



SPECIAL FOCUS--SIERRA FOOTHILLS & SNEP REPORT

WHAT IS THE FUTURE OF THE SIERRA FOOTHILLS?

The future of the Sierra Nevada's western foothills is a critical California issue. People are moving to the foothills in large numbers. The state projects a tripling in population between 1990 and 2040, much higher than the projected statewide growth rate. The potential social and ecological impacts are enormous. "How can we avoid a development process that will destroy the very features that make a region a desirable place to live?" asks Berkeley Professor Tim Duane in his paper in the Sierra Nevada Ecosystem Project (SNEP) report. There are no simple answers.

Surveys show that most Americans would rather live in small towns or rural areas than in cities. The beauty of the grasslands, savannas, woodlands and farmlands in the spectacular hilly setting of the Sierra foothills are particularly attractive to people seeking a rural quality of life. A 1992 survey in El Dorado County found that 75 percent of the respondents moved to the county for the rural environment. 72 percent cited open space, 65 percent cited air quality, 62 percent scenic views, as key factors.

Most of the people who moved to the foothills between 1970 and 1990 weren't looking for life in compact livable communities (see *Linkages* article on solutions to sprawl, Fall, 1995). They were in search of their own small, 5 or 10 acre, piece of open space - more if they could afford it - with privacy from neighbors, where they could have a chicken or two, maybe a goat for the children's 4-H project, or the garden they always wanted but had no room for in the city. These newcomers settled in the unincorporated areas of the rural counties, outside existing communities and beyond the service boundaries of water and sewer infrastructure.

"The rapid population growth being experienced in some rural areas has the potential to transform radically the physical and social environments of those regions,

including significant fragmentation of habitat and likely loss of native biodiversity" writes Tim Duane.

"Continuing the existing pattern of sprawl development with a high-growth scenario could result in human settlement on nearly half the private land in the Sierra Nevada."

The high rate of growth is driven by development of large metropolitan areas like Sacramento and Fresno in the Central Valley, and the growing desire of Californians to exchange urban homes and neighborhoods for a rural lifestyle. The Sierra population doubled between 1970 and 1990, with 40 percent of this growth occurring in the foothill counties east of the greater Sacramento region. Nevada, Placer and El Dorado counties developed

bedroom communities like El Dorado Hills and Cameron Park for escaping urbanites. Future Central Valley urban development (*Linkages*, Spring 1996) will lead to the inevitable rapid growth of their adjacent foothills, particularly where there is easy highway access.

Social Impacts of Projected Development

One of the first negative impacts of growth that residents notice is traffic congestion on collector roads (to page 3)

Sierra Foothill Population Growth Projections			
Subregion	Pop in thousands		
	1990	2040	Increase
Gold Country <i>Nevada, Placer, El Dorado (western)</i>	223	622	280%
Mother Lode <i>Amador, Calaveras, Tuolumne, Mariposa, and Madera (eastern)</i>	125	419	340%
South Sierra <i>Fresno, Tulare, & Kern (Sierra & Tehachapi Mtns)</i>	92	448	480%

- Tim Duane, *Sierra Nevada Ecosystem Project Report, 1996*

News from IEH

IEH seeks solutions to land use issues that provide for both people and nature. Our initial focus area is central California, from northern Los Angeles County to the Sacramento region. Here a combination of rapidly growing population and sprawling suburban and rural development patterns threatens the future of people, farmland and biodiversity.

1996 has been a busy year for the Institute for Ecological Health. Workshops in Sacramento, Santa Clarita and Fresno (page 14) were a highlight. Our spring issue of *Linkages*, focused on the Central Valley, was very well received and obtained coverage in Dan Walters' column. IEH gained additional newspaper, radio and TV coverage. We made presentations to various groups, and developed a successful slide\sound show in conjunction with the Friends of the Santa Clara River. We began developing a vision for part of the Santa Clara River Basin, and long-term land use strategies for the six county Sacramento region.

Graphic artist Anne Kao of Oakland designed the new logo. She is designing a new Web site, which we will launch in February. Please visit us (see masthead for url). We aim to build this site into an excellent source of information on land use issues, including biodiversity and livable communities. There will be a discussion / conference system exploring key issues. One initial topic will be how to attain conservation planning that protects native biodiversity, provides a net benefit to endangered species, and yet works for landowners and government.

We have challenging plans for 1997. We wish to produce three issues of *Linkages*, including one focused on conservation planning and one on stewardship and watershed programs. We will hold three Central Valley / Sierra foothill land use workshops, focusing on strategies and solutions that can work in the areas' cities and counties. We are considering a conservation planning workshop. And we will build our regional projects, especially one for the six-county Sacramento region. We will release a central Santa Clara River Basin vision document.

All these activities take money, for everything from printing to payroll. We are most grateful to Patagonia Inc. and the Strong Foundation for grant support, and to our individual, business and organization donors, which made this work possible. Individual donors are the critical foundation of IEH. Donors are now members. We hope you will join us with a 1997 membership (see insert or page 16 coupon.) Thank you for your support.

Finally, please contact us if you would like an IEH presentation to your group, or an organization in your area (address on masthead.)



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Linkages

Our newsletter provides information on California land use topics, including conservation biology, planning and economics, development, urban design, and agriculture. We will discuss techniques important to citizens groups, from mapping to city and county general plans. We wish to explore the needs of different interests and creative solutions. Readers are encouraged to submit articles, ideas, or letters for future issues to IEH.

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FUTURE OF THE SIERRA FOOTHILLS *(con'd)*

state highways. Rapidly growing rural counties fall far behind in meeting the transportation needs of rapid, dispersed growth. Congestion, increased accidents, and worsening air quality begin undermining the quality of life.

Environmental analysis of the Placer County General Plan, for example, shows a future with 20 mile traffic jams on I-80 during rush hours. El Dorado County calculates it will take 800 million to a billion dollars to upgrade road infrastructure over the next 20 years. Fiscal problems at all government levels, and voter unwillingness to approve additional expenditures, make this funding unlikely.

In many rural Sierra counties, most homes depend on wells and septic tanks. Future development of substandard parcels, created under earlier planning laws, will likely result in failed septic systems and contaminated ground water. Wellwater supplies are uncertain for all this potential development. Most ground water outside riparian zones is trapped in pockets in fractured rock formations rather than in the underground aquifers common to the flatlands.

Wildfire poses a serious threat and a potentially huge insurance expense to a dispersed rural population. The foothill ecosystems are usually a tinderbox by late summer. Lightning and arson induced fires occur every year. "In most low elevation oak-woodland and conifer forest types of the Sierra Nevada, presettlement fires were frequent, collectively covered large areas, burned for months at a time, and although primarily low to moderate in intensity, exhibited complex patterns of severity" states the SNEP report. Fire control costs millions. Protection of structures scattered across the landscape is extremely difficult and consumes resources that would otherwise be used to limit the spread of a wildfire.

Prescribed fire reduces fuel loads and improves ecosystem health by mimicking a more natural fire regime of frequent low intensity burns. But the use of prescribed burns is severely limited by the presence of scattered housing. A strong case can be made for public policy that limits publicly financed fire protection of structures to already developed areas and future higher density developments. But such a step is politically and socially unacceptable at this time.



Air quality will also suffer from extensive low density development. Residents will be dependent upon automobiles for all their needs, often making several trips a day. Trips that start with a cold engine are especially polluting.

AIR POLLUTION TRANSPORTED TO THE FOOTHILLS

The Central Valley is the primary source of the foothills' major ozone and particulate air pollution problems. "The dramatic decline of peak ozone level seen (in recent years) in places such as the Los Angeles Basin is not seen in the Central Valley" state Professor Thomas Cahill and coworkers in the SNEP Report. Summer ozone is transported from the Valley into the Sierra. "The resultant daytime ozone levels between 2,000 and 6,000 feet are essentially as severe as those on the valley floor." While Valley ozone levels drop rapidly at night, they stay high in the Sierra. Significant ozone damage to human and biological health will continue until the proposed new federal standard of 8 parts per million is met for the Central Valley floor and the Sierra foothills.

CONCLUSIONS

Standard large-lot zoning both fragments the landscape and creates social and biological problems. One alternative is clustered development, with buildings grouped in one area of a large land parcel, permanently protecting the rest in open space. To be biologically effective, clustering should result in large open space areas, carefully selected to preserve critical habitat and wildlife corridors connected over a large landscape.

But many Sierra residents are leery of this approach for two reasons – they want large lots and they fear that protected open space could be developed in the future. Values underlying large lots can be met through project designs that incorporate a sense of privacy while maximizing access to open space for clustered housing residents. The fear that open spaces will be built out later can be addressed if communities require that development rights of the open space be deeded in perpetuity in exchange for development rights elsewhere.

General Plan revisions in Nevada and other counties rejected the concept of clustered communities, and continued reliance on large lot zoning. Another obstacle is the large number of still unbuilt smaller parcels, especially

in many areas near major highways. Build out of these existing parcels, including legally allowed subdivision into 2 or 4 parcels, will result in very substantial growth.

In the communities of Sutter Creek and Mariposa, vivid pictorial demonstrations of the effects of build out caused local residents to oppose build out scenarios and new development projects. But political efforts to slow subdivisions are difficult in foothill counties. In 1996, El Dorado county voters narrowly defeated an initiative requiring new developments to have a long-term water supply and to be denied a permit if they would result in severe traffic congestion. The initiative lost after a long period of intense publicity and debate over growth impacts of the revised General Plan.

ACHIEVING WORKABLE SOLUTIONS

The Sierra foothills need effective solutions to these long-term growth problems. These solutions must effectively maintain the rural quality of life, conserve areas vital to biodiversity protection and ecosystem health, and ensure the future of economically viable rangeland. Only solutions that come from the region, and are supported by foothill residents, will succeed.

Foothill residents need a region wide public debate to build public understanding of the implications of current trends and to develop popular solutions that serve both people and nature.

Here are some steps to help protect the quality of life and nature in the foothills.

U Protect small town character and values in existing communities such as the gold rush towns. This requires avoidance of urban /suburban sprawl and maintenance or restoration of economically and socially strong town centers.

U Design any new higher-density areas as true villages or towns that have economic and social centers with shops, civic buildings, and other amenities. Avoid communities that are a mosaic of housing subdivisions and malls.

U Restrict low density development to carefully selected areas, using cluster development where acceptable to local residents. Maintain large tracts of undeveloped land, using private landowner incentives and other steps to make ranch and wood lands economically viable.

U Actively reduce build out on existing substandard parcels, using techniques such as transfer of development rights.

This article draws heavily on the finding of Tim Duane in the SNEP Report (Volume II, chapter 11.)

FURTHER READING

Human Settlement, 1850-2040. Tim Duane in *Sierra Nevada*

Ecosystem Project, Final Report to Congress Status of the Sierra, Volume II: Assessments and Scientific Basis for Management Options. Centers for Water and Wildlands Resources, UC Davis, 1996.

Managing the Sierra Nevada. Tim Duane in *California Policy*

Choices, Volume 8. Ed. John Kirlin. Univ. of Southern Calif., School of Public Administration, 1992.



Understanding Growth in Tuolumne County

December 11, 1996 - 14 Days Until Christmas

By Glenda Edwards

The land use decision-making power vested in county boards of supervisors in California ensures that a highly politicized and contentious atmosphere surrounds growth and development issues in every county, even a county with a population of only 53,000. Every step in the planning process is political. Under the provisions of the California Environmental Quality Act (CEQA), the public has a clearly defined role in the decision making process, and is able to participate given sufficient time, interest, knowledge of the process and a friendly county planning department. But the final yes or no decision for a developer comes in Tuolumne County on that Tuesday when all the environmental review is done, the comment and testimony is finished and the Board of Supervisors makes his dream come true with at least three votes for his project, or says, "no."

Whether or not the developer gets what he wants on that vital Tuesday depends to a large extent on the values of the supervisors in power on the given Tuesday and the planning department hired by that board of supervisors. But even the most inept planning department must consider, as part of its recommendation, whether or not a project is consistent with the county's general plan. So it is easy to understand the significance a new general plan has for the citizens of a county and easy to explain the great heat that has arisen around the writing of a new general plan for Tuolumne County, the first since 1980.

53% in the 1970's and 42.8% in the 1980s – making it the tenth fastest growing county in the State during the 1980s. People came to the County in the '70s and '80s mostly for

the rural lifestyle but also for the unparalleled recreational opportunities found on the rivers and in the forests of the neighboring national forests and Yosemite National Park. Largely because of the public lands, tourism is the biggest sector of the County economy, followed by services and natural resource dependent businesses like agriculture, timber and mining. Mistakes in managing growth can be found around the County in the form of poor drainage planning, deteriorating roads, small lot subdivisions without curbs, gutters and sidewalks, failing sewer and septic systems and large commercial sites that have been graded and then abandoned to erosion when a project failed.

In 1987 the County, in response to frustrated developer wanting certainty regarding requirements for habitat protection, hired a consultant to conduct a survey of plants and animals and their habitats within the County and to recommend ways to prioritize protection needs. The result was the *Tuolumne County Wildlife Handbook* which became part of the general plan, gained approval from the California Department of Fish and Game and was cited as a model for other county

planning departments. The County conducted its own initial wildlife surveys on many projects following the guidelines of the handbook and began assembling a good knowledge of habitats and plant and animal populations.

TUOLUMNE COUNTY AT A GLANCE

Of the County's 2,200 square miles, 77.1% is public land and 22.9% is in private ownership. The bulk of the private land is in the central urbanized area and the lower foothill ranch and range lands connecting to the San Joaquin Valley at the western County line. The public land is mostly in the mid to upper elevation conifer forests and in the alpine rock and ice at the Sierra Crest, 70 miles to the east.

Good wildlife habitat can still be found on both public and private land and a wealth of undeveloped ranch and forest land gives the County a rural quality that is becoming increasingly rare in California. As in all foothill counties, riparian areas and wetlands have taken a beating from dams, mining, timber and cattle grazing and from paving over for urban development.

The unincorporated communities in the county tend to have their own carefully defended sense of place, some dating back to Gold Rush days and early railroad logging times. Two state historic parks, Railtown 1897 and Columbia State Historic Park, capitalize on the appeal to tourists of the County's history. Sonora is the only incorporated city and the largest concentrated population center. Beginning at Sonora's eastern city limits, a highly urbanized corridor of strip commercial development, industrial sites, and housing has grown up for several miles along State Highway 108. Dispersed rural development can be found almost everywhere on private land in the county.

The County has already experienced very rapid growth –

The new general plan projects another population surge to 97,100 by 2040. The profound environmental changes that will come with the predicted doubling of population, and the enormous profits to be made if the planning process is sympathetic to growth and development interests, have stirred every environmental, historic and cultural, real estate, building industry, private property rights, timber and agricultural interest in the County.

The new plan identifies 5,000 acres for a "new community"—no specific plan proposed. It slates 12,725 acres for conversion from agricultural uses to development to take care of all the new people and the industry and commerce to create jobs for them. Just in case that isn't enough, the plan identifies land uses that could accommodate in excess of 290,000 people by 2040 if demand should arise and growth pressure from burgeoning Central Valley urban areas to the west should be greater than projected.

The general plan was developed by the planning department at a stately pace over several years, beginning with recommendations by a Blue Ribbon Growth Committee and moving through a period of review by the planning department and selected planning commissioners that also included informal public participation. Responses to a survey in the local newspaper asking what people wanted to see in Tuolumne County in the next 20 years showed a decided preference among the County population for preserving a rural quality of life and scenic beauty. The planning department took note and wrote a plan to meet those desires as much as possible while still finding places for all levels of housing needs and new commercial and industrial uses.



In early 1996, the growth and development interests in the county, having three dependable supervisors in place on the board, captured the general plan process and proceeded to "edit" the plan. They removed most enforceable language in the Conservation and Open Space elements, removed the *Tuolumne County Wildlife Handbook* added to the current general plan in 1987, did away with most language about scenic protections, and drastically cut the Cultural Resources Element that had been written with the help of a state grant. Language was inserted throughout calling for protection of private property rights as part of policies and implementations and lots of voluntary compliance to do good things. Count down began on a fast track time line to approve the plan by the end of 1996.

In the ensuing blow-up, the supervisor leading the "edit" of the general plan lost the election, which indicates that at least some citizens don't like being bulldozed. For those in control of the general plan process, final approval before a fresh and possibly less friendly board is installed in January, 1997 is even more urgent that it was before the election.

As Christmas nears, planning commissioners, planning staff, and the supervisors are spending their days and evenings reading documents and listening to public testimony. The interested members of the public are spending their holiday time reading the Final Environmental Impact Report released on November 22, in preparation for their final opportunity to state their case in testimony before planning commissions and at the final hearing before the Board of Supervisors on December 17.

The process that has brought Tuolumne County a new general plan showcases all that is best and worst about the County and about the land use planning process in California. First, people have strong and extremely varied opinions about the best future for Tuolumne County and are not afraid to stand up and state them. Second, a supervisor who listens to only one set of interests to the exclusion of other public opinion stands a very good chance of being relieved of office. And third, change is a given. Even what looks like the best and most progressive of improvements and is of benefit to both sides such as the *Tuolumne County Wildlife Handbook*, can be eliminated with the stroke of an editor's pen. And finally, the name of the planning game at every bureaucratic level is politics.

Glenda Edwards is Vice President of the Institute for Ecological Health and a Tuolumne County resident

Sierra Foothill Biodiversity, from Peril to Conservation

There is a great variety of wildlife habitats in the foothills. Grasslands, oak savanna, blue oak woodland, mixed oak-foothill pine woodland and chaparral are major communities below the yellow pine belt. They form a complex mosaic depending on slope, aspect (eg north or south facing), soils, rainfall, and disturbance history.

Species composition also varies with situation. For example, some north facing woodland stands are rich in California buckeye and redbud. A series of rivers and streams cut into the hills, forming valleys and steep-walled canyons and providing the riparian habitat so essential to many wildlife species.

THE IMPORTANCE OF FOOTHILL HABITATS

Over half of California's vertebrates use oak woodlands for breeding according to the California Wildlife Habitat Relationships system. Eighty five vertebrate species require west-slope habitats to retain population viability in the range, states the Sierra Nevada Ecosystem Project (SNEP) report.

Foothill woodland is essential many species, including acorn woodpeckers and foothill yellow-legged frogs. Also, it is important wintering habitat for a number of species which summer at higher elevations. These include mule deer and bird species like the chipping sparrow and the red breasted sapsucker.

Oak woodlands have many structural aspects that provide key habitat. Standing dead limbs and trees, and downed logs, are critical breeding and feeding habitat for numerous species, just as they are in ancient forests. The great range of tree densities, from the scattered oaks of savannas to dense woodlands, combined with a range of understory shrubs and herbs, introduce additional extensive habitat diversity.

Streamside (riparian) woodlands are especially important to wildlife. This varies from pure Valley oak stands to mixes of species, including sycamores and ash. Natural disturbances, in particular spring floods, result in a complex



structural mosaic, from cleared areas with fresh soil, to stands with many layers of vegetation, including shrubs and vines. Riparian areas provide habitat with moisture and cooler temperatures during the dry, hot summers.

The woodlands are a source of nutrients for the waterways below, while some invertebrates use the vegetation for portions of their life-cycles. In addition, the vegetation stabilizes banks and provides movement corridors for some wildlife.

Grasslands also provide for a wide variety of wildlife, including hawks and other raptors - foothill grasslands appear to be a significant raptor wintering area. Varied chaparral communities are rich in plants, including a number of rare species only found on specific soil types, such as the lone buckwheat and the Pine Hill manzanita.

CHANGES SINCE EUROPEAN SETTLEMENT

Nineteenth century grazing brought extensive change to grasslands and other areas. Native perennial grasses were essentially eradicated, and replaced by annual grasses. The alteration resulted in the soil adsorbing less water and drying out more quickly in the summer. Many weedy introduced flowering plants displaced native wildflower displays.

More recently, removal of oaks for firewood, settlement, and increased grazing has been widespread. In many locales there is little dead and downed wood. The SNEP

40 year loss of oak woodland from some foothill counties ('45- '85]

Tehama	- 23%
Placer	- 32%
Calaveras	- 29%
Tuolumne	- 42%

Source: SNEP Report, Vol III

(see inset.)

report found that blue oak woodlands are the most imperilled of the broad vegetative types in the Sierra. Between 1945 and 1985, years, about 800,000 acres of Sierra oak woodlands have disappeared says the SNEP report, 16 percent of the total. Losses have been much greater in some counties

Future growth in the Sierra Nevada could lead to extensive loss of remaining woodlands, and their fragmentation into smaller patches that are less biologically viable.

The different types of chaparral scrub in the foothills also fared poorly in recent decades. The policy of suppressing wildfire and the widespread conversion of chaparral to grasslands on private ranchlands raise concern for the long-term sustainability of these fire adapted plant communities' states the SNEP report.

CURRENT CONDITION

“Many, perhaps most, Sierran species that specialize in oak woodland habitat seem to be decreasing in the Sierra”

states the SNEP report. Some foothill species, like the blunt nose leopard lizard and California tiger salamander, were formerly common on the Central Valley floor. The foothills form the edge of their geographic range, but are now much more important because of habitat loss in the Valley and elsewhere.

Some Rare or Imperiled Specialized Foothill Communities

- Riparian woodlands, Gabbroic chaparral, Serpentine chaparral, Ione chaparral, Leather oak chaparral, Serpentine bunchgrass, Wildflower field, Vernal pools

Source: *Sliding Toward Extinction*, The Nature Conservancy.

There is little establishment of blue oak saplings in many areas, leading to stands with only old trees and the specter of many oak woodlands dying out at some future time. The reasons are complex, and not completely understood. A key issue is inadequate moisture as a result of the change from perennial to introduced grasses. Areas with less rainfall or thin soils are especially hostile to young oaks. Large populations of deer and rodents, resulting from too few predators, is also a problem. For example, over 99 percent of acorns were eaten by pocket gophers in a Carmel Valley area protected from cattle and deer grazing.

Introduced animals, as well as plants, cause major ecological changes. Rooting by wild pigs causes extensive damage. Cowbirds parasitize songbird nests. Bullfrogs decimate amphibian populations.

Riparian woodlands and the rivers and streams themselves are often biologically degraded or radically changed. The waterways are radically altered by dams and water diversions. With grassland soils adsorbing less water and drying more quickly in the summer, once perennial foothill streams dry up in the summer, and water tables are lower. In the low foothills, some streams that were once wooded are devoid of vegetation other than grasses. Their banks are often degraded by the long history of grazing.

Localized, patchy communities such as those found on El Dorado gabbroic soils, are especially threatened, running the risk of being limited to small reserves in a sea of suburban development. A number of plant species found in these unique areas are endangered

CONSERVATION STRATEGIES FOR THE FOOTHILLS

“The most important identified cause of decline of Sierran vertebrates has been loss of habitat, especially foothill and riparian habitats

Percentage of some Sierra foothill communities on private land	
Grassland	88%
Valley oak woodland	98%
Blue oak woodland	89%
Interior live oak woodland	71%
Foothill pine-oak woodland	82%

and late successional forests” states the SNEP report. Widespread protection, and restoration, of native communities and fully functioning ecosystems are essential if we are to conserve the health and beauty of the Sierra foothills. Pockets of natural areas, lying in a sea of development, are simply inadequate.



REGIONAL PRESERVE SYSTEM

Preserves are important to any regional conservation strategy, ideally a regional preserve system with representatives of all native ecosystems and plant communities. Multiple preserves for each type are preferable. While the Sierra has large acreages in national parks and wilderness areas, these are all at higher altitudes. "Less than one percent of the foothill woodland zone is in designated preserves or other areas managed primarily for native biodiversity," state Frank Davis and David Stoms in the SNEP report. Many foothill biological communities are largely on private lands.

BIODIVERSITY MANAGEMENT AREAS

SNEP scientists led by Frank Davis of UC Santa Barbara examined potential strategies for Sierra biodiversity management area (BMA) strategies. Biodiversity protection would be the top priority for these areas, whether on public or private lands. Through computer modeling, they determined what BMAs would be needed to protect 10 percent of each of 83 plant community types. Each BMA is one of 1,785 watersheds in the Sierra.

The modeling was weighted in favor of public lands, areas with few roads or residents, and minimizing the total area within BMAs. In the Central and Southern Sierra, this would require 370,000 acres in addition to existing parks and wilderness (high elevations as well as foothills). Thirty percent of the selected acres are privately owned.

This BMA analysis demonstrates the magnitude of the problem we face. It would not necessarily work in practice. Creation of preserves on private lands requires willing landowners (for example, as sellers of conservation easements and/or recipients of payments in return for biodiversity protection) and would need to focus on larger landownerships to be feasible.

Preserves need to be large enough to provide protection or restoration of ecosystem functions, and to be linked. We need a combination of preserves and an extensive matrix of natural lands managed both for their economic use and for biodiversity conservation. This matrix must be economically viable and appealing to private landowners, and be free of the threat of extensive development of houses, other buildings, and roads.

The combination of preserves and matrix should include stretches of land running from the Central Valley to the high Sierra at several points along the length of the range,

conserving migration routes and other biological processes that require altitudinal connections.

RESTORATION OF NATIVE ECOSYSTEMS

Reestablishment of riparian areas and native bunch grasses and oak regeneration are vital steps that rely on the activities of private landowners. They require cooperative programs by Resource Conservation Districts, UC Extension, agencies and others, as well as financial incentives to participating landowners.

PRESERVING RANGLAND

Conservation of private rangeland is essential for protection of the foothills. These lands will provide most of the matrix and many of the BMA preserves. But ranching is a marginal business. Society must find ways to make conservation and restoration financially rewarding such as laws to exchange inheritance taxes for conservation or agricultural easements. Foothill conservation will succeed only with the interest and involvement of foothill residents, including local government, landowners, and interested organizations.

Further Reading

- Oaks of California*. Bruce Pavlik et al. Cachuma Press, 1991.
- An Island Called California: an Ecological Introduction to its Natural Communities*. Elna Bakker. California University Press. 1984.
- Saving Nature's Legacy: Protecting and Restoring Biodiversity*. Reed Noss and Allen Cooperrider. Island Press. 1994.
- Sierra Nevada Ecosystem Project, Final Report to Congress*. Vols I, II and III. University of California, Davis, Centers for Water and Wildland Resources. 1996.



The SNEP Report

This summer the Sierra Nevada Ecosystem Project (SNEP) presented its assessment of the range to Congress. The product of more than two years work by over 100 scientists, it covers ecological, social and economic conditions. There is analysis of future trends and various management options. But, it is not a plan or recommendation for future management of the Sierra, a task the scientists leave to the public policy arena. The SNEP report provides the information needed for debate and decision making on the future of the Sierra. We recommend that everyone concerned with this region read Volume 1 of the SNEP report, which summarizes the assessments and possible management strategies.

In this issue of *Linkages*, we have focused on growth and biodiversity issues in the foothill zone. Here is a sketch of key findings on just some of the more general issues.

Climate. Change over time is an especially important concept in California. On a time frame of centuries, annual precipitation is even more erratic than in the last few years. Within the last 1,200 years there have been 100 and 200 year droughts in the Sierra. The last 150 years “has been relatively warm and wet, containing one of the wettest half century intervals of the past 1,000 years” say the SNEP scientists. The implications are profound, ranging from what natural conditions would look like without settlement by Europeans, to the risks of over-estimating the amount of water available for farms and cities. Further climate shifts will occur in the future, whether or not significant anthropogenic global warming occurs, bringing major ecological and resource changes.

Fire. Fire places a major role in ecosystem function and process in the Sierra. Over the past 150 years, our society has radically changed fire patterns and fuel loadings by actions ranging from cutting of large, fire-resistant trees to fire suppression. SNEP scientists point out that “timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any other factor.” The SNEP report has various proposals for dealing with the serious fire problem, including defensible fuel zones and more extensive use of prescribed fire to restore natural processes. You will find an excellent discussion of SNEP’s extensive fire material, written by CSERC executive director John Buckley, on our revamped Web site (launch date February 1997 - see masthead).

Late Succession Forests. Forest management is a



major focus of the report, and much of the publicity. Most of the late successional or old growth conifer forests of the range have gone. The report examines various possible strategies for retaining high-quality late successional forests and supporting their full range of species and ecological functions. SNEP scientists found strong consensus on the importance of maintaining late successional forests at all elevations and the length of the range. Connectivity between blocks of late successional forest is essential, so “matrix lands are an extremely important parts of a rangewide network.” Also David Graber, in his analysis of Sierra wildlife, identifies another requirement for the continued existence for protection of the full range of species - “provide a sufficient quantity and distribution of snags and other dead wood in forests of all ages, with all degrees of canopy cover and tress densities.”

Amphibians. Amphibians are in trouble across the Sierra. The red-legged frog and foothill yellow-legged frog are virtually eradicated, the Yosemite toad endangered. The problems are caused by a number of interacting factors, each species being affected in different ways. Factors range from habitat loss and fragmentation, to the introduction of trout in once fishless high Sierra lakes and streams, to the spread of the non-native bullfrog.

Historically, many local amphibian populations would become extinct because of some disturbance event, then reform through colonization by neighboring populations. But native amphibians, especially frogs, now exist “as fragmented, individual populations that are highly vulnerable to extirpation” writes herpetologist Mark Jennings. “This fragmentation and likely local extinction is certain to lead to local, then regional, then Sierra-wide extinction of selected amphibian species if current trends continue.”

Aquatic Habitats. There are several reports on aquatic and riparian habitats, which are more changed and degraded than any others in the Sierra. Peter Moyle suggests a system of potential aquatic diversity management areas, using those watersheds which are still in good condition. He determined condition using a native fish and amphibian based index, including existence of natural hydrological regimes and other factors.

There are 42 potential areas, seven of which are in excellent condition. Deer and Mill Creeks (Tehama County) and the Clavey River watersheds are outstanding, while the North Fork of the Calaveras is also in excellent condition. Several other good condition watersheds extend into the foothill zone, including the Consumnes, the Merced River above McClure reservoir, and Deer Creek in Tulare County. Higher elevation watersheds from the south fork of the Kern to the south fork of the Kings River form a large block in the south Sierra. Additional factors require us to pay attention to other watersheds. These include the very localized occurrence of

many aquatic invertebrate species. The crucial importance of riparian vegetation to so many wildlife species also mandates a wide-ranging approach to conservation and restoration

Economic and community issues. The SNEP report also considers economic and community issues, particularly those associated with local resource based economies. It examines role of institutions in the Sierra and looks at ecosystem management, with extensive examination of a number of case studies. It analyzes issues ranging from grazing, to recreation, to poverty.

*

This assessment shows the inadequacy of existing information and knowledge for many biological issues. It presents society and the region with tremendous challenges - the need to use this material to reach agreement on effective solutions, the need to build on this information and understanding, and the need to monitor and adapt.

Obtaining the SNEP Report

Volume I is the main report to Congress. Volumes II and III are detailed scientific reports on the full range of SNEP topics. There is also an Addendum Volume and a CD Version.

2004 Update. You can access all the material online at <http://ceres.ca.gov/snep/pubs>



The Sierra Nevada Alliance

The Sierra Nevada Alliance is a regional coalition of mostly grassroots groups working in the Sierra for protection and restoration of natural resource and community values. Half of the member grassroots groups are located in the Western Sierra foothill communities, where the population pressures are great.

The Alliance is committed to building coalitions between community leaders and grassroots groups through sustainable community activities. Current community efforts are underway in Placer, Tuolumne, Amador and Calaveras county areas, working through local member groups. It works on resource and land use issues at the regional scale, while

supporting grass roots member groups with clearinghouse services, networking, and referrals to experts.

The Alliance is currently focused on two issues of critical importance to the Sierra - education about the information that is available in the Sierra Nevada Ecosystem report and the potential for crafting a watershed restoration and financing plan for Sierra watersheds, working with counties, state and federal agencies.

For information on the Sierra Nevada Alliance, contact Sierra Nevada Alliance, PO Box 9072, South Lake Tahoe, CA 96158. Phone (530) 542-4546

Sierra Wealth Index Links Economy and Ecology

This summer the Sierra Business Council (SBC) published a precedent-setting *Sierra Nevada Wealth Index*. It recognizes three types of wealth: social (human capital), natural (natural resource capital), and financial. "Each must be conserved and increased if the Sierra Nevada economy is to be prosperous, stable, and sustainable", says the SBC. "Deteriorating natural assets such as polluted streams, degraded forests, or lost farm lands reduce property values, drive away new business, and undermine the quality of life for current residents."

The SBC points out that the best investments are those that increase or conserve at least two of these types of capital, and do not diminish the third. For example, if a new development takes place in a vacant urban lot, rather than farmland, it builds financial capital (fewer service costs) and social costs (shorter commutes and enhanced community vitality) while preserving the natural capital of the farmland.

The Index uses a system of 42 carefully chosen indicators to measure these three types of wealth. Examples are high

school drop out rate, voter participation and poverty levels (social capital), old growth habitat and stream water quality (natural capital), job growth and number of small businesses (financial capital). Many indicators are broken down by Sierra subregion. Appendices list indicator values by county.

The Sierra Business Council

The Sierra Business Council focuses on the overall health of the Sierra Nevada, and the importance of natural and social values to financial health. In a recent survey of Sierra business owners, SBC found that 82 percent identified "the high quality of life" as one of the most significant advantages of the region, while placing little value on "fewer regulations than urban areas" or "lower cost of doing business". Business owners translated this quality of life as "the rural character of the overall region", "access to high quality wildlands" and "the landscape surrounding my immediate community". The SBC's Wealth Index and its other activities will play a major role in guiding future economic activity on a path that provides for both people and nature in the Sierra Nevada.

Order the Sierra Wealth Index Report from: Sierra Business Council, PO Box 2428, Truckee, CA 96160. (916) 582-4800. \$11.73, including shipping and tax (checks payable to SBC/Tides).



Barriers to Livable Communities Perpetuate Urban Sprawl

Second in a livable community series (part one in Fall 1995 issue.)

Increasingly, people and institutions recognize that growth through sprawling urbanization is a social, economic, and environmental disaster. Yet we continue to build dysfunctional communities, inviting a future of vast mega-cities, crippling traffic congestion, and an array of social, economic and environmental problems.

Architects, planners and others know how to build livable communities that provide a high quality of life for people, avoid the economic costs of sprawl, and minimize loss of farmland and wildlife habitat (*Linkages* Fall 1996.) What are the barriers to change? Here is a summary of many factors that maintain the sprawl habit.

Plans, zones and codes. General plans, zoning ordinances, and building codes determine how development occurs in a community. Requirements of these plans and regulations often mandate urban sprawl.

Segregated zoning for commercial and residential buildings.

Restrictions on mixed uses, such as dwellings above stores, coupled with low density development, force people to drive their cars on congested roads to run simple errands.

Parking requirements that lead to large parking lots – the dominant feature in many commercial areas.

Zoning requirements for housing position and design– restrictions require large set backs, minimum size, and prohibit row houses.

Requirements for needlessly wide streets – teamed with prohibitions against sidewalk cafes limit human amenities.

Author James Kunstler, in *Home from Nowhere*, offers an alternative – a traditional town planning ordinance that prescribes a more desirable everyday environment.

FISCAL BARRIERS. Money plays a major role in determining how development occurs. Here are some ways in which fiscal decisions perpetuate sprawl.

Financial institutions often will not support infill projects or mixed use development.

Infill development is expensive for the builder. In 1993,

Sargent and Flessig determined that infill costs a developer \$163 to \$191 a square foot in the San Francisco Bay area, urban fringe development \$100 to \$132 a square foot. This includes the lower price of land in the urban fringe.

Concern by developers and banks over the marketability of livable communities and infill development. By contrast, they know ‘conventional’ subdivision houses will sell.

Failure to evaluate the total long-term build-out costs of development approaches. For example, infill development uses existing infrastructure, thus reducing transportation costs for city residents. Whereas residents of auto-dependent suburbs have much higher transportation costs (car payments, insurance, parking fees, gasoline, repairs, etc.)

Local government funding has broken down in California and ‘cash box zoning’ drives decision making. Cities and counties, desperate for sales tax dollars,

eagerly approve sprawl and traffic inducing commercial development, such as mega-stores and factory outlet complexes.

Campaign contributions from those who benefit from sprawling development dominate local elections.

PUBLIC CONCERNS. Local citizens often oppose infill development, fearful of increased congestion and social problems, ignorant of how livable communities provide a better quality of life. Conversely, there are few local residents to oppose sprawl development beyond the urban fringe.

STRATEGIC ISSUES. Lack of a vision for the future leads communities and regions to drift, accepting piecemeal sprawl development.

Principal Features of Livable Communities

- Easy access to a mix of uses by foot, bicycle, transit.
- A human scale people friendly streets
- Economically healthy town centers, with civic buildings and public spaces
- A diversity of housing and employment opportunities
- Environmentally sustainable

Further Reading

Home from Nowhere, James Kunstler. Atlantic Monthly, September 1996.

Building Livable Communities: a Policymaker's Guide to Infill Development. Local Government Commission. 1995. [Obtain from LGC at (916) 448-1198.

Lack of integrated planning at regional and subregional scales, absence of firm urban boundaries, and ease of general plan revision, makes development at and beyond the

urban fringe enticing. This leads to increased prices for agricultural and natural land near urban areas, so reducing the economic viability of farming and ranching.

1996 Workshops by IEH

In 1996, IEH held successful workshops in Sacramento, Santa Clarita, and Fresno focused on preserving regional biodiversity, livable communities, and the future of each region. The Santa Clarita and Fresno events, in particular, attracted people with a wide range of interests. It was especially heartening to see agriculture, conservation, and business participants find common ground in Fresno.

We thank the many experts who gave freely of their time to make excellent presentations, the wide range of generous sponsors that ensured success, and the many individuals who helped plan and run these events. Our apologies for not having the space to name everyone.

Preserving Biodiversity in Sacramento

The June workshop explored issues and approaches for protecting biodiversity in a rapidly urbanizing six-county area that ranges from Central Valley farmland to foothill woodlands. Topics included regional status and trends, oak woodland conservation, wildlife-friendly farming practices, habitat conservation planning (HCPs), mitigation, and conservation banking. The use of landforms to determine preservation strategies was an innovative and exciting concept.

Participants used a hypothetical growth area for a conservation decision making exercise. Workshop materials on status and trends, a preliminary framework for conserving the region's biodiversity, and HCPs will appear on the IEH Website

Livable Communities in Santa Clarita

This October workshop was organized jointly by the Santa Clarita Organization for Planning the Environment (SCOPE), the Friends of the Santa Clara River, and IEH. Rick Cole of the Local Government Commission and former

Mayor of Pasadena, gave a penetrating overview of current design problems of southern California communities, stating "we live in garages with homes attached." He explained how thousands of Pasadena citizens became involved in determining the city's future – not by following details of the staffs' General Plan revision, but by collaborating on a vision for the future.

Keynote speaker William Fulton considered whether the future California will be livable, and stressed the need for citizens to get involved in local plans for inevitable growth. "We need to engage in the community and overcome our cocoon instinct," he said. "We need to get out and go to bat for our libraries and parks and schools."

The workshop included panels on development patterns, and air and water quality. Portland, Oregon, with its growth boundaries and higher density mixed-use transit oriented development provided a success story. Participants heard about developers' difficulties with projects other than the norm, the health problems of air pollution, and opportunities for cleaner air by changing land use decisions. Speakers addressed water issues, ranging from change in western water use decisions to conservation of aquifers and watersheds.

Regional Futures in Fresno

In November, IEH examined the future of the San Joaquin Valley and the adjacent Sierra foothills, with a focus on land use issues. The potential for massive loss of farmland was a major issue, and Rudy Platzek provided maps and details on the problem outlined in the Spring issue of *Linkages*. David Mitchell pondered the link between air quality and land use in a region that could develop the nation's worst air quality in the decades ahead. Daniel Williams described the biology of Valley and foothills, and the precarious status and possible protection strategies for many species. Participants realized that simply shifting sprawl from the Valley floor to

the grasslands and the foothills produces a whole new set of problems.

As in previous workshops, participants learned about wildlife friendly farming practices and the benefits of livable

communities. Small groups, each with a geographical and interest range, brainstormed land use problems, then solutions and local actions for these problems. Finally Chuck Peck of the Sierra Foothills Conservancy provided a superb slide show on foothill wildlife and habitats.

Information Resources

National

Land Use in America : The Report of the Sustainable Use of Land Project. Henry Diamond and Patrick Noonan. Island Press. 1996.

An over-view of land use issues, with a 10 point agenda for communities. One startling statement underscores how land use problems are not just the result of population growth, as some would suggest. Between 1970 and 1990, metropolitan Los Angeles grew 45 percent in population, 300 percent in area!

Diamond and Noonan focus on changes occurring in different areas, future trends, and the actions society should take. Most of the 10 Agenda points are fairly general, rather than prescriptive solutions for how we should plan. Lengthy boxes highlight issues and examples, from a homebuilder's perspective on metropolitan growth patterns, to the Hudson River Greenway. The second half of the book is a useful series of essays. Vermont's governor Howard Dean on Growth Management Plans. Christopher Leinberger on the social and environmental implications of late '90s development trends. And several others, with a range of topics and perspectives.

Transportation, Land Use and Sustainability. Center for Urban Transportation Research, University of South Florida. 1994. <http://www.arch.usf.edu/flctr/projects/tlushtml/default.htm>.

Browsing the WWW for real information is often frustrating. This site at the Univ. of South Florida is a cheering exception with detailed information on land use and transportation sustainability. The guide for sustainable community development discusses key actions from urban growth boundaries to mixed use development. Well worth a visit by land use web surfers!

Lost Landscapes and Failed Economies: The Search for a Value of Place. Thomas Power. Island Press. 1996.

Thomas Power, chairman of the Economic Department at Montana State University, dispels the myth that increased environmental protection has been the source of decline in extractive industries and the loss of jobs. He finds that

economic health in the region is dependent on preserving the unique quality of life that makes each small town attractive, and on economic diversification. "Owls versus jobs was just plain false. What we've got here is quality of life. And as long as we don't screw that up, we'll always be able to attract people and business" states Bill Morrisette, mayor of Springfield, Oregon.

Power's solutions include elimination of federal subsidies for resource extraction industries, assistance for families in transition, and the need to distinguish between economic change and economic decline. Continued reliance of a community in natural resource exports is not an economic development, but a prescription for further dependence and instability in rural communities.

California

Reader on Urban Growth Boundaries. Greenbelt Alliance. 1995

Ten articles on growth boundaries. Sources range from the American Planning Association to the City of Portland and newspapers in California's Bay Area. \$12 from Greenbelt Alliance, 116 New Montgomery # 640, San Francisco, CA 94105.

Transportation-Related Land Use Strategies to Minimize Motor Vehicle Emissions : an Indirect Source Research Study. California Air Resources Board. 1995

A detailed study of in land use planning, transportation alternatives that benefit air quality. It presents a set of community-level performance goals, quantitative reduction in vehicle miles traveled and pollutant emissions per household, with separate goals and strategies for urban, suburban and rural communities.

You can get a copy from the California Air Resources Board, Office of Air Quality and Transportation at (916) 322-2745. For those needing less detailed information, we also recommend the Board's earlier publication *The Land Use - Air Quality Linkage : How Land Use and Transportation Affect Air Quality* (1994).

A Planner's Guide for Oak Woodlands, and Guidelines for Managing California's Hardwood Rangelands. California Integrated Hardwood Range Management Program and California Department of Forestry and Fire Protection.

The planning guide examines a variety of oak woodland conservation issues. They include developing an oak woodland conservation strategy, CEQA mitigation for projects, tree ordinances. There is a case study from Visalia, biological

information and agency addresses. The management guidelines provide detailed information for land-owners. Topics include oak woodland ecology. Grazing management, developing recreational income.

Order from the Integrated Hardwood Range Management Program, 160 Mulford Hall, University of California, Berkeley, CA 94720-3114. Cost is \$10 for the Planner's Guide, \$15 for the Management Guidelines. Checks payable to UC Regents.

Join IEH and be Part of the Solution

The Institute for Ecological Health relies on contributions from individuals for much of its funding. We hope you will wish to join us, or make your annual renewal. With your assistance, we will help citizens and interests develop long term strategies and effective local solutions nto key land use issues. Workshops, *Linkages*, the Web site, a successful meaid campaign, and regional projects are all supported by membership donations.

Yes, I want to join IEH and support its programs. Here is my tax deductible contribution of:

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