meetings: Minimum attendance at three (6) public meetings including the Agricultural Commission, the Planning Commission, and the Board of Supervisors. It is anticipated that the consultant will be working with PAWTAC and ISAC at standing monthly meetings (1 per month for each group, 36 meetings). Meeting length will not exceed three (3) hours. Consultant will meet with planning staff as necessary.

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13. Schedule: The final schedule will be determined upon formal approval of the agreement for services by the Board of Supervisors. The County offers the following schedule of major milestones be used as a general guide for proposal:

	Schedule	**Projected time line:**	**Cumulative timeline:**
1	Board of Supervisors contract approval.	0	0
2	Staff and Consultant hold kickoff meeting after contract approved by BOS	2 weeks	2 weeks
3	Consultant reviews INRMP Work Program; General Plan Policies/Measures; any other requested documents	4 weeks	6 weeks
4	Consultant prepares Admin Draft Important Habitat Connectivity Map and Report	12 weeks	18 weeks
5	Consultant prepares Public Review Draft Important Habitat Connectivity Map and Report	8 week	26 weeks
6	Consultant prepares Final Important Habitat Connectivity Map and Report	8 weeks	34 weeks
7	Consultant prepares Admin Draft Important Biological Corridor Report and Map	12 weeks	46 weeks
8	Consultant prepares Public Review Draft Important Biological Corridor Report and Map	8 weeks	54 weeks
9	Consultant prepares Final Important Biological Corridor Report and Map	8 weeks	62 weeks
10	Consultant prepares Admin Draft Habitat Protection Strategy	16 weeks	(this depends on overlap by consultant) ↓
11	Consultant prepares Admin Draft Mitigation Assistance Program	12 weeks	
12	Consultant prepares Admin Draft Habitat Acquisition Program	12 weeks	
13	Consultant prepares Admin Draft Habitat Management Program	12 weeks	
14	Consultant prepares Admin Draft Habitat Monitoring Program	12 weeks	
15	Consultant prepares Admin Draft INRMP	4 weeks	
16	Consultant prepares Public Review Draft INRMP	8 weeks	
17	Planning staff prepares and distributes Legal Ad.; NOI; distributes to agencies	1 week	
18	Consultant prepares Draft Initial Study and (anticipated) Negative Declaration (IS/ND)	12 weeks	
19	Staff schedules Agricultural Commission Meeting to review IS/ND	4 weeks	

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	Schedule	**Projected time line:**	**Cumulative timeline:**
20	Staff schedules Planning Commission (PC) Meeting: Legal Ad, public notice to mailing list, transmit IS/ND hearing notice to Agencies, transmit IS/ND to PC; staff report to PC; 10 day notice period for PC; PC hearing and recommendation to Board of Supervisors (Board)	4 weeks	
21	Formal 45 day review period	7 weeks	
22	Planning staff provides Consultant copy of all comments received on IS/ND	0 week	
23	Consultant prepares and submits Admin Draft Final IS/ND	8 weeks	
24	Planning staff reviews Admin Draft Final IS/ND	2 weeks	
25	Consultant prepares and submits Final IS/ND	2 weeks	
26	Consultant prepares Final INRMP	2 weeks	
27	Staff schedules Board Meeting: Legal Ad, public notice to mailing list, transmit IS/ND hearing notice to Agencies that submitted comments on IS/ND, transmit IS/ND to Board; staff report to Board; 10 day notice period for Board; PC hearing minutes and recommendation to Board.	4 weeks	
28	Board considers and Certifies IS/ND. Adopts Ordinance(s) (INRMP; IBC Overlay) as may be amended by the Board. Ordinance effective 60 days thereafter.	4 weeks	
29	Staff files NOD with DFG fees with County Clerk after Board approval. (County pays DFG fee of $1,993 (if ND)	0 weeks	
30	Clerk Posts NOD (immediately after the Board meeting) for 30 day statute of limitations.	4 weeks	

14. Assumptions:
    i. County staff will vett policy decisions with the Board of Supervisors;
    ii. Mapping and mapping reports (Task 1) will go through admin draft – public review draft - final stage approval first; other sections of the INRMP will be vetted at the Admin Draft stage (by staff, PAWTAC, and ISAC), then be grouped together for a release of the Public Review Draft INRMP;
    iii. County staff will author ordinances.

III. **Proposal Content:** Proposal responses must adhere to the requirements set forth in this section, both for content and sequence. Failure to adhere to these requirements or the inclusion of conditions, limitations or misrepresentations may be cause for rejection of the submittal. Use 8-1/2 x 11 sheets (foldouts are acceptable for charts, etc.) and font size large enough to be easily legible, but not smaller than 10 point. The original proposal and each subsequent copy must be submitted on paper, properly bound, appropriately tabbed and labeled in the following order:

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A. **Cover letter:** Provide a "cover letter" and introduction, including the name and address of the organization or individual submitting the proposal, together with the name, address, telephone and fax numbers, and e-mail address of the contact person who will be authorized to make representations for the organization, and an expression of the Proposer's ability and desire to meet the requirements of this Request for Proposal. **The letter must be signed by an individual authorized to bind the firm contractually.**

B. **Table of Contents:** This section shall include a detailed "Table of Contents" and an outline of the submittal, identified by sequential page number and by section reference number and section title as described herein.

C. **Proposer's Capabilities:** Describe the firm's resources, experience and capabilities as they relate to scope of services described hereinabove. Submit in the order identified below:

1. **Executive Summary:** An executive summary should briefly describe the Proposer's approach to the proposal and clearly indicate any options or alternatives. It should indicate any major requirements that cannot be met by the Proposer. This summary should highlight the major features of the proposal and identify relevant supporting materials. The executive summary shall not exceed three pages.

2. **Detailed Discussion:** The detailed discussion is a general, but complete, narrative of the Proposer's assessment of the work to be performed and the ability to meet those objectives. This overview should clearly demonstrate the Proposer's understanding of the performance expectations as well as how the requirements will be met. Discuss each item in **Section II. Scope of Services 1 through 14** and describe how your firm will accomplish the desired scope in the timeframe suggested. By virtue of submitting a response to this RFP, Proposer understands, acknowledges and agrees to the standard terms and conditions of Exhibit "A".

D. **Background and Experience:** Describe the firm's background, its organizational structure, length of time in business, and experience in providing the type of services solicited herein.

E. **Work Plan:** Outline how the firm's team intends to approach this project, along with anticipated timelines for training, delivery of supplies, and full implementation.

F. **Insurance Requirements:** A written statement of your firm's ability to comply with the insurance requirements set forth in Exhibit "A".

G. **Cost Proposal:** Proposers shall provide a comprehensive fee schedule of all account team members. Identify any ancillary costs or expenses. The fee schedule must remain firm for the contract period. List all of the fees for every service you can provide that aren't identified in this Request for Proposal.

H. **References:** Proposers must provide a minimum of three (3) client references, preferably of county governments, municipalities, or service districts in California, of organizations with whom you currently have contracts with and/or have previously had contracts with for the provision of services of equal type and scope within the last five (5) years. Each reference shall include company or

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organization name, contact person, title, telephone number, length of business relationship, and summary of services performed.

I. **Additional Data:** (this Section shall be limited to five pages) Include any other data the Contractor deems essential to the evaluation of the qualifications and proposal statements. Where appropriate, please key data back to information contained in Section A thru H. If there is no additional data, this section will consist of the statement, "We wish to present no additional data."

IV. **Proposal Submittal:** Proposers must submit one (1) original and six (6) copies of their proposal, along with any addenda, in a sealed envelope or container, clearly marked **"RFP #00-000-000 – MAILROOM DO NOT OPEN"**, **no later than 3:00 PM – November xx, 2008**, to:

County of El Dorado
Procurement and Contracts
330 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 the 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 Dan Lynch, Sr. Department Analyst at (530) 621-5180.

V. **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 PM – on November xx, 2008**. All envelopes or containers must be clearly labeled **"RFP #00-000-000, 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. The County reserves the right to decline a response to any question if, in the 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 the County, will be posted on the Procurement and Contracts website on or about **November xx, 2008**.

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

Bonnie H. Rich, Purchasing Agent
Procurement and Contracts
330 Fair Lane
Placerville, California 95667
RFP #00-000-000 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.

VI. **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 the 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 the County and will not be returned.

VII. **Valid Offer:** Proposals shall remain valid for 120 days from the due date. The 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 the 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 the 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.

VIII. **County's Rights:** The County reserves the right to:

1. Request clarification of any submitted information
2. Waive any informalities or irregularities in any qualification statement
3. Not enter into any agreement
4. Not select any consultant
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 the County
8. Interview consultants prior to award
9. To request additional information during an interview

IX. **El Dorado County Web Site 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

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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://www.co.el-dorado.ca.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."

X. **Evaluation:** Proposals shall be evaluated by a team composed of County personnel representing the El Dorado County Development Services Department and _____ on the basis of:

A. Proposal Content and Presentation

B. Compliance with Administrative Requirements

C. Experience, Qualifications, and Work Plan

D. Total Cost

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.

XI. **Award:** Award shall be recommended to the Proposer whose proposal best meets the needs of the County. The County reserves the right to reject any or all proposals, and to solicit additional proposals if deemed in the best interest of the 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. Receipt of the fully executed agreement will serve as Proposer's notice to proceed with services.

XII. **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.

XIII. **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. The 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 vendor.

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

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STATEMENT OF NO RESPONSE

If Vendor is not submitting a response to this BID, RFP, RFI, RFQ, etc, please complete and return this form to: El Dorado County Procurement and Contracts, 330 Fair Lane, Placerville, CA 95667, or fax to (530) 295-2537. Failure to respond to a BID, RFP, RFI, RFQ, etc, or submit a 'Statement of No Response' three (3) times in succession will result in removal from the County's bidders list.

Board of Supervisors Procurement Policy C17, Section 8.2:
Removal of a vendor from the bidders list may be for:

(a) Failure to respond to more than three (3) consecutive formal invitations to bid; or
(b) Failure to respond responsibly to more than three (3) notices to bid; or
(c) Failure to perform after an award of a bid; or
(d) Other reasons that show the bidder to be a non-responsive or non-responsible bidder.

The Purchasing Agent must review and approve the removal of a vendor from the bidders list. The Purchasing Agent shall notify the vendor in writing that said vendor has been removed from the bidders list. Vendors removed from the bidders list shall have an opportunity to request reinstatement at any time, and may submit a bid notwithstanding if they have been removed from the list. The request for reinstatement must be submitted to the Purchasing Agent on such forms as provided by the Purchasing Agent

Invitation # (BID, RFP, RFI, RFQ, etc.): _____

Name of Firm: _____

Address: _____

_____

Signature: _____

Telephone Number: _____ Date: _____

The above has declined to submit a bid response for the following reason(s) (please check all that apply):

____ We do not offer this commodity and/or service or an equivalent.

____ Insufficient time to respond to the RFP.

____ Our schedule would not permit us to perform.

Remarks:

_____

_____

_____

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Exhibit "A"

SAMPLE AGREEMENT FOR SERVICES # (~)
For Illustrative Purposes only

THIS AGREEMENT made and entered by and between the County of El Dorado, a political subdivision of the State of California (hereinafter referred to as "County" or "Grantee") and (~), a Corporation duly qualified to conduct business in the State of California, whose principal place of business is (~)(address), (~)(city), (~)(state) (~)(zip), (hereinafter referred to as "Contractor");

W I T N E S S E T H

WHEREAS, County has determined that it is necessary to obtain a Contractor to provide (~); and

WHEREAS, Contractor has represented to County that it is specially trained, experienced, expert and competent to perform the special services required hereunder and County has determined to rely upon such representations; and

WHEREAS, it is the intent of the parties hereto that such services be in conformity with all applicable federal, state and local laws; and

WHEREAS, County has determined that the provisions of these services provided by Contractor are in the public's best interest and that these services, are more economically and feasibly performed by outside independent Contractors as well as authorized by El Dorado County Charter, Section 210 (b) (6) and/or Government Code 31000;

NOW, THEREFORE, County and Contractor mutually agree as follows:

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ARTICLE I
Scope of Services:

ARTICLE II
Term: This Agreement shall become effective when fully executed by both parties hereto and shall expire …….. .

ARTICLE III
Compensation for Services: For services provided herein, County agrees to pay Contractor (~) (monthly in arrears). Payment shall be made within thirty (30) days following County receipt and approval of itemized invoice(s) detailing services rendered. (For the purposes hereof, the billing rate shall be (~). The total amount of this Agreement shall not exceed (~).

ARTICLE IV
Changes to Agreement: This Agreement may be amended by mutual consent of the parties hereto. Said amendments shall become effective only when in writing and fully executed by duly authorized officers of the parties hereto.

ARTICLE V
Contractor to County: It is understood that the services provided under this Agreement shall be prepared in and with cooperation from County and its staff. It is further agreed that in all matters pertaining to this Agreement, Contractor shall act as Contractor only to County and shall not act as Contractor to any other individual or entity affected by this Agreement nor provide information in any manner to any party outside of this Agreement that would conflict with Contractor's responsibilities to County during term hereof.

ARTICLE VI
Assignment and Delegation: Contractor is engaged by County for its unique qualifications and skills as well as those of its personnel. Contractor shall not subcontract, delegate or assign services to be provided, in whole or in part, to any other person or entity without prior written consent of County and the State.

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ARTICLE VII

Independent Contractor/Liability: Contractor is, and shall be at all times, deemed independent and shall be wholly responsible for the manner in which it performs services required by terms of this Agreement. Contractor exclusively assumes responsibility for acts of its employees, associates and subcontractors, if any are authorized herein, as they relate to services to be provided under this Agreement during the course and scope of their employment.

Contractor shall be responsible for performing the work under this Agreement in a safe, professional, skillful and workmanlike manner and shall be liable for its own negligence and negligent acts of its employees. County shall have no right of control over the manner in which work is to be done and shall, therefore, not be charged with responsibility of preventing risk to Contractor or its employees. Contractor, and the agents and employees of Contractor, in the performance of this Agreement, shall act in an independent capacity and not as officers or employees or agents of the State.

ARTICLE VIII

Fiscal Considerations: The parties to this Agreement recognize and acknowledge that County is a political subdivision of the State of California. As such, El Dorado 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 fiscal 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 the County, this Agreement may be deemed to be cancelled in its entirety subject to payment for services performed prior to cancellation.

ARTICLE IX

Default, Termination and Cancellation:

A. Default: Upon the occurrence of any default of the provisions of this Agreement, a party shall give written notice of said default to the party in default (notice). If the party in default does not cure the default within ten (10) days of the date of notice (time to cure), then such party shall be in default. The time to cure may be extended at the discretion of the party giving notice. Any extension of time to cure must be in writing, prepared by the party in default for signature by the party giving notice and must specify the reason(s) for the extension and the date on which the extension of time to cure expires.

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Notice given under this section shall specify the alleged default and the applicable Agreement provision and shall demand that the party in default perform the provisions of this Agreement within the applicable period of time.

No such notice shall be deemed a termination of this Agreement unless the party giving notice so elects in this notice, or the party giving notice so elects in a subsequent written notice after the time to cure has expired.

B. Bankruptcy: This Agreement, at the option of the County, shall be terminable in the case of bankruptcy, voluntary or involuntary, or insolvency of Contractor.

C. Ceasing Performance: County may terminate this Agreement in the event Contractor ceases to operate as a business, or otherwise becomes unable to substantially perform any term or condition of this Agreement.

D. Termination or Cancellation without Cause: County may terminate this Agreement in whole or in part seven (7) calendar days upon written notice by County for any reason. If such prior termination is effected, County will pay for satisfactory services rendered prior to the effective dates as set forth in the Notice of Termination provided to Contractor, and for such other services, which County may agree to in writing as necessary for contract resolution. In no event, however, shall County be obligated to pay more than the total amount of the contract. Upon receipt of a Notice of Termination, Contractor shall promptly discontinue all services affected, as of the effective date of termination set forth in such Notice of Termination, unless the notice directs otherwise. In the event of termination for default, County reserves the right to take over and complete the work by contract or by any other means.

E. Termination for Cause: The State may terminate this Agreement and be relieved of any payments should the Contractor fail to perform the requirements of this Agreement at the time and in the manner herein provided.

ARTICLE X

Notice to Parties: All notices to be given by the parties hereto shall be in writing and served by depositing same in the United States Post Office, postage prepaid and return receipt requested. Notices to County shall be in duplicate and addressed as follows:

COUNTY OF EL DORADO
(~)
(~)
PLACERVILLE, CA 95667
ATTN: (~)

or to such other location as the County directs.

Notices to Contractor shall be addressed as follows:

(~)
(~)

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(~)
ATTN: (~)

or to such other location as the Contractor directs.

ARTICLE XI
Indemnity: The Contractor shall defend, indemnify and hold the County harmless against and from any and all claims, suits, losses, damages and liability for damages of every name, kind and description, including attorneys fees and costs incurred, brought for, or on account of, injuries to or death of any person, including but not limited to workers, County employees and the public, or damage to property or any economic or consequential losses, which are claimed to or in any way arise out of or are connected with the Contractor's services, operations or performance hereunder, regardless of the existence or degree of fault or negligence on the part of the County, the Contractor, subcontractor(s) and employee(s) or any of these, except for the sole or active negligence of the County, its officers and employees, or as expressly prescribed by statute. This duty of Contractor to indemnify and save County harmless includes the duties to defend set forth in California Civil Code Section 2778.

ARTICLE XII
Insurance: Contractor shall provide proof of a policy of insurance satisfactory to the El Dorado County Risk Manager and documentation evidencing that Contractor maintains insurance that meets the following requirements:

A. Full Worker's Compensation and Employer's Liability Insurance covering all employees of Contractor as required by law in the State of California.

B. Commercial General Liability Insurance of not less that $1,000,000.00 combined single limit per occurrence for bodily injury and property damage.

C. Automobile Liability Insurance of not less than $1,000,000.00 is required in the event motor vehicles are used by the Contractor in the performance of the Agreement.

D. In the event Contractor is a licensed professional, and is performing professional services under this Agreement, professional liability (for example, malpractice insurance) is required with a limit of liability of not less that $1,000,000.00 per occurrence. For the purposes of this Agreement, professional liability (~)(is)(is not) required.

E. Contractor shall furnish a certificate of insurance satisfactory to the El Dorado County Risk Manager as evidence that the insurance required above is being maintained.

F. The insurance will be issued by an insurance company acceptable to Risk Management, or be provided through partial or total self-insurance likewise acceptable to Risk Management.

G. Contractor agrees that the insurance required above shall be in effect at all times during the term of this Agreement. In the event said insurance coverage expires at any time or times during the term of this Agreement, Contractor agrees to provide at least thirty (30) days prior to said expiration date, a new certificate of insurance evidencing insurance coverage as provided for herein for not less than

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the remainder of term of the Agreement, or for a period of not less that one (1) year. New certificates of insurance are subject to the approval of Risk Management and Contractor agrees that no work or services shall be performed prior to the giving of such approval. In the event the Contractor fails to keep in effect at all times insurance coverage as herein provided, County may, in addition to any other remedies it may have, terminate this Agreement upon the occurrence of such event.

H. The certificate of insurance must include the following provisions stating that:

1. The insurer will not cancel the insured's coverage without thirty (30) days prior written notice to County, and;

2. The County of El Dorado, its officers, officials, employees and volunteers are included as additional insured, but only insofar as the operations under this Agreement are concerned. This provision shall apply to all liability policies except worker's compensation and professional liability insurance policies.

I. The Contractor's insurance coverage shall be primary insurance as respects the County, its officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the County, its officers, officials, employees or volunteers shall be in excess of the Contractor's insurance and shall not contribute with it.

J. Any deductibles or self-insured retentions must be declared to and approved by the County, either; the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the County, its officers, officials, employees and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

K. Any failure to comply with the reporting provisions of the policies shall not affect coverage provided to the County, its officers, officials, employees or volunteers.

L. The insurance companies shall have no recourse against the County of El Dorado, its officers and employees or any of them for payment of any premiums or assessments under any policy issued by any insurance company.

M. Contractor's obligations shall not be limited by the foregoing insurance requirements and shall survive expiration of this Agreement.

N. In the event Contractor cannot provide an occurrence policy, Contractor shall provide insurance covering claims made as a result of performance of this Agreement for not less than three (3) years following completion of performance of this Agreement.

O. Certificate of insurance shall meet such additional standards as may be determined by the contracting County Department either independently or in consultation with Risk Management, as essential for protection of the County.

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ARTICLE XIII
Interest of Public Official: No official or employee of County who exercises any functions or responsibilities in review or approval of services to be provided by Contractor under this Agreement shall participate in or attempt to influence any decision relating to this Agreement which affects personal interest or interest of any corporation, partnership or association in which he/she is directly or indirectly interested; nor shall any such official or employee of County have any interest, direct or indirect, in this Agreement or the proceeds thereof.

ARTICLE XIV
Interest of Contractor: Contractor covenants that Contractor presently has no personal interest or financial interest, and shall not acquire same in any manner or degree in either: 1) any other contract connected with or directly affected by the services to be performed by this Agreement; or, 2) any other entities connected with or directly affected by the services to be performed by this Agreement. Contractor further covenants that in the performance of this Agreement no person having any such interest shall be employed by Contractor.

ARTICLE XV
California Residency (Form 590): All independent Contractors providing services to the County must file a State of California Form 590, certifying their California residency or, in the case of a corporation, certify that they have a permanent place of business in California. The Contractor will be required to submit a Form 590 prior to execution of an Agreement <u>or</u> County shall withhold seven (7%) percent of each payment made to the Contractor during term of the Agreement. This requirement applies to any agreement/contract exceeding $1,500.00.

ARTICLE XVI
Administrator: The County Officer or employee with responsibility for administering this Agreement is (~)(Name), (~)(Title), (~)(Department), or successor.

ARTICLE XVII
Authorized Signatures: The parties to this Agreement represent that the undersigned individuals executing this Agreement on their respective behalf are fully authorized to do so by law or other appropriate instrument and to bind upon said parties to the obligations set forth herein.

ARTICLE XVIII
Partial Invalidity: If any provision of this Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions will continue in full force and effect without being impaired or invalidated in any way.

ARTICLE XIX
Venue: Any dispute resolution action rising out of this Agreement, including, but not limited to, litigation, mediation or arbitration, shall be brought in El Dorado County, California, and shall be resolved in accordance

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with the laws of the State of California. Contractor waives any removal rights it might have under Code of Civil Procedure Section 394.

ARTICLE XX
Taxpayer Identification Number (Form W-9): All independent Contractors or Corporations providing services to the County must file a Department of the Treasury Internal Revenue Service Form W-9, certifying their Taxpayer Identification Number.

ARTICLE XXI
Conflict of Interest: The parties to this Agreement have read and are aware of the provisions of Government Code Section 1090 et seq. and Section 87100 relating to conflict of interest of public officers and employees. Contractor attests that it has no current business or financial relationship with any County employee(s) that would constitute a conflict of interest with provision of services under this contract and will not enter into any such business or financial relationship with any such employee(s) during the term of this Agreement. County represents that it is unaware of any financial or economic interest of any public officer of employee of Contractor relating to this Agreement. It is further understood and agreed that if such a financial interest does exist at the inception of this Agreement either party may immediately terminate this Agreement by giving written notice as detailed in the Article in the Agreement titled, "Default, Termination and Cancellation".

ARTICLE XXII
Entire Agreement: This document and the documents referred to herein or exhibits hereto are the entire Agreement between the parties and they incorporate or supersede all prior written or oral Agreements or understandings.

Contract Administrator Concurrence:

By: _____Dated: _____
(~)(Name), (~)(Title)
(~)(Department)

Requesting Department Concurrence:

By: _____Dated: _____
(~)(Name), (~)(Title)
(~)(Department)

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IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the dates indicated below, the latest of which shall be deemed to be the effective date of this Agreement.

- - C O U N T Y O F E L D O R A D O - -

Dated:_____

By:_____
Chair
Board of Supervisors
"County"

ATTEST: Cindy Keck,
Clerk of the Board of Supervisors

By::_____Dated:_____
Deputy Clerk

- - C O N T R A C T O R - -

Dated:_____

(~)COMPANY,
A (~)(State) CORPORATION

By:_____
(~)Name, (~)Title
"Contractor"

By::_____Dated:_____
Corporate Secretary

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Exhibit "B"

INRMP PAWTAC & ISAC Joint Meeting
August 27, 2008

RFP Comments

a. Identify Important Habitat
    - Resolve conflicts between Pine Hill Plants and larger biological areas. Include previously existing bio reports done for development projects incorporated into INRMP. Develop mechanism for a process for present and future bio reports to be mapped.
    - Identify where bio surveys have been done and nothing has been found – where things aren't (Rare, Threatened, Endangered Species)
    - Are we missing things that haven't been covered. Are oaks mapped correctly; clear identification.
    - Definitions to be included; what are source of definitions. Assumption that State has definition of "Important Habitat."
    - How old are the studies/maps? Is there something newer?
    - Assumption that this is to deal with county-wide, global issues, but projects will need to deal with special status species on a project-by-project basis.
    - List of what maps will be included – soils that support special status plants, etc. List of what has already been mapped.
    - List of special status species from DFG database is old; work with DFG on data
    - Use spatial data, not point data.
    - How do state/federal lands interrelate with what INRMP is trying to do? What state/federal lands rules apply to their lands?
    - Explore linkages between habitats. Landscapes are connected. Explore literature. Develop criteria for inventory; modeling – identify under different criteria effects on habitat/species.
    - How do lands under federal/state ownership protect special status species (Policy 7.4.1.5)?
    - Are we in conflict with state or federal plans? Make sure we are tied into it.
    - Comprehensive study at the beginning before completing other steps. Fragmentation and connectivity issues.
    - What connectivity is and isn't. What corridors are important or not. Substantial evidence in record regarding riparian, highway 50 barrier, Weber Creek.

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- Different species have different needs in connectivity and corridors; what species to address connectivity issue on; not feasible for connectivity on every species. Committee and Board support on species chosen. Different scale species (some species miles, some feet). Scaled analysis – larger moving species, smaller local species.
- Large expanse of native vegetation – large expanse is different for oak trees than for Stebbin's morning glory. Is it trying to address special status needs, or? Scaled approach.
- Approach matrix on connectivity and special status species so that it is dynamic – not a snapshot, but a moving picture, updated on a consistent basis. Don't lock in decisions or processes that can't be changed over time.
- Term special status species comes from a table in the GP EIR.
- There needs to be an adaptive management component. Consultants develop an appropriate list after consulting with experts. CEQA mitigations and protections are driving this.
- Integrating into a plan both general habitat and habitat for special status species.
- Process – consultant identifies species, bring back to committees in early part of process for review, then to Board.
- Table that identifies species that share habitat – biological criteria – whether habitat addresses future species.
- Get a consultant separately to help define RFP.
- What are economic costs of managing land – how much it costs and how does it get paid for?
- Don't duplicate processes occurring on state oversight or federal lands.
- Adaptive management – update on a regular basis – include mechanisms for doing that. Perpetuities?

b. Habitat Protection Strategy

- "Meeting CEQA measures" constrains. There can be voluntary measures by people as well. Sort out regulatory context items from voluntary measures.
- We're implementing policy decisions; more than CEQA measures. There is a regulatory component to this.
- Impacts of climate change and what will happen to the waterways. Will it have an impact on waterways? What could happen as snowpack decreases?
- Opportunity for conservation strategy; this is what bullet B is. How does this tie into a project-by-project basis? What are we trying to accomplish with this on a project-by-project basis?
- Areas identified as "Important" go through discretionary review and do project-by-project studies.

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- Financing needs to be a component of a Habitat Protection Strategy. What choices and alternatives are out there and "battle-tested" out in state as to what a real habitat protection strategy is?
- What is currently successful in this county? Fire safety plans; management of forest lands. Prop 40 funding.
- There has been progress in wildlife crossings and roadways in the past 4-6 years. Check recent studies on what works and doesn't; develop toolbox for use on projects. Things that don't work can be clearly identified. Not just in U.S. but European studies (they are ahead of us). It also incorporates the corridor issue.
- Cooperative strategy. Look at successful projects; timbering, grazing, Delta rice farmers, etc. Win-win for different groups.
- Different ways of thinking of how to get conservation to happen, such as economic incentives. Develop some ideas that could work, such as carbon credits, various tools for use in toolbox.
- Detailed inventory of all publicly owned lands (conservation easements, etc.) then overlay on parcel map.
- BMPs in place for Ag Districts that don't affect habitats. Such as leaving riparian areas as habitat corridors. Is effective in protecting habitat areas – don't have to have acquisition strategy to set aside those lands in perpetuity. Ag landowners have a significant amount of their land in natural habitat. Study to identify those lands and recognize them as natural habitats.
- Direct consultant to identify and determine roles organizations play that conserve.
- Ask the consultant to develop recommendations for prioritizing the most significant/important areas for conservations from among the Important Habitat inventory. Where will county direct funds that are collected and where will those funds be directed at in priority order? Maybe higher priority to links that connect already protected lands.
- Loop monitoring into habitat strategy. Which strategies in literature have most efficacy and most bang for the buck? Build in appropriate feedback loops. Not done when plan adopted. Monitoring is critical.
- Put Best Practices list that works in situations – would be a good toolbox.

c. Mitigation Assistance

- "Important Habitats" – adaptive management – if the purpose of this section is impacts based on "a", which is adaptive and changes – how is the mitigation done? Clearly articulated and disseminated to the public, who will have to pay fees or do the 2:1 mitigation. The map could change, how will the public know?
- A list of species, and their habitats, could clearly identify "important habitat."
- Consult with agencies and coordinate mitigation.

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- What is the role of a qualified land trust?
- Discretionary projects have to do their own CEQA, so there should be no conflicts.
- This section includes the word "incentives." Voluntary, less punitive, allows people to comply.
- Having mitigation options. Acquisitions are not fundamental piece. Alternatives and options. Recognize where mitigation has occurred onsite.
- Could be mitigation bank, conservation banks. Project proponent has a menu/choice.
- Realistic solutions such as in urban areas; mitigation assistance fund could obtain something in priority areas. Protection/avoidance should be tools that can be used. Range of impacts; range of mitigations. Not one size fits all.
- Scale and scope, BMPs, things that are battle-tested.
- Develop a toolbox of things that can be used to retain the values. Protect habitat, not just mitigate projects. Strategy for values not already protected – recognize what is already protected.
- Different levels of protection – for federal lands, etc., in mapping.
- Plan is effective because we know county; not plan that will be trumped.

d. Habitat Acquisition

- Under CO-M, we've already adopted an Initial Map, we can start acquiring. What do County and advisory groups think is appropriate for prioritization of acquisitions? Is it red-legged frog habitat, oaks, rare plants? Develop a point system?
- We have rare plants and oaks funding programs. Rare plant acquisition coordinates with state/federal agencies and that's where that funding goes.
- Better to have a county process to identify priority – better for county citizens and Board to decide, not consultant.
- Economic impact of habitat acquisition to surrounding areas. If you are a landowner with an IBC or IH designation, could affect property value. Ripple effect. Potential impact of degrading property values. Needs economic analysis, everyone needs to be treated appropriately and fairly.
- Functional transfer of density – TDR. Implicit onsite, clustering of a project. Is it a mechanism for transferring density and/or economic windfall? Including parcels where density was not recognized in GP.
- PAR software evaluates true cost of acquiring and managing land in perpetuity.

e. Habitat Management

- Opportunities to transfer lands to BLM or FS. Might be more practical than county to manage lands.

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- Baseline on population, acreages, quality of habitat. Don't punish landowners who have done work on their land and have invested in their land.
- Develop carrying capacity for whatever you are trying to manage.
- Setting up separate group to discuss management strategy.
- Consultants can provide different options of what can be done. What is management? Can be achieved through conservation easement language, there is oversight there. Cost different things. Can have some kind of oversight group. Consultant needs to identify options, infrastructure to support options, and costs of those options.
- Management and Monitoring go hand in hand. What is economically viable way of doing this?
- Some lands already managed such as in Timber Harvest Zones.
- This section is for lands that have been acquired through the INRMP. Global monitoring is in section "a".
- Look at OWMP. Management of PCAs is well written, and tools are in toolbox. Marrying some of that language and don't reinvent the wheel.
- Management side, we already have regulatory constraints. INRMP is like offsite mitigation. You're protecting resources in other areas due to areas affected by development.

f. Monitoring

g. Public Participation
h. Funding
i. IBC
j. Incorporation of OWMP and Rare Plants into INRMP

- Incorporate BOS issues/decisions/deferrals of continuation of OWMP into INRMP
- Incorporate Policy 7.4.4.5

k. How will development projects conform to the INRMP?

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Exhibit "C"

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El DORADO COUNTY

GENERAL PLAN POLICIES RELATED TO THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP)

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.

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 uses within these areas shall be limited to those activities that do not require grading or vegetation removal.

Policy 7.4.2.5 Setbacks from all rivers, streams, and lakes shall be included in the Zoning Ordinance for all ministerial and discretionary development projects.

Policy 7.4.2.6 El Dorado County Biological Community Conservation Plans shall be required to protect, to the extent feasible, rare, threatened, and endangered plant species only when existing Federal or State plans for non-jurisdictional areas do not provide adequate protection.

Policy 7.4.2.7 The County shall form a Plant and Wildlife Technical Advisory Committee to advise the Planning Commission and Board of Supervisors on plant and wildlife issues, and the committee should be formed of local experts, including agricultural, fire protection, and forestry representatives, who will consult with other experts with special expertise on various plant and wildlife issues, including representatives of regulatory agencies. The Committee shall formulate objectives which will be reviewed by the Planning Commission and Board of Supervisors.

Policy 7.4.2.8 Develop within five years and implement an Integrated Natural Resources Management Plan (INRMP) that identifies important habitat in the County and establishes a program for

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effective habitat preservation and management. The INRMP shall include the following components:

A. Habitat Inventory. This part of the INRMP shall inventory and map the following important habitats in El Dorado County:

1. Habitats that support special status species;
2. Aquatic environments including streams, rivers, and lakes;
3. Wetland and riparian habitat;
4. Important habitat for migratory deer herds; and
5. Large expanses of native vegetation.

The County should update the inventory every three years to identify the amount of important habitat protected, by habitat type, through County programs and the amount of important habitat removed because of new development during that period. The inventory and mapping effort shall be developed with the assistance of the Plant and Wildlife Technical Advisory Committee, CDFG, and USFWS. The inventory shall be maintained and updated by the County Planning Department and shall be publicly accessible.

B. Habitat Protection Strategy. This component shall describe a strategy for protecting important habitats based on coordinated land acquisitions (see item D below) and management of acquired land. The goal of the strategy shall be to conserve and restore contiguous blocks of important habitat to offset the effects of increased habitat loss and fragmentation elsewhere in the county. The Habitat Protection Strategy should be updated at least once every five years based on the results of the habitat monitoring program (item F below). Consideration of wildlife movement will be given by the County on all future 4- and 6-lane roadway construction projects. When feasible, natural undercrossings along proposed roadway alignments that could be utilized by terrestrial wildlife for movement will be preserved and enhanced.

C. Mitigation Assistance. This part of the INRMP shall establish a program to facilitate mitigation of impacts to biological resources resulting from projects approved by the County that are unable to avoid impacts on important habitats. The program may include development of mitigation banks, maintenance of lists of potential mitigation options, and incentives for developers and landowner participation in the habitat acquisition and management components of the INRMP.

D. Habitat Acquisition. Based on the Habitat Protection Strategy and in coordination with the Mitigation Assistance program, the INRMP shall include a program for identifying habitat acquisition opportunities involving willing sellers. Acquisition may be by state or federal land management agencies, private land trusts or mitigation banks, the County, or other public or private organizations. Lands may be acquired in fee or protected through acquisition of a conservation easement designed to protect the core habitat values of the land while allowing other uses by the fee owner. The program should identify opportunities for partnerships between the County and other organizations for habitat acquisition and management. In evaluating proposed acquisitions, consideration will be given to site specific features

(e.g., condition and threats to habitat, presence of special status species), transaction related features (e.g., level of protection gained, time frame for purchase completion, relative costs), and regional considerations (e.g., connectivity with adjacent protected lands and important habitat, achieves multiple agency and community benefits). Parcels that include important habitat and are located generally to the west of the Eldorado National Forest should be given priority for acquisition. Priority will also be given to parcels that would preserve natural wildlife movement corridors such as crossing under major roadways (e.g., U.S. Highway 50 and across canyons). All land acquired shall be added to the Ecological Preserve overlay area.

E. Habitat Management. Each property or easement acquired through the INRMP should be evaluated to determine whether the biological resources would benefit from restoration or management actions. Examples of the many types of restoration or management actions that could be undertaken to improve current habitat conditions include: removal of non native plant species, planting native species, repair and rehabilitation of severely grazed riparian and upland habitats, removal of culverts and other structures that impede movement by native fishes, construction of roadway under and overcrossing that would facilitate movement by terrestrial wildlife, and installation of erosion control measures on land adjacent to sensitive wetland and riparian habitat.

F. Monitoring. The INRMP shall include a habitat monitoring program that covers all areas under the Ecological Preserve overlay together with all lands acquired as part of the INRMP. Monitoring results shall be incorporated into future County planning efforts so as to more effectively conserve and restore important habitats. The results of all special status species monitoring shall be reported to the CNDDB. Monitoring results shall be compiled into an annual report to be presented to the Board of Supervisors.

G. Public Participation. The INRMP shall be developed with and include provisions for public participation and informal consultation with local, state, and federal agencies having jurisdiction over natural resources within the county.

H. Funding. The County shall develop a conservation fund to ensure adequate funding of the INRMP, including habitat maintenance and restoration. Funding may be provided from grants, mitigation fees, and the County general fund. The INRMP annual report described under item F above shall include information on current funding levels and shall project anticipated funding needs and anticipated and potential funding sources for the following five years.

Policy 7.4.2.9 The Important Biological Corridor (-IBC) overlay shall apply to lands identified as having high wildlife habitat values because of extent, habitat function, connectivity, and other factors. Lands located within the overlay district shall be subject to the following provisions except that where the overlay is applied to lands that are also subject to the Agricultural District (-A) overlay or that are within the Agricultural Lands (AL) designation, the land use restrictions associated with the -IBC policies will not apply to the extent that the agricultural practices do not interfere with the purposes of the -IBC overlay.

• Increased minimum parcel size;

• Higher canopy-retention standards and/or different mitigation standards/thresholds for oak woodlands;

• Lower thresholds for grading permits;

• Higher wetlands/riparian retention standards and/or more stringent mitigation requirements for wetland/riparian habitat loss;

• Increased riparian corridor and wetland setbacks;

• Greater protection for rare plants (e.g., no disturbance at all or disturbance only as recommended by U.S. Fish and Wildlife Service/California Department of Fish and Game);

• Standards for retention of contiguous areas/large expanses of other (non-oak or non-sensitive) plant communities;

• Building permits discretionary or some other type of "site review" to ensure that canopy is retained;

• More stringent standards for lot coverage, floor area ratio (FAR), and building height; and

• No hindrances to wildlife movement (e.g., no fences that would restrict wildlife movement).

The standards listed above shall be included in the Zoning Ordinance.
Wildland Fire Safe measures are exempt from this policy, except that Fire Safe measures will be designed insofar as possible to be consistent with the objectives of the Important Biological Corridor

MEASURE CO-L

Develop guidelines for the preparation of biological study reports. [Policy 7.4.1.6]

Responsibility:	Planning Department and Department of Transportation
Time Frame:	Develop guidelines within five years of General Plan adoption.

MEASURE CO-M

Develop and implement an Integrated Natural Resources Management Plan consistent with Policy 7.4.2.8.

Responsibility:	Planning Department
Time Frame:	Develop initial habitat protection strategy; develop and implement mitigation assistance program; and develop and implement conservation fund within two years of General Plan adoption. Develop framework for acquisition strategy and monitoring program within three years of General Plan adoption. Begin actual acquisition after completion of the initial inventory and mapping; develop management strategies as properties are acquired. Adaptive management of the entire program will be ongoing.

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MEASURE CO-N

Review and update an Important Biological Corridor (-IBC) Overlay land use designation consistent with Policy 7.4.2.9.

Responsibility:	Planning Department
Time Frame:	Within two years of General Plan adoption.

MEASURE CO-U

Mitigation under Policy 7.4.1.6 shall include providing sufficient funding to the County's conservation fund to acquire and protect important habitat at a minimum 2:1 ratio. The cost associated with acquisition, restoration, and management of the habitat protected shall be included in the mitigation fee. For larger development projects (i.e., those that exceed a total of 10 acres), in addition to contributing to the conservation fund at a minimum 2:1 ratio, onsite preservation and/or restoration of important habitat shall be required at a 1:1 ratio. Impacts on important habitat and mitigation requirements shall be addressed in a Biological Resources Study and an Important Habitat Mitigation Program (described below).

A. Biological Resources Study. The County shall adopt biological resource assessment standards that apply to all discretionary projects that would result in disturbance of soil and native vegetation in areas that include important habitat as defined in the INRMP. The assessment of the project site must be in the form of an independent Biological Resources Study, and must be completed by a qualified biologist. The evaluation shall quantify the amount of important habitat, by habitat type, as defined in the General Plan and delineated on maps included in the INRMP. The Biological Resources Study shall also address the potential for the project to adversely affect important habitat through conversion or fragmentation. This requirement shall not apply to projects that are on lands that either (1) have already been the subject of a study and for which all mitigation requirements are being implemented or (2) have been evaluated by the County and found to not possess any important habitat resources.

B. Important Habitat Mitigation Program. The Biological Resource Study shall include an Important Habitat Mitigation Program that identifies options that would avoid, minimize, or compensate for impacts on important habitats in compliance with the standards of the INRMP and the General Plan. All mitigation programs shall include a monitoring and reporting component requiring reports to the County not less than once each year for a period of not less than 10 years. The report will include a description of the lands included in the mitigation program (including location and size), a summary of the evaluation criteria established at the time the mitigation program was approved, an evaluation of the mitigation program based on those criteria, and recommendations for action during the following year. The County shall adopt standards for evaluating mitigation programs proposed as part of the Biological Resources Study described above. The standards shall ensure that the mitigation reduces direct and cumulative impacts of proposed development on important habitats to less than significant levels in accordance with CEQA thresholds.

Responsibility:	Planning Department
Time Frame:	Refer to Measures CO-L and CO-M as applicable.

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Exhibit "D"

Oak Woodland Management Plan

Please download from

http://www.co.el-dorado.ca.us/Planning/OakWoodlandsAdoptedMay2008.html

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Exhibit "E"

Chapter 17.71

ECOLOGICAL PRESERVES

17.71.010 Definitions.

Whenever the following words are used in this Chapter, they shall have the meanings herein ascribed to them:

CALIFORNIA DEPARTMENT OF FISH AND GAME OR DFG: The California State Department of Fish and Game, a part of the State Resources Agency.

CALIFORNIA ENDANGERED SPECIES ACT OR STATE ENDANGERED SPECIES ACT: Those statutes found at California Fish and Game Code sections 2050 through 2098 and implementing regulations.

CALIFORNIA ENVIRONMENTAL QUALITY ACT OR CEQA: 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.

DEVELOPMENT PROJECT: 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.

EID: The El Dorado County Irrigation District.

ECOLOGICAL PRESERVE: An area officially designated as such on General Plan Maps on file in the County Planning Department.

ECOLOGICAL PRESERVE MITIGATION: 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.

FEDERAL ENDANGERED SPECIES ACT: Those Federal statutes found at 16 U.S.C. 1531 et seq., and implementing regulations.

MITIGATION AREA 0: Lands within an ecological preserve as shown officially on maps on file in the County Planning Department.

MITIGATION AREA 1: 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.

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MITIGATION AREA 2: 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.

RARE PLANT OFF-SITE MITIGATION PROGRAM: 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.

RARE PLANTS OR PINE HILL ENDEMICS: 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
USBR: The United States Bureau of Reclamation.
USFWS: The United States Fish and Wildlife Service. (Ord. 4500, 7-28-1998)

17.71.200: MITIGATION AND FEE PAYMENTS:

A. 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 Chapter.

B. On-Site Mitigation in Mitigation Area 0:

1. 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 (3) 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.

2. Option B1b of this Section shall apply only to properties greater than five (5) acres in area.

C. 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 (2) options:

1. 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

2. Participate in the rare plant off-site mitigation program. (Ord. 4500, 7-28-1998)

17.71.230: ECOLOGICAL PRESERVE FEE:

A. Formula: The amount of the fee is based on the following formula: Mitigation Areas 1 and 2 are each assigned fifty percent (50%) of the total local cost of the rare plant mitigation program, based upon the probability that fifty percent (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 one thousand five hundred (1,500) square feet 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.

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B. Annual Fee Review: The fee amounts shall be reviewed on an annual basis and adjusted as necessary to ensure that the anticipated fees are no more and no less than required for the purpose for which they are collected.
C. 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. (Ord. 4500, 7-28-1998)

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. (Ord. 4500, 7-28-1998)

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. (Ord. 4500, 7-28-1998)

17.71.280: DISPOSITION OF FUNDS:

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. (Ord. 4500, 7-28-1998)

17.71.290: APPEALS:

An appeal from a decision made pursuant to this Chapter shall be in accordance with the appeals procedures set forth in Chapter 6 of this Title; except, that DFG shall also be notified of the appeal hearing in writing at least five (5) days in advance of the hearing. (Ord. 4500, 7-28-1998)

17.71.300: TERMINATION OF REQUIREMENT OR FEE IN LIEU OF MITIGATION:

The requirements of mitigation or payment of a fee in lieu of ecological preserve

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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. (Ord. 4500, 7-28-1998)

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Exhibit "F"

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The Potential Impacts of Development on Wildlands in El Dorado County, California

Saving, S. C.[1] and G. B. Greenwood[2]

Abstract

We modeled future development in rapidly urbanizing El Dorado County, California, to assess ecological impacts of expanding urbanization and effectiveness of standard policy mitigation efforts. Using raster land cover data and county parcel data, we constructed a footprint of current development and simulated future development using a modified stochastic flood-fill algorithm. We modeled combinations of constraints from the 1996 County General Plan and parcel data – slope, stream buffers, oak canopy retention, existing development, public ownership, regional clustering, and acquisition programs – and overlaid development outcomes onto the land cover data. We then calculated metrics of habitat loss and fragmentation for natural land cover types. Rural residential development erodes habitat quality much more than habitat extent. Policy alternatives ranging from existing prescriptions to very restrictive regulations had marginal impact on mitigating habitat loss and fragmentation. Historic land parcelization limits mitigation of impacts by the current General Plan prescriptions that only apply when a parcel requires subdivision before development. County-wide ordinances were somewhat more effective in preserving habitat and connectivity. These solutions may not offer enough extra protection of natural resources to justify the expenditures of "political capital" required for implementation. Custom, parcel based acquisition scenarios minimized habitat loss and maximized connectivity. Better analysis of public policy and planning design may be a more effective "smart growth" tool than generic policy prescriptions.

INTRODUCTION

The California Department of Finance projects the State's population to increase from 34 million to over 45 million by the year 2020 (California Department of Finance 2001). During the past 20 years, the spatial distribution of California's population has also changed as more people moved to the periphery of the dense Los Angeles and San Francisco Bay metropolitan areas and to the historically lower density Central Valley and Sierra Nevada foothills (U.S. Census Bureau 1991, 2001). Since the eastern half of many of these Sierran counties is predominantly national forest above 1,500 meters, the vast majority of this additional population will reside in the lower elevation foothills, a region dominated by oak hardwood savannah. The hardwood rangeland region of the Sierra, extending from 100 to 1,500 meters in elevation, is almost exclusively privately owned and has historically been used for grazing and some dryland farming (Greenwood and others 1993, Duane 1996). The switch from large parcel, low to moderate intensity agriculture to small parcel, high intensity urban and ex-urban land use promises great change to the natural

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ecosystems of the foothills region. These 5-acre to 40-acre ranchettes will likely contain the majority of naturally functioning hardwood landscape in the near future.

One such region of rapid change is El Dorado County in the Central Sierra Nevada Mountains. We conducted a policy analysis of the El Dorado County General Plan by modeling development in the western, foothill portion of the county. We were interested in two topics: 1) ecological impacts on wildland habitat resulting from expanding urbanization under the County's General Plan; and 2) the effectiveness of commonly proposed land use policy initiatives to mitigate those impacts. Several models exist for projecting development expansion at the county and regional scale (Landis 1994, 1995, 1998a, 1998b; Johnston 2000, 2001; US Environmental Protection Agency 2000). These models focus on dense urban development (1 - 2 acre parcels or smaller) using economic formulas of land values and empirically derived "attractors" of development such as proximity to existing infrastructure (roads, sewer, water, etc.) to guide development probabilistically and incrementally over time. However, in rural areas (5 - 40 acre parcels), where attractors are less obvious or more difficult to model, or where tractable economic factors are not the primary drivers behind development decisions, these models generally ignore rural development or resort to random allocation (Johnston 2001). In El Dorado County, the General Plan designates 23 percent of the county for development in this rural density range. In order to adequately predict impacts in these regions, we needed to place the existing and potential footprint of development as explicitly as possible. We developed a cell-based, empirical model that characterizes development patterns from existing development and then extends those patterns across the landscape onto vacant lands. Because we were primarily concerned with the relative impacts of the county's General Plan and alternative policy proposals, we chose to extend development to full "buildout" of the General Plan, approximately a 20 year time horizon, rather than incorporating an economic component which might allow the phasing of development over time.

We began by determining where development existed in 1996, the most recent year for which digital parcel data were available. We then predicted where development would be at full buildout of the General Plan under various scenarios (e.g., uncontrolled vs. smart growth, strict vs. loose environmental land use policy, and combinations thereof). For any given scenario, our model can assess the implications for a variety of issues ranging from natural ecosystem functions to local and regional economies to general quality of life. At present, we have analyzed a wide range of land use policies in the County and their relative impacts on two major areas of concern, wildland habitat quality (characterized by extent, fragmentation, and configuration) and economic costs and losses due to wildfire. This paper presents our research on the former.

STUDY AREA

El Dorado County is a predominantly rural county in the Central Sierra region of California stretching from the floor of the Central Valley east of Sacramento to the crest of the Sierras and the southern portion of Lake Tahoe (mean latitude 38.75° N, mean longitude 120.5° W). The county's 463,500 hectares cover a wide diversity of habitats including low elevation annual grasslands and blue oak (*Quercus douglasii*) savannah at the western edge, mid-elevation oak woodlands and mixed oak-conifer-shrub complexes in the central region, and Sierran mixed conifer forest dominated by

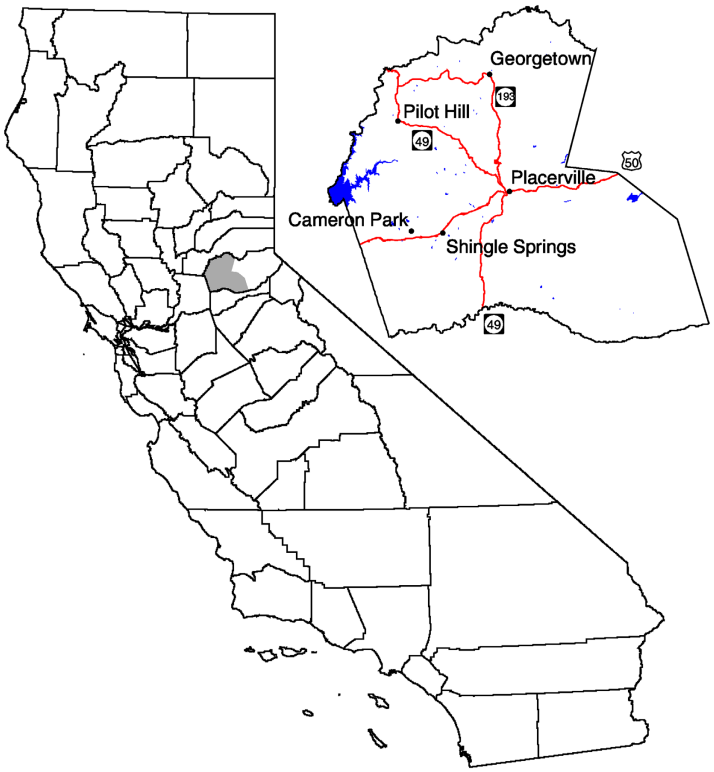

Figure 1 – Location of study area with major highways and cities.

ponderosa pine (*Pinus ponderosa*), Jeffrey pine (*Pinus jeffreyi*), and lodgepole pine (*Pinus contorta*) in the eastern half. According to the 2000 Census (U.S. Census Bureau 2001), 156,299 people lived in El Dorado County at an overall density of 33.7 persons/km^2. However, because the eastern half of the county is almost entirely national forest except for settlements on the southern littoral edge of Lake Tahoe, the average density for private lands is 63.3 persons/km^2. Housing density is 28.9 units/km^2. Our study area encompasses 220,954 ha and is restricted to the predominantly privately owned western foothills region of the county (*fig. 1*).

From the time Gold Rush pioneers settled in the 1850's, the population of El Dorado County fluctuated between 6,000 and 20,000 people until the 1950's. Since that time the decadal growth rate has ranged from 20 percent to 100 percent, with growth rates of 46.8 percent and 24.0 percent in the 1980's and 1990's, respectively (U.S. Census Bureau 1991, 2001). State Department of Finance projections indicate this magnitude of growth continuing for the next two decades resulting in 252,900 residents by 2020 (California Department of Finance 2001).

METHODS

Study Design

The purpose of this study was to evaluate the potential impact of El Dorado County's General Plan on wildland habitat in the county (primarily oak woodland) and how policy alternatives might mitigate these impacts. We modeled several

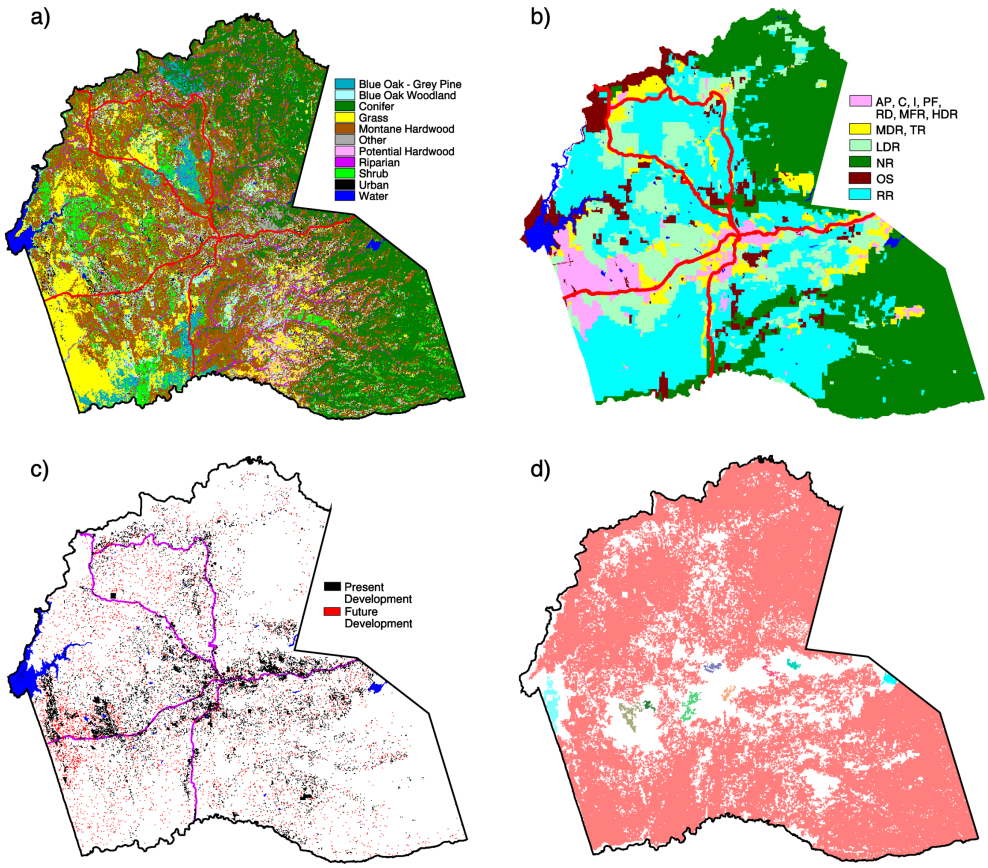

Figure 2 – a) land cover types from 1990 Hardwoods Pixel Data (Pacific Meridian Resources, 1994), b) 1996 El Dorado County Adopted General Plan land use classes collapsed to 6 categories (see Table 2 for land use codes), c) footprint of current and future development under General Plan scenario (503), and d) map of current wildland habitat in the study area.

alternative scenarios, three iterations each, by varying one or more of the General Plan prescriptions, as well as the possible spatial configuration of future development (*table 1*), and overlaying the resulting footprint of development onto the land cover data and measuring the core extent, fragmentation and configuration of wildland. As we intended this work to be directly relevant to issues facing the county, many of these scenarios were devised from suggestions by residents and county officials. Thus, we did not attempt to analyze every possible combination of variables, especially as it became apparent that one of them was not proving to be effective in mitigating the impacts on wildland.

We used three main geographic information system (GIS) datasets as inputs: 1) 1990 Hardwood Rangelands Pixel Data (Pacific Meridian Resources 1994) for land cover and current footprint of development (*fig. 2a*); 2) 1996 County Assessor's parcel data for land tenure information; and 3) 1996 Adopted County General Plan for future potential development densities (*fig. 2b*). We converted the parcel and General Plan data to 25 m raster grids and snapped them to the Hardwoods data. We conducted all spatial modeling with ESRI's ARC/INFO and GRID software (vers.

Table 1 – *Description of the combinations of restrictions used for each scenario tested.*

	Slope/Stream Restrictions			Canopy Retention[a]			Other Restrictions			Total Area (ha)
Scenario	Description	Extent	Area (ha)	Description	Extent	Area (ha)	Description	Extent	Area (ha)	Restricted[f]
500	Present Condition	-	-	-	-	-	-	-	-	-
503	25 m stream setbacks, < 40% slope	subdiv.	19,567	as per GP	subdiv.	5,980	-	-	-	122,774
504	25 m stream setbacks, < 40% slope	all	26,983	as per GP	subdiv.	5,980	-	-	-	128,389
505	50 m stream setbacks, < 40% slope	subdiv.	23,319	as per GP	subdiv.	5,980	-	-	-	125,988
506	50 m stream setbacks, < 40% slope	all	31,819	as per GP	subdiv.	5,980	-	-	-	132,694
507	25 m stream setbacks, < 40% slope	subdiv.	19,567	as per GP	subdiv.	5,980	Clustering[c]	LDR, subdiv.	12,526	122,774
508	25 m stream setbacks, < 40% slope	subdiv.	19,567	as per GP	subdiv.	5,980	Clustering[d]	LDR, subdiv.	12,526	122,774
509	25 m stream setbacks, < 40% slope	subdiv.	19,567	Increased[b]	subdiv.	7,096	-	-	-	123,920
513	25 m stream setbacks, < 40% slope	subdiv.	19,567	as per GP	all	6,409	-	-	-	123,368
514	25 m stream setbacks, < 40% slope	all	26,983	as per GP	all	6,409	-	-	-	128,944
515	50 m stream setbacks, < 40% slope	subdiv.	23,319	as per GP	all	6,409	-	-	-	126,564
516	50 m stream setbacks, < 40% slope	all	31,819	as per GP	all	6,409	-	-	-	133,217
520	50 m stream setbacks, < 40% slope	all	31,819	as per GP	all	6,409	Clustering[d]	LDR, subdiv	12,526	133,127
543	25 m stream setbacks, < 40% slope	subdiv.	19,657	as per GP	subdiv.	5,980	Acquistion[e]	AOC	2,071	124,513

[a] Canopy retention restricts development by limiting the amount of development. In most cases, this does not mean complete restriction but rather a reduction in density only (Table 2). See Greenwood and Saving, 1999.

[b] For details, see Greenwood and Saving, 1999.

[c] Proportion (B) of developed cells increased from 9% to 14%. Adjacency (C) increased from 55% to 95%.

[d] Proportion (B) of developed cells increased from 9% to 14%. Adjacency (C) increased from 55% to 98%.

[e] We manually selected parcels to be restricted to development in Areas of Concern (AOC).

[f] Includes all restrictions plus existing *developed* parcels, parcels *closed to development*, public ownership, and areas designated Open Space (OS) in the General Plan.

7.1.1 - 8.1) on UNIX workstations except the fragmentation metrics, which we calculated using APACK v. 2.15 (Mladenoff and DeZonia, 2000) on a Windows2000 operating system. An in-depth detail of our methodology has been previously published on the CDF-FRAP website (Greenwood and Saving 1999). Here, we present only a basic overview.

Creating the Footprint of Development

In order to model future development, we first had to construct a pixel-based *footprint of current development* which showed as explicitly as possible where structures and other human disturbances to the natural landscape exist. Remote sensing-based pixel data, such as the Hardwoods data, serve this purpose to some degree, especially in rural areas (Merenlender and others 1998; Ridd and Liu 1998), but provide no context of land use. Such data also miss development obscured by tree canopy and tend to confuse some urban and non-urban land cover types (e.g., rock outcrops and concrete) (Quarmby and Cushnie 1989; Fisher and Pathirana 1990; Bruzzone and others 1997). From the parcel data we determined the land use of each parcel and thus derived two binary layers – development status (*developed* or *vacant*) and intensity of use (*intense* or *not intense*) at the parcel level. For *developed* and *intense* parcels smaller than 1 hectare (2.5 acres), we included the entire parcel in the footprint. However, for larger parcels we turned to the Hardwoods data to identify specific areas of human disturbance within the parcel. We compared the classes Urban and Other (U/O) from the Hardwoods data to the development status of the parcel data. Where a U/O pixel(s) existed inside a *developed* parcel, we included those U/O pixels in the *footprint of current development*. Where a U/O pixel(s) existed in a *vacant* parcel, we considered those pixels "false positives" and did not include them in the *footprint of current development*, although they did remain in the land cover layer as Barren. For *developed* parcels with no U/O pixel(s), we simulated a pattern of development in the parcel using the same technique to project future development patterns (see below). Thus, we created a picture of current development composed of three elements: 1) small, intensely used parcels; 2) scattered pixels of development in larger parcels; and 3) stochastically placed pixels in developed parcels within which we could not determine the explicit location of development (*fig. 2c*).

The first step in creating the *footprint of future development* required knowing where development could *not* occur. From the General Plan we derived a *restriction status* for each parcel. A parcel was *closed to future development* if it were already *developed* and already at the minimum allowable lot size for that General Plan density class. Alternatively, a parcel was *open to development with restrictions* imposed by the General Plan (i.e., discretionary permit review) if it were *developed* or *vacant* but at least twice as large as the allowable minimum lot size, meaning the lot could be further subdivided. Finally, a parcel was *open to development without restriction* (i.e., ministerial review) if it were *vacant* and already at the minimum allowable lot size for that General Plan density class and therefore could not be subdivided further.

Table 2 – *Canopy retention guidelines from Adopted General Plan. Values represent percentage of canopy that must be retained for each combination of General Plan Land Use Class and Current Canopy Closure percentage. Where 100 percent of the canopy must be retained, no development can occur on oak pixels.*

	Current Oak Canopy Closure (%)				
General Plan Land Use Class	**≤ 19**	**20-39**	**40-59**	**60-79**	**80-100**
Multi-family Residential (MFR)	90	85	80	70	60
High Density Residential (HDR)	100	90	80	70	65
Medium Density Residential (MDR)	100	90	80	70	65
Low Density Residential (LDR)	100	100	90	85	80
Rural Residential (RR)	100	100	100	95	90

The General Plan contained three major restrictions applying to discretionary permit review that we were able to model spatially – 25 m (1 pixel) stream setbacks[3], no development on slopes over 40 percent, and an oak canopy retention guideline based on the density class of development and the existing canopy cover (*tables 1, 2*). We created a separate mask for each of these restrictions which could be turned on or off or, in order to simulate an ordinance, be applied to all parcels open to development regardless of restriction class. We also created similar masks reflecting 50 m stream buffers and increased canopy retention. Lastly, some areas were off limits to development in every scenario – areas classified as Urban or Other in the Hardwoods data, parcels that were *developed* and *closed to future development*, public lands, private reserves, easements, and open space designated in the General Plan.

Once we determined where development was allowable, we then determined the spatial configuration of development at the 25 m pixel scale. McKelvey and Crocker (1996) developed a stochastic flood-fill algorithm to create theoretical landscapes burned by fire using two aspects of spatial configuration – proportion (B) of landscape burned by fire, and the spatial adjacency (C) of the burned pixels. Adjacency is defined as the probability that if a cell is burned, an adjacent cell is also burned.[4] We modified their algorithm to create binary neutral landscapes that mimic the development patterns for each housing density class in the General Plan. By overlaying the Urban and Other pixels from the Hardwoods data onto classified 1990 Census block housing density data, we calculated proportion (B) and adjacency (C) for landscapes settled at different densities. The proportion of Urban and Other pixels ranged from 27 percent for housing density classes greater than 1 unit/acre down to 3 percent for density classes less than 1 unit/40 acres (*table 3*). Adjacency values varied to a lesser degree, ranging from 62 percent to 50 percent over the same housing density range (Greenwood and Saving, 1999). By masking non-developable areas and inserting portions of these theoretical landscapes into the appropriate

[3] The Adopted General Plan calls for 100' stream setbacks. Since our model is raster based, we used a one pixel (25 m) buffer as the closest estimate.

[4] McKelvey and Crocker refer to the adjacency measure (C) as contagion. To avoid confusion with the contagion indices of O'Neill et al. (1988) and Li and Reynolds (1993), we have chosen to use the term adjacency.

Table 3 – *General Plan land use classes and allowable lot sizes with proportion of cells (B) from the Hardwoods data classified as Urban or Other and likelihood of adjacency (C) of Urban and/or Other cells.*

General Plan Land Use Class	Allowable Lot Size	Proportion of Urban or Other Cells (B)	Probability of Adjacency (C)
Multi-family Residential (MFR), High Density Residential (HDR)[a]	<= 1 acre	27%	0.62
Medium Density Residential (MDR)[b]	1 - 5 acres	14%	0.61
Low Density Residential (LDR)	5 - 10 acres	9%	0.55
Rural Residential (RR)	10 - 40 acres	6%	0.55
Natural Resources (NR)	40 - 160 acres	3%	0.50

[a] Includes these General Plan Land Use Classes - Adopted Plan (AP), Commercial (C), Industrial (I), Public Facilities (PF), and Research and Development (RD)

[b] Includes Tourist Recreation (TR)

General Plan density region, we created potential *footprints of future development* for the study area (*fig. 2c*).

For most scenarios, we assumed the spatial configuration of development for a given density class would not be significantly different in the future than at present. In other words, the values of B and C for a given density class did not change. However, the model did not limit us to this assumption. The General Plan allows for the doubling of total housing density in the Low Density Residential (LDR) class (5 - 10 acre parcels) if the development is highly "clustered". Our landscape generator allowed us to easily simulate how this development pattern might appear (scenarios 507 and 508). We created two clustered density patterns for LDR by increasing B from 9 percent to 14 percent to simulate the density bonus, and by increasing C from 55 percent to 95 percent and 98 percent to simulate clustering (*table 1*).

Quantifying Impacts to Wildand Habitat

For this analysis, we defined *habitat* as all land cover types in the 1990 Hardwoods Pixel Data that were not Urban, Other, or Water. We combined Urban and Other pixels, along with developed cells from the *footprint of future development*, into one class called *developed*. Water was masked from the analysis environment. We defined *wildland habitat* as *habitat* more than 50 m (2 pixels) from a *developed* pixel, in patches greater than 100 hectares and containing no constrictions, or narrow necks, of *wildland habitat* narrower than 50 m. *Urban habitat* were those areas of natural vegetation within 50 m of a *developed* pixel, whereas *marginal habitat* were all areas not defined as *urban* or *wildland habitat* (narrow constrictions or patches less than 100 hectares, and > 50 m from *developed* pixels). This overlay of the footprint of development onto the natural land cover creates a landscape mosaic of wildland, marginal and urban habitats.

A quick review of the landscape ecology literature reveals many highly specialized metrics for capturing specific characteristics of a landscape. Several studies (Ritters and others 1995; McGarigal and McComb 1995, 1999; Tinker and others 1998; Hargis and others 1999) have shown that the simplest, most basic measures are the easiest to understand and serve well to compare and contrast

landscapes. We calculated the following fragmentation metrics for wildland habitat for each scenario – total area, number of patches, mean patch size, largest patch size, mean shape index (McGarigal and Marks, 1995; Ritters 1995; Frohn 1998), corrected mean perimeter/area ratio (Baker and Cai 1992), and total edge density. Ritters (1995) inverts McGarigal and Marks' (1995) mean shape index for raster data, calling it "average normalized area, square model," to make the values range from 1.0 for a perfectly square patch to 0.0 for patches that are long and narrow. The APACK software calculates Ritters' metric. As this metric measures the same landscape attribute as McGarigal's mean shape index (shape complexity - patch shape relative to a square), we have chosen to use McGarigal's name, mean shape index, when referring to it rather than Ritters' more cumbersome moniker. Although these metrics provide an objective means of comparing landscapes, they do not quantify all aspects of landscape configuration. Therefore, we also assessed model results through visual inspection of the output maps of wildland extent.

RESULTS

General Plan

Figure 2d shows the present extent of wildland habitat in the study area. The dominant feature of the landscape is a single patch of wildland (mean area of all iterations, 159,535 ha) that extends across the county from north to south and bridges the Highway 50 corridor. The influence of development is substantial yet would appear not to have significantly disrupted the contiguity of wildlands outside of the Highway 50 corridor and the communities of Pilot Hill and Georgetown. Figure 4a shows how the county's wildlands might appear if the General Plan were completely built out (scenario 503). The most apparent impact is the increase in number of patches and the cleaving of the wildland into distinctly separate northern and southern regions. Compared to present conditions, mean number of patches per iteration double from 10.0 to 19.67 and mean patch size accordingly drops from 16,182 ha to 6,337 ha *(table 4*). Mean largest patch size similarly declines to 59,603 ha. As patch sizes drop, measures of total edge density and corrected perimeter-to-area (P/A) perforce increase. Mean total edge density rises from 46.6 m/ha to 68.4 m/ha while mean corrected patch P/A ratio increases from 8.97 to 9.76. Mean shape index decreases from .070 to .043 indicating that not only does wildland shrink and fragment, it also becomes more complex spatially due to low density development perforating the existing wildland matrix. It is important to note, however, that the significant loss of wildland does not mean that large portions of the county have been paved over. While the mean loss of wildland is 23 percent, only 4.5 percent of wildland is actually converted to urban use. For oak woodland land cover types, 40 percent of wildland becomes marginal or urban woodland but only 4 percent is physically lost to development. In other words, areas that once functioned under a more natural state and presumably provided functional habitat for species are degraded, either due to proximity to urban land uses or by isolation from larger patches of contiguous natural vegetation.

Table 4 – *Landscape metrics for wildlands under present condition and under the General Plan Scenario.*

	Present Condition Scenario 500	General Pan Scenario 503
Mean Total Area	161,825 ha	123,267 ha
Mean # of Patches	10.00	19.67
Mean Mean Patch Size	16,182 ha	6,337 ha
Mean Largest Patch Size	159,535 ha	59,603 ha
Mean Mean Shape Index	0.070	0.043
Mean Mean Patch P/A Ratio, Corrected	8.974	9.762
Mean Total Edge Density	46.57 m/ha	68.38 m/ha

General Plan Alternatives - Increased Development Restrictions

Figures 4b-d and 4g-k show the extents of wildlands for the General Plan alternatives meant to mitigate impacts through increased restrictions to development. The most noticeable aspect of these maps is their similarity to the present General Plan. The north and south patches remain highly separated in all scenarios except for scenario 543 where a few small patches come close to reconnecting the north and south patches. The differences become more apparent when the metrics are examined. All scenarios maintain a greater area of wildland than the General Plan. Scenarios that increase the areal extent of development restrictions (504, 505, 506, 509, 513, 514, 515, 516) generally indicate a decrease in fragmentation (mean number of patches decreases slightly and mean patch size increases slightly) (*fig. 3*). However, the range for number of patches and mean patch size for these scenarios is high, indicating site-specific sensitivity to placement of development. Scenarios 506 and 516 show the greatest increase in wildland mean total area (126,716 ha and 126,877 ha, respectively) and mean largest patch size (60,906 ha and 61,105 ha, respectively). Scenarios 506, 509 and 516 have the highest mean patch sizes (6,805 ha, 7,021 ha, and 6,952 ha), although 509 has a large range (1,238 ha). These results are consistent with those expected as the scenarios 506 and 516 restrict the largest amounts of land from development (132,694 ha and 133,217 ha, respectively). Patch shape complexity shows little difference in all scenarios as mean shape index remains virtually unchanged as does the mean corrected patch P/A ratio. Mean total edge density declines slightly with 506 and 516 having the greatest decrease (67.02 m/ha and 67.00 m/ha, respectively).

General Plan Alternatives - Development Clustering

For scenarios 507 and 508 we examined the efficacy of clustering development for mitigating wildland habitat loss. For General Plan density classes of Low Density Residential (LDR), we increased adjacency (C) values to 95 percent and 98 percent, respectively. Because the General Plan allowed for a density bonus to the next higher density class, Medium Density Residential (MDR), we also increased the proportion (B) of developed pixels in LDR from 9 to 14 percent for both scenarios. Neither scenario shows a demonstrable increase in wildland habitat retention over the General Plan scenario, while some metrics indicate increased fragmentation. Mean

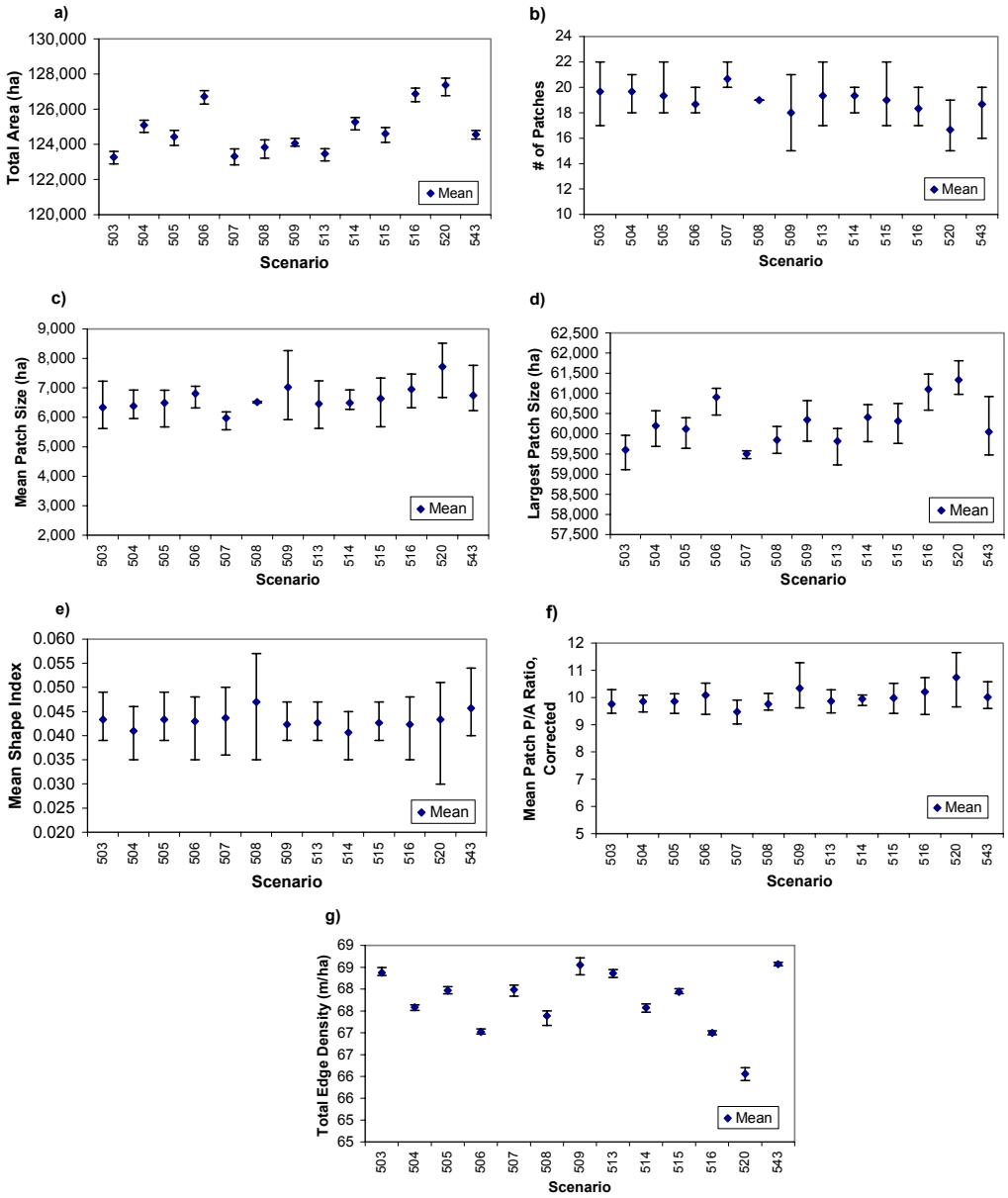

Figure 3 – Values of wildland landscape metrics for three iterations of the General Plan scenario (503) and alternatives (504-543). a) mean total area, b) mean number of patches, c) mean mean patch size, d) mean largest patch size, e) mean mean shape index, f) mean mean patch P/A ratio, corrected, and g) mean total edge density.

total area for scenario 507 (123,310 ha) is virtually the same as the General Plan and only slightly higher for scenario 508 (123,831 ha) (fig. 3). Mean largest patch size (507 = 59,502 ha, 508 = 59,847 ha) and mean corrected patch P/A ratio (507 = .044, 508 = .047) show similar behavior while mean total edge density does decrease slightly for 508 (67.39 m/ha). Mean number of patches (507 = 20.67, 508 = 19.0) remains within the range of values of those of the General Plan. Mean patch size actually goes down for 507 (5,979 ha) and remains unchanged for 508 (6,517 ha).

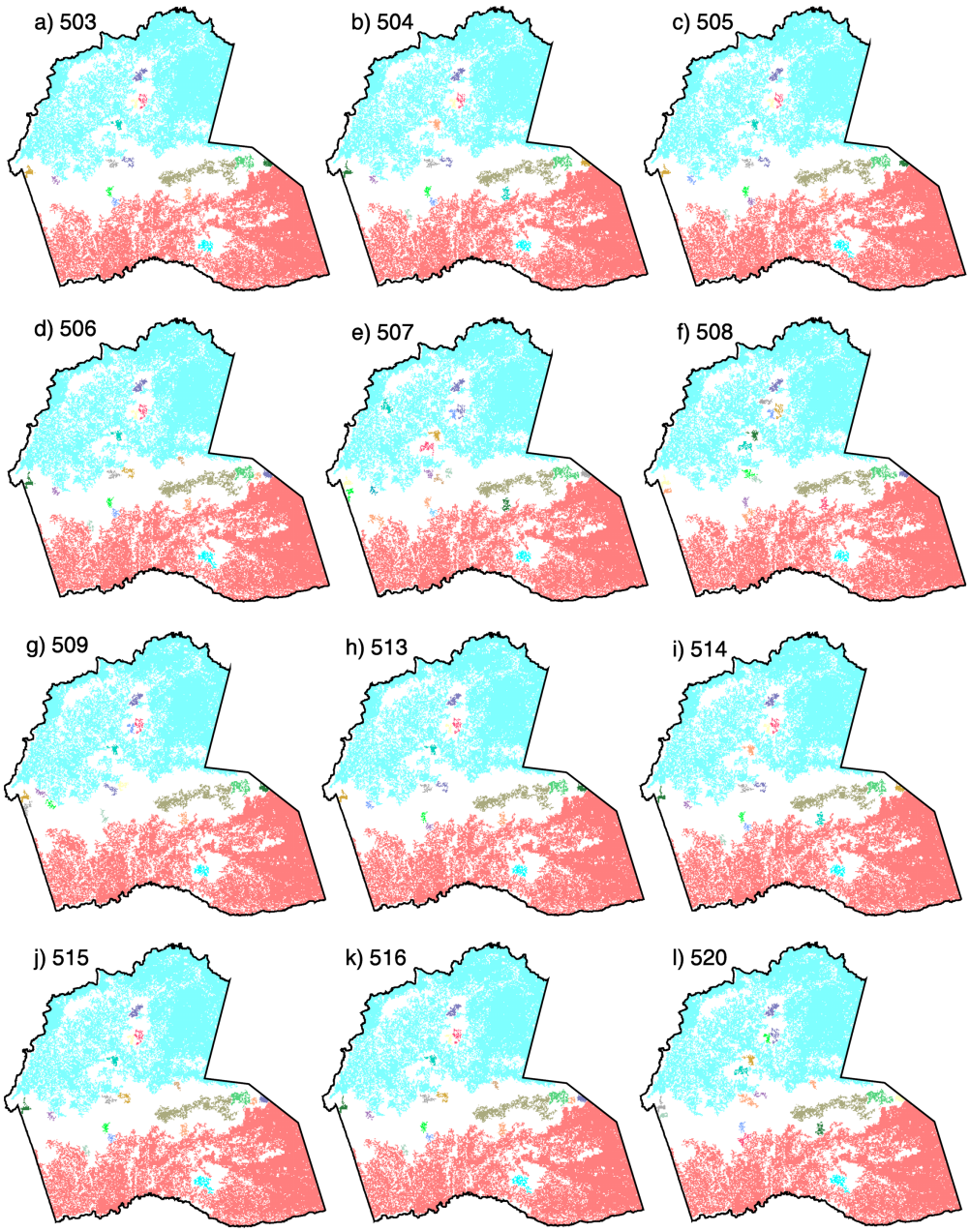

Figure 4 – Maps of wildland habitat after full buildout for all scenarios. Areas of the same shade are a contiguous patch.

One of the iterations for scenario 508 has the highest shape index of all scenarios (.057) but another iteration of 508 has the second lowest (.035). Neither scenario was effective at maintaining the north-south connection (*figs. 4e, 4f*).

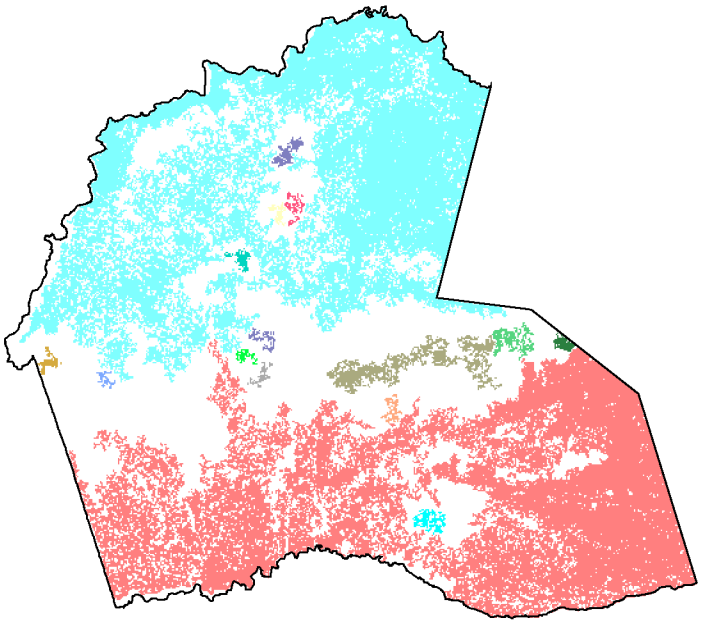

Figure 5 – Map of wildland habitat after full buildout for parcel acquisition scenario (543).

General Plan Alternatives - "Kitchen Sink" and Planned Acquisition

Given that scenarios 504-516 were ineffective at increasing wildland habitat retention over the General Plan scenario or at maintaining the north-south connection, we tested two additional approaches. Scenario 520, dubbed the "Kitchen Sink" scenario, combined all of the most restrictive policies yet tested – 50 m stream buffers, 40 percent slope restriction, oak canopy retention for all developable land regardless of restriction status, plus clustering as per scenario 508 (B = 14 percent, C = 98 percent) (*table 1*). Scenario 543 takes a completely different approach leaving all original General Plan restrictions intact but expanding the area of non-developable land by restricting select parcels from development in key areas of concern. This scenario represents a planned acquisition approach through the use of easements and/or outright purchase of development rights by the county. We selected several vacant parcels in the Indian Creek canyon area where it crosses Highway 50 between Placerville and Shingle Springs in an attempt to reconnect the northern and southern portions of wildland. In those selected parcels, we only masked development for oak pixels and areas within 50 meters of oak pixels. This left some parcels still potentially developable.

As expected, scenario 520 retains the highest mean total area (127,376 ha) of wildland because it restricts the greatest area of land from development (133,217 ha) (*table 1a*). Mean number of patches (16.67) is the lowest for all scenarios and subsequently mean patch size (7,721 ha) is the highest (*fig. 3*). Mean largest patch size (61,332 ha) is also the highest of all scenarios. Shape complexity does not

decrease, however. Shape index is the same (.043) as the General Plan scenario and mean corrected patch P/A ratio is the highest of all scenarios (10.74). In contrast, mean total edge density is the lowest of all scenarios (66.1 m/ha). Scenario 520 also does not come close to maintaining the north-south connection (*fig. 4l*).

As we made no attempt to preserve amount, but rather configuration, of wildland, scenario 543 only preserves an average of 1,296 more hectares than the General Plan (mean total area = 124,563 ha) and actually has slightly more average patches (20.0) and a smaller mean patch size (6,229 ha) (*fig. 3*). However, mean shape index is the second highest for all scenarios (.046) while mean corrected patch P/A ratio is only slightly better than the General Plan (10.013). Mean total edge density is the same as the General Plan (68.57 m/ha). Most importantly, however, scenario 543 comes the closest of all scenarios to maintaining a connection between the northern and southern wildland patches (*fig. 5*).

DISCUSSION

Our study demonstrated that the General Plan for El Dorado County will not allow the county to become one giant suburban subdvision. The General Plan allocates 43.0 percent of private land to development in the 1 unit/5 acre to 1 unit/40 acre density range (LDR and RR). Moreover, only 4 percent of the existing oak canopy will actually be removed by, or converted to, development. However, the configuration of this development is of concern as full buildout could force as much as 40 percent of the County's existing wildland oak woodlands into marginal or urban habitats. When counties are faced with such impacts, a popular mitigation approach is to implement prescriptions in the General Plan that regulate, and/or limit, how and where development can occur (e.g., stream setbacks, slope restrictions, etc.). However, such prescriptions can only apply to development that will undergo discretionary permit review, that is, parcels that have yet to be subdivided to the smallest allowable density in the General Plan. In the case of El Dorado County, 31 percent of *vacant* land that is *open to development* in the county (86 percent of parcels) had been subdivided prior to the adoption of the General Plan and is therefore not subject to these prescriptions. These parcels only require ministerial review (i.e., a building permit) before construction can occur. To impose a restriction that would regulate where development could occur in those parcels would require a county-wide ordinance. Our model allowed us to test both alternative General Plan prescriptions and county-wide ordinances. The former had little effect decreasing wildland habitat loss or fragmentation over existing General Plan policies. We attribute this to the large portion of the county not subject to the prescriptions due to prior subdivision. Ordinances showed greater wildland retention over the General Plan but that increase was still small. Scenario 516, the most restrictive ordinance scenario, only preserved 3,610 hectares more wildland than the General Plan and made little difference to patch configuration, shape complexity or edge density. The political expense in implementing ordinance-type solutions would seem to far outweigh the potential ecological benefits to oak woodlands.

Clustered development is a popular prescription proposed by the smart growth community. By holding overall density constant for an area but decreasing the space between structures, less space is scattered between structures which could otherwise serve as habitat and perform other ecosystem functions. The perceived advantages are so great that in order to promote clustering, El Dorado County offers a density

bonus for clustered development in the Low Density Residential category (5 - 10 acre parcels). We modeled two clustering scenarios allowing densities to increase to the Medium Density Residential level (1 - 5 acre parcels). Neither scenario improved wildland habitat condition over the General Plan and some metrics for scenario 507 (mean number of patches, mean patch size and largest patch size) were actually worse. The increase in density, and therefore the increase in the amount of land developed, offset any benefit that would be gained from clustering. Furthermore, clustering can only occur in *vacant* parcels *open to development with restriction* in LDR. This occurs only in a few small areas in the northern portion of the county.

Scenario 520, the "Kitchen Sink" scenario, employed the strictest policy restrictions we tested, plus clustering. Looking solely at the fragmentation metrics (*fig. 3*), this scenario offers the most improvement in wildland habitat condition over the General Plan. Yet when examining the maps, we did not notice any significant difference in wildland amount or configuration. Most notably, the north-south separation is still very pronounced. Implementing county-wide ordinances which mandate 50 m stream buffers, 40 percent slope restrictions and oak canopy retention on all undeveloped parcels, plus requiring clustering in LDR, is highly unrealistic, not to mention, very politically expensive. Again, we contend that the political costs of such a scenario are probably greater than the ecological benefits.

Alternatively, we examined a limited parcel acquisition, or easement, strategy (scenario 543) for areas of concern which removes key parcels from the potential development landscape. One such area is the Indian Creek Canyon region. Here, a stringer of oak woodlands presently connects the northern and southern wildland patches. Although this scenario did not actually maintain the connection, several small patches do extend through the area indicating that the concept has the potential to maintain this critical corridor. This area of the county is highly desirable for development, therefore making this scenario potentially fiscally expensive. However, unlike the ordinance approach, an acquisition approach would encounter fewer stakeholders directly and would offer owners compensation for the loss of development rights on their property. Involving private conservation groups or land trusts could greatly reduce costs to the public sector.

Rural residential development erodes habitat quality much more than habitat extent, requiring a more nuanced approach to assessing impacts than when natural habitats are simply removed or paved over. At these low densities, we were unable to use polygons of housing density to determine the relationship of naturalness to density. At certain scales, the landscape still looks much as it once did. Rather, we modeled the real impacts of site alteration which required an entirely unique set of variables and characteristics such as determining the exact footprint of development (e.g., Do lightly used roads count? Do outbuildings?) and establishing the sphere of influence from a structure (e.g., How far from the structure is natural vegetation disturbed? How far does sound travel? What impact does it have? What influence do pets have and at what distance?). We can easily adjust these variables in our model to examine their sensitivity and ability to assess other issues besides wildland connectivity such as impacts to specific species habitat requirements, watershed degradation from increased sediment generation, and changes in wildfire probability due to vegetative fuel alteration. Most people can agree that high density urban and suburban development do not provide much high quality habitat for most species, but seldom can stakeholders, land managers, public officials, or even scientists agree on the thresholds or the degrees at which rural development begins to impact the

landscape. As more of the landscape of California transitions from large extents of wilderness owned by relatively few private individuals to a landscape divided up amongst thousands of owners regularly dotted with houses every few thousand feet, understanding these impacts and enacting policies that are effective, fair, and feasible become ever more important and challenging.

FUTURE DIRECTIONS

One aspect of development and conversion of natural land cover that we have not addressed is agricultural expansion. In El Dorado County this primarily involves vineyards. Agricultural expansion has the potential for far greater impact to habitat extent and connectivity than residential development as a greater area of land in larger contiguous patches is generally more greatly disturbed. Agricultural expansion can also be more difficult to predict. Heaton and Merenlender (2000) have developed a model to determine site suitability for vineyard expansion in Sonoma County which could be adapted for use in El Dorado County.

More investigation of the effects of riparian corridors on habitat connectivity is needed, including the effectiveness of stream setbacks and the development of methods to characterize linear features, as opposed to the two dimensional features analyzed here.

Better knowledge of the likelihood of development would enhance our ability to tailor solutions to specific areas of concern. The incorporation of economic models of development such as Johnston's UPLAN (2001) and Landis's CURBA (1998a, 1998b) would provide more realistic future scenarios as well as the ability to model development in stages over time rather than only at full buildout as we have done. Implementing other constraining factors to development such as water availability and habitat conservation plans could also improve our predictions of future development.

CONCLUSION

Fine-grained spatial models with highly detailed datasets are required for evaluating impacts of development on ecological, economic, or social systems at the local level. Such large-scale, high-resolution models also enable stakeholders to more easily relate the data portrayed on maps to their perception of the landscape in which they live. However, most site-specific models of development have been created for dense urban areas, using complex economic formulas of land value and empirically derived patterns of past development trends. These models prove less than reliable at predicting low-density development of the rural ranchette variety which is now so prominent in the Sierra foothills and which has such great impact on habitat quality. We have developed a model that is both fine-grained and capable of predicting potential rural ranchette development and its impacts. Moreover, by having a tool that can operate under various assumptions and constraints, we can actually test a proposed solution's efficacy at achieving a desired goal, which in this case is maintaining wildland connectivity. We have also used our model of predicting footprint of development to assess impacts of wildfire on future structure loss. Our explicit model of development could prove useful for studies of water quality and cumulative impacts for watersheds by incorporating elements such as

sediment generation from road development, nutrient loading from septic systems, and conversion of natural land cover to impervious surfaces.

Existing land tenure (the historic parcelization of land) limits effective control of development by General Plan prescriptions that are only applicable when a parcel requires subdivision before development, thus leaving solutions that require large expenditures of political capital such as ordinances or downzoning. The political expense in implementing such solutions would seem to far outweigh the potential benefits. For El Dorado County, our study concludes that the most effective way to maintain wildland oaks in large contiguous patches would be a land acquisition program focused on those critical areas of connectivity, often referred to as habitat corridors. More importantly, broad-brush, "best management practice" type solutions (i.e., the conventional wisdom) applied evenly across the landscape are not necessarily the most effective approach. Site-specific design may be a more effective tool in minimizing negative impacts of development than generic policy prescriptions. "Good" policy should be a process by which better analysis of the problem leads ultimately to better design of the solution.

References

Baker, W.L.; Cai, Y. 1992. **The r.le programs for multiscale analysis of landscape structure using the GRASS geographical information system**. Landscape Ecology 7:291-302.

Bruzzone, L.; Conese, C.; Maselli, F.; and Roli, F. 1997. **Multisource classification of complex rural areas by statistical and neural-network approaches**. Photogrammetric Engineering & Remote Sensing 63:523-533.

California Department of Finance. 2001. **Interim County Population Projections**. Sacramento, CA: State of California, Department of Finance.

Duane, T.P. 1996. **Human Settlement, 1850-2040**. In: Sierra Nevada Ecosystem Project: Final Report to Congress, vol II, Assessments and Scientific Basis for Management Options. Davis, CA: Centers for Water and Wildland Resources, University of California-Davis; 235-360.

Frohn, R.C. 1998. **Remote Sensing for Landscape Ecology**. Boca Raton, FL.: Lewis Publishers; 99 p.

Heaton, E.; Merenlender, A.M. 2000. **Modeling vineyard expansion, potential habitat fragmentation**. California Agriculture 54:12-19.

Fisher, P.F.; Pathirana, S. 1990. **The evaluation of fuzzy membership of land cover classes in the suburban zone**. Remote Sensing of the Environment 34:121-132.

Greenwood, G. B.; Marose, R.K.; Stenback, J.M. 1993. **Ownership of California's Hardwood Rangelands**. Sacramento, CA: California Department of Forestry and Fire Protection, Fire and Resource Assessment Program.

Greenwood, G.B. and Saving, S.C. 1999. **Case study: current and future patterns of development in El Dorado County**. Sacramento, CA: California Department of Forestry and Fire Protection, Fire and Resource Assessment Program. http://frap.cdf.ca.gov/projects/eldo_buildout/eldobuildout_fr.html

Hargis, C.D.; Bissonnette, J.A.; David, J.L. 1998. **The behavior of landscape metrics commonly used in the study of habitat fragmentation**. Landscape Ecology 13:167-186.

Johnston, R.A.; de la Barra, T. 2000. **Comprehensive regional modeling for long-range planning: Integrated urban models and geographic information systems**. Transportation Research 34A:125-136.

Johnston, R.A.; Shabazian, D.R. 2001. **Uplan: a versatile urban growth model for scenario testing**. Unpublished draft supplied author.

Landis, J.D. 1994. **The California urban futures model: A new generation of metropolitan simulation models**. Environment and Behavior B21:399-420.

Landis, J.D. 1995. **Imagining land use futures: Applying the California urban futures model**. Journal of the American Planning Association 61:438-457.

Landis, J.D.; Zhang, M. 1998a. **The second generation of the California urban futures model. Part 1: Model logic and theory**. Environment and Planning B25:657-666.

Landis, J.D.; Zhang, M. 1998b. **The second generation of the California urban futures model. Part 2: Specification and calibration results of the land-use change submodel**. Environment and Planning B25:795-824.

Li, H.; Reynolds, J.F. 1993. **A new contagion index to quantify spatial patterns of landscapes**. Landscape Ecology 8:155-162.

McGarigal, K.; Marks, B. 1995. **FRAGSTATS: Spatial analysis program for quantifying landscape structure**. Gen. Tech. Report PNW-GTR-351. Portland, OR: Pacific Northwest Research Station, Forest Service, U.S. Department of Agriculture; 122 p.

McGarigal, K.; McComb, W.C. 1995. **Relationships between landscape structure and breeding birds in the Oregon coast range**. Ecological Monographs 65:235-260.

McGarigal, K.; McComb, W.C. 1999. **Forest fragmentation effects on breeding bird communities in the Oregon Coast Range**. In: Rochelle, J.A.; Lehman, L.A.; Wisniewski, J. eds. Forest fragmentation: Wildlife and management implications. Leiden, The Netherlands: Koninklijke Brill NV; 223-246.

McKelvey, K.; Crocker, J. 1996. **Simulating fire on the landscape using Markov models**. Sacramento, CA: California Department of Forestry and Fire Protection, Fire and Resource Assessment Program.

Merenlender, A.M., Heise, K.L.; Brooks, C. 1998. **Effects of subdividing private property on biodiversity in California's north coast oak woodlands**. Transactions of the Western Section of the Wildlife Society 34:9-20.

Mladenoff, D.J.; Dezonia, B. **APACK 2.15 Analysis Software** [Computer program]. 2000. Madison, WI: Forest Landscape Ecology Laboratory, University of Wisconsin; Available from http://flel.forest.wisc.edu/.

O'Neill; R.V.; Krummel, J.R.; Gardner, R.H.; Sugihara, G.; Jackson, B.; DeAngelis, D.L.; Milne, B.T.; Turner, M.G.; Zygmunt, B.; Christensen, S.W.; Dale, V.H.; Graham, R.L. 1988. **Indices of landscape pattern**. Landscape Ecology 1:153-162.

Pacific Meridian Resources. 1994. **California Hardwood Rangeland Monitoring Final Report**. Sacramento, CA: California Department of Forestry and Fire Protection, Fire and Resource Assessment Program.

Quarmby, N.A.; Cushnie, J.L. 1989. **Monitoring urban land cover changes at the urban fringe from SPOT HRV imagery in south-east England**. International Journal of Remote Sensing 10:953-963.

Ridd, M.K.; Liu, J. 1998. **A comparison of four algorithms for change detection in and urban environment**. Remote Sensing of the Environment 63:95-100.

Ritters, K.H.; O'Neill, R.V.; Hunsaker, C.T.; Wickham, J.D.; Yankee, D.H.; Timmins, S.P.; Jones, K.B.; Jackson, B.L. 1995. **A factor analysis of landscape pattern and structure metrics**. Landscape Ecology 10:23-29.

Tinker, D.B.; Resor, C.A.C.; Beauvais, G.P.; Kipfmueller, K.F.; Fernandes, C.I.; Baker, W.L. 1998. **Watershed analysis of forest fragmentation by clearcuts and roads in a Wyoming watershed**. Landscape Ecology 13:149-165.

U. S. Census Bureau. 1991. **Census 1990: State-County Summary File 1**. Washington, D.C.: U.S. Department of Commerce.

U. S. Census Bureau. 2001. **Census 2000: State-County Summary File 1**. Washington, D.C.: U.S. Department of Commerce.

U.S. Environmental Protection Agency. 2000. **Projecting land-use change: A summary of models for assessing the effects of community growth and change on land-use patterns**. USEPA Report EPA/600/R-00/098. Washington, D.C.: U.S. Department of the Interior.