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COMPETITION FOR NATURAL RESOURCES IN CALIFORNIA'S SIERRA NEVADA

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California's Sierra Nevada Mountains have participated in colorful and diverse historic events. First settled by American Indians 10,000 years ago, the region came to the attention of the world much later when gold discovered in the 1840s occasioned the first large scale wave of immigrants. More recently the mountain region's resources played an essential role in supporting settlements on the California coast, the Central Valley and in other parts of the United States and abroad. Elements of the colorful and productive past continue to the present, but remind one that "past is prologue." Current economic and social transformations, including inherent conflicts, are part of a continuing process.

This chapter examines market forces and selected policies that have shaped development patterns and the environment in the Sierra Nevada during recent decades and probably into the future. Central to the discussion is California's population growth from 20 to 34.5 million people in the 1970-2000 period which was largely concentrated in the State's coastal regions. However, as the years advanced, the most rapid rates of growth shifted first from the coast to inland areas and more recently to parts of the Sierra Nevada. In the process, large tracts of vacant undeveloped, agricultural, resource-rich and environmentally-fragile lands were transferred to human settlements.

Reasonable projections suggest California's population will grow another 33 percent approaching 46 million by 2020. The Sierra Nevada region is expected to grow by 50 percent from about 700,000 people in 2000 to 1.1 million by the end of the next two decades. Population density will continue to be relatively low throughout the region as a whole but a transformation is in process with significant urban and visitor oriented development experienced in certain areas and especially along the Sacramento –Lake Tahoe –Reno axis.

Growth internal to the Sierra Nevada has been accompanied by continued claims on the region's resources from outside in California's urban and agricultural areas. This process involves demands on, and calls for expansion of, the State's extensive water supply system with its dams, reservoirs and distribution systems; timber and other extractive resources; and large scale land development and related projects serving visitors from throughout California, the nation and the world. All of the developments induced by growth from within and outside the region are interrelated and, in part, feed on each other.

In response to regional and interconnected State economic developments, intensive studies have been directed to promote and protect the Sierra Nevada's

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wilderness, recreational opportunities and economy. Policies have been adopted, often in competition with each other, to meet these goals. Efforts have been directed towards examining the Sierra Nevada's complex ecology. But this purportedly all-embracing approach often emphasized preservation of a changing natural environment that has been in flux, for millennia. At the other end of the spectrum are evaluations and policy recommendations that view the Sierra Nevada as providing endless resources in meeting California's primary objectives of serving burgeoning human settlements and economic developments. Policies which concentrate on the conservation and protection of resources to meet long term future demands in this line of reasoning are seen as secondary and often counterproductive. In recent years the alternate positions above have occasioned nagging debates and, as will be shown, acceptance of policies often followed by reversal depending on which interest group has access to the decision making process.

Overview

In the following section we define the region whose experiences we examine. This definition is followed by review of early developments, including resource extraction and related policies, whose impact in part continues to the present. The purpose is to suggest how decisions in a distant past may influence events today. A subsequent section shows the recent disproportionately rapid rate of Sierra Nevada population and housing growth. Its role as a target for weekend, retirement and vacation housing is identified – a role closely linked to the State's aggregate population and economic growth. Continued pressures for expansion of this segment of the housing market will probably be exerted in the future, requiring careful management of the environment to preserve the region's attractiveness.

Rapid economic developments in the Sierra Nevada have been accompanied by diversification of its economic base. The region's potential to serve various markets, of course, has broad implications for its resources. An attractive environment has induced settlement by exurbanites who commute long distances to accessible employment centers. In view of the propensity to shop and obtain consumer services near places of residence the disproportionately rapid growth of the retail and service sectors is associated with this pattern. But it is also connected to the burgeoning visitor industry. Modern technology has facilitated reduction of clustering in the information-intensive industries with the result that locations near desirable residential areas have become more feasible. Mixed evidence on this point is available, but the rapid growth of the trade sectors and the relatively large role of self-employment may be indicative. A reasonable prognosis is that further pressures for growth in the future will come from information intensive industries who seek locations in desirable environments attractive to highly skilled employees as places of work and residence

The Sierra Nevada draws large numbers of summer and winter visitors who enjoy a growing range of sports and entertainment activities. Many of these activities consume large tracts of land, draw participants into the back country, take place in areas not especially suitable for permanent human settlements, or use fragile resources. This tourist attraction comes in addition to the concentration of visitor facilities in environments with urban services and the accoutrements of our industrialized society. Thus visitors, together with year round residents, are an

additional and growing component requiring natural and extractive resources within the Sierra Nevada, which are also in heavy and growing demand for use in other regions. The visitor industry is generally welcome and encouraged in State and Federal parks, and forests as well as elsewhere, via the provision of infrastructure and public investments in improved accessibility. In recent years, however, the size and growth of visitors and facilities plus growing awareness of potential environmental implications have occasioned calls to regulate this sector with the goal of conserving the natural environment and wildlife.

Policy formulation and decision-making relating to water have a high priority in the allocation of the Sierra Nevada's resources. With the Sierra Nevada as a major source of water for the State, literally every economic sector is affected and involved. Below we briefly examine the evolution of California water rights and its distribution system as background to evaluating the implications of recent and current policies on the Sierra Nevada and the State's net social product. Initially, this policy determination involves strategic decisions concerning investments in projects (dams, reservoirs, aqueducts, etc.) to allocate water to agriculture, urban areas, and environmental quality including bio-diversity. There will also be accompanied by specific allocation of water resources according to location, season, crop, property rights, land quality or use, and related criteria.

The long-standing approach of viewing the Sierra Nevada as a consistent and long run expanding supply of water to meet California's agricultural and urban needs is only slowly being revised. Historically, except for brief droughts, the assumption was that addition or expansion of another investment component of the complex water system would mitigate perceived problems. Water demand was weakly defined by reference to fixed or narrowly fluctuating relationships on the amount required per person or acre. Market forces and responses were considered weak reference points. In recent years counter pressures have dampened enthusiasm for investments supporting large projects and profligate use of water. The pressures from California's agricultural and urban areas are being resisted by groups interested in preserving bio-diversity in the Sierra Nevada and environmental quality. Also, the growing population within the region views the continuous and rising export of water to other regions as undesirable in the long run. Policy is slowly shifting in support of water transfers and water pricing that will improve allocation and reduce excesses including subsidized prices.

Growth management policies are also examined below, though realistically they are substantially within the jurisdiction of local authorities whose perspectives on maintaining and conserving bio-diversity and the natural environment are confined to the areas they regulate. In certain situations, the Lake Tahoe area for example, we are witnessing the emergence of a regional authority since the community spillover effects of pollution are pervasive and obvious and can only be addressed by collective action including intergovernmental agreements. When local jurisdictions act alone, they are likely to be guided by goals and objectives concerning their own community and the delicate environmental interrelationships cutting across communities do not receive the attention they deserve. In a region where wildlife, in particular, migrates by altitude, season, and across jurisdictions, strictly local policies may neglect interdependencies at the cost of environmental quality and bio-diversity in the larger

region. An important potential mitigating factor is that most of the Sierra Nevada lands are in the public domain controlled by the Federal government or the State of California. At this level, major shifts in policies will often be implemented in response to changes in the political arena and differences in views concerning societal or regional goals and objectives and how to attain them. Such shifts in policies may respond unduly to special interests when a more balanced and deliberate approach would be advisable.

Policies relating to the recreational environment and opportunities present some of the most puzzling challenges. No disagreement exists that the special quality of the natural environment of the Sierra Nevada is a treasure to which as many persons as possible should be exposed. How to accomplish this goal without severely compromising environmental quality and visitor enjoyment has been debated for many years. Generous access routes developed in the past are being reevaluated and in some cases blocked to vehicular traffic or all interested visitors. However, policies are prone to wobble because limitations on visitors invariably affect some groups more than others. Also, managers of fragile resources see the curbing of visitors as threatening their economic viability or they are concerned over sharp public reaction if they assert their professional views on this subject. Nonetheless, in light of events such as people lining up to climb Half Dome in Yosemite, traffic jams of rubber rafts on scenic rivers and similar incidents of congestion or pollution, policies to check these types of problems will surely be pursued. Although correct pricing of these resources is one approach to improve efficiency in allocation, it presents difficulties since scenic and recreational opportunities may be looked upon as a national heritage whose access should be broadly available. This stricture, however, has less weight when considering other resources such as water, land for development and lumber.

Definition of the Region

As shown on Appendix Figure 1, The Sierra Nevada extends for more than 700 kilometers in the eastern part of California covering an area of approximately 80,000 square kilometers. The Great Basin is on the east and California's Central Valley lies to the west. Its mountainous areas, with Sequoia and Yosemite National Parks and Lake Tahoe as reference points, are known as the High Sierra. However the larger region incorporates foothill areas especially on the west with gentle slopes including a subregion sometimes identified as Gold Country and also known as the "mother lode."

The Sierra Nevada encompasses fault block mountains shaped by the upward and downward tilting of major blocks of the earth's crust. On the west one finds a gentle tilt in the direction of the Central Valley and on the east are sharp breaks around faults in the earth and a steep rise in the mountains forming long escarpments. The crest of the mountain chain, with heights from 9,700-13,000 feet, presents a formidable barrier to east-west movement of people and goods. Year-round transportation routes across the Sierra Nevada are few and far apart. About 300 miles separate Walker Pass, near the southern boundary of the chain, from the highway and rail routes across famed Donner Pass. While the Sierra Nevada may be viewed as diverse and extensive, it is nevertheless considered to be a single region, due to commonalities including resource exports, recreational amenities, and emerging socioeconomic shifts. For purposes of this paper, and the presentation of data, we

define the Sierra Nevada to include twelve counties: Alpine, Amador, Calaveras, El Dorado, Inyo, Mariposa, Mono, Nevada, Placer, Plumas, Sierra and Tuolumne.

Wilderness and Flora

The Sierra Nevada offers a rich and diversified natural environment, with variations, which are significantly associated with time, climate, elevation, geographic location, and human settlement. Its natural environment of the region has been researched in some detail and we apply a broad brush here, with references, to develop a background for later discussion.

Temperature, precipitation, earth movements and soil conditions in combination have exerted major influence on the region's diverse vegetation. The Sierra Nevada Ecosystem Project (SNEP, 1996) in its report to Congress, mentions, "more than 3,500 native species of plants, making up more than 50% of the plant diversity of California. Hundreds of rare species and species growing only in the Sierra Nevada (endemics) occupy scattered and particular niches of the range" (SNEP, Vol. I, p.11). In the foothills, meadows, rangelands, woodlands including oaks and foothill pine are found interspersed with forests along streams and rivers. These are also the areas with growing human settlements experiencing potential threats to bio-diversity. Indeed, bio-diversity is an important issue and explains why expanding human settlements in the Sierra Nevada should be scrutinized carefully especially when fragile resources serving the state and the nation are threatened and when these resources are not easily replaceable from others areas.

In moving from the hillsides to the higher elevations of the Sierra Nevada, one witnesses the transition from chaparral to mixed conifer forests much of which has commercial value. At higher elevations the conifer forests gives way to white and red firs, which eventually are replaced by subalpine and alpine species. On the eastside of the chain the transition is more abrupt. Variations in vegetation across small distances are significant and are the result of fire, storms, insects, soils, winds, long term climatic changes and other factors. Importantly, the Sierra Nevada forests have been the source of a large variety of distinct products and services for industry and consumers.

Forests, Woodland, and Wildlife

Approximately 84 percent of the land in the Sierra Nevada is in the public domain or in public ownership, with private ownership of land concentrated in the central Sierra Nevada (Sierra Nevada Business Council, 1999). Lumber harvests have shown sharp fluctuations over the past twenty years, with the peak harvest in 1986 when residential production, a heavy user of lumber, attained a cyclical high. Timber harvests declined since then, especially on public lands where national policies are significant. A result of these developments has been decreased employment in the timber industries with a significant impact on selected counties, e.g., Alpine, Mono and Inyo, with limited alternative employment opportunities.

The interrelationships between healthy vegetation and animal life, of course, are a matter of continuing public concern. Of the approximately 400 animal species many occupy areas at different elevations depending on season or stages in the precipitation cycle over the years. Most of the species are not unique to the Sierra

Nevada but occupy other niches on the Pacific Coast or throughout the West. One implication, however, is that loss of seasonal habitat has effects on other areas in the region. For example, the disappearance of certain migrating species in the High Sierra during, say, summers is associated with loss of foothill habitat in winter or spring due to human settlements. Only three species have become extinct in the Sierra Nevada during the modern period (SNEP, Volume I, pp. 79-83). These include the grizzly bear, the California condor, and Bell's least vireo (a bird). Attempts to reintroduce species as, for example, the condor and bighorn sheep, have met varying success. Approximately 17% of the animal species are designated as endangered or their populations are small. The reasons for extinction or near extinction are manifold and often involve indirect as compared to direct effects of human settlements. Insecticides, introduction of non-native species, reductions in food supply, loss of habitat near streams or rivers due to water projects, power lines, diseases and declines in old growth forests as shelter are examples in point.

Mining

California's modern history has its roots in the Sierra Nevada beginning with the discovery of gold in 1848 along the American River in El Dorado County. Gold exploration and mining induced large scale migration and the establishment of a number of towns, many of which had a brief life. Population rose rapidly from an original wave of 25,000 miners to perhaps 150,000-175,000 migrants in the years from 1848 to 1860. The in-migration of prospectors was associated with a precipitous decline of the native Indian population due to disease, starvation, warfare, resettlement and extermination. The early boom, involving placer mining, soon ended as availability of surface deposits declined. Next, hydraulic mining, concentrated in fewer areas, resulted in scarring of the land and clogging and polluting of rivers. In this method, water under high pressure is directed onto banks of gold bearing gravel. The gravel is washed into sluices with grooves to trap the gold (Alden, 1970). The conflicts arising from these methods led to legislation and regulations which curbed hydraulic mining practices. The effect on the land of mining, and scarring remains to this day. Other impacts of mining included denuding of woodlands and forests at lower elevations for fuel and construction of mines and communities. Much of this denuded land was converted to cropland, pastures and rangeland.

With the end of hydraulic mining and the gold rush in about 1880, the region experienced a temporary decline in population. Hard rock gold mining expanded at the beginning of the 20th century, providing initially an economic base for a number of communities, such as Grass Valley and Nevada City. In more recent years, these communities have attracted tourists, exurbanites, retirees and vacation housing. Other mining activities followed the gold boom on the west since the region is rich in ores. Over twenty different minerals have been found (SNEP, Volume II, p.15), including silver, lead, copper, chromite, tungsten, molybdenite and others including nonmetallic minerals such as soda ash, trona, and borax. Relatively few mines are in operation today and mining represents a small fraction of the Sierra Nevada's economic base.

Mining operations in the Sierra Nevada over more than 150 years have fluctuated in response to new discoveries, the vagaries of price and cost movements, alternative supply sources, technological changes, innovations and other forces. The region continues to have a large potential supply of ores and related natural resources

according to recent studies. For the time being mining plays a modest role in the regional economy, but this could well change in the future.

Grazing

Prior to and at the beginning of the gold rush, sheep and other livestock were introduced into the Sierra Nevada. Inexperience and lack of understanding of range management occasioned overgrazing by cattle and sheep. Moreover, most of the land was in the public domain and, as is common in collective goods, the costs of mismanagement are borne not by particular individuals but by the larger community (Mankiw, p. 235). Few incentives were present to conserve and use resources efficiently with long term objectives in mind.

Unregulated grazing practices were reduced around 1900 as limits were placed on the number of livestock by area and periods of grazing. The problem with overgrazing is that native plants are not given enough time to recover. If the land is given a rest the grasslands may reappear, but erosion of stream channels associated with overgrazing may take decades to repair. Non-native short season grasses and other species also may flourish and this outcome often has the result of reducing foraging productivity. Measures to shift timing, duration and intensity of use of public grazing lands in the twentieth century brought further improvements toward sustainable activity.

Beef in general and beef raised on rangeland remains a product much in demand in the United States notwithstanding that cereals providing the same nutritional value could be farmed on less land. Eventually, consumer behavior may change. In the meantime a significant part of California's beef production has shifted to feed lots.

Farming

The hilly and mountainous terrain of the Sierra Nevada offers limited opportunities for the production of row crops on a large scale. However, dairy products as well as fruits and nuts play a role in this region, including vineyards and wineries. Most of the cultivated land in the Sierra Nevada is in private hands in contrast to rangelands, forests and woods. On the west slope, agricultural land often is in the path of human settlements and given the appetite for low density residences, may be transferred. The issue is that productive agricultural land, privately owned, is more likely to be transferred to urban use than non-productive or marginally productive public land.

Farms and other open lands in California are offered an incentive not to convert to urban use through legislation known as the Williamson Act. Owners of farms and open lands who agree to maintain the land in agriculture for 10 years will have the land assessed at current rather than potential use and property taxes will be reduced. Without such a contract, farmland may be valued for tax purposes according to its potential urban use, with consequently higher taxes. Nine out of twelve Sierra Nevada counties participate and approximately 2,000 square miles are enrolled. Since the program reduces local public tax revenues, the state in part compensates participating counties. Notwithstanding, much land continues to be transferred to urban uses in Sierra Nevada counties suggesting property owners participate in the

Williamson Act selectively. Many who participate do not renew their contract when the benefits from transfer out of farming outweigh the costs. Also, beneficiaries of the legislation include many who had no intention of transferring land to urban use.

The actual or potential loss of agricultural lands to urban development, although much deplored, probably is overrated. Some of the losses may be replaced by the conversion of rangelands to cultivation in the Sierra Nevada. Also, the crops grown in the past on urbanized lands in the region for the most part were not specialty foods, but could be grown in many areas. Finally, in California, about 80 percent of the water is used in agriculture and the transfer of farmland to urban areas does not impose large new net demands on the Sierra Nevada water supply.

Demographic Characteristics

Table 1 presents the demographic characteristics of the Sierra Nevada region, based on 1990 and 2000 census data. In terms of population, the region expanded from 554.5 thousand in 1990 to 688.8 thousand in 2000, representing a ten-year growth rate of 24.2%. During this same period, housing units grew at an overall rate of 21.5%. Vacant units for seasonal use expanded by approximately 8,000 units, for a growth rate of 18.2% during the decade. In 2000, these seasonal units comprised nearly 18% of all units in the region. The housing unit growth rate for the Sierra region was similar to the population growth rate. In contrast, for California as a whole, the growth rate of population exceeded that for housing units.

TABLE 1
Population and Housing Trends
Sierra Nevada Region and California

	<u>1990</u>	<u>2000</u>	<u>% Growth</u> <u>1990-2000</u>
Sierra Nevada Region			
Population	554,503	688,833	24.2%
<u>Housing units</u>	276,327	335,866	21.5%
Occupied	209,871	269,903	28.6%
Vacant for seasonal use	43,058	50,895	18.2%
Other vacant units	23,398	15,068	-35.6%
State of California			
Population	29,760,021	33,871,648	13.8%
<u>Housing units</u>	11,182,882	12,214,549	9.2%
Occupied	10,381,206	11,502,870	10.8%
Vacant for seasonal use	193,254	236,857	22.6%
Other vacant units	608,422	474,822	-22.0%
Sierra Nevada Share of California			
Population	1.9%	2.0%	n/a
<u>Housing units</u>	2.5%	2.7%	n/a
Occupied	2.0%	2.3%	n/a
Vacant for seasonal	22.3%	21.5%	n/a
Other vacant units	3.8%	3.2%	n/a

Source: U.S. Census Bureau, 1990 and 2000 Census of Population and Housing

Economic Characteristics

While possessing abundant natural, cultural and historic assets and amenities, many counties in the Sierra Nevada region have experienced high and chronic unemployment, and have been characterized by a relatively low-skilled and low-earnings labor force. The Sierra region unemployment rate stood at 8.5% in 1985, while the statewide unemployment rate was 7.2%. By 2000, the statewide rate stood at 5.2%, with the Sierra Nevada region rate at 4.7%, reflecting the strong economic growth of the latter period of the 1990s.

Data on inter-county commuting is available from the 1990 census, but no data are currently available for 2000. Nearly all parts of the Sierra Nevada region showed significant proportions of employed residents commuting outside the region. Up to 20-25% of workers in the Sierra Nevada commute to job locations in the Central Valley, primarily in the western portions of centrally located counties. This commuting reflects an exurban pattern, with such Gold Country communities as Nevada City, Grass Valley, Placerville, Jackson, Sutter Creek, Ione, Sonora, Jamestown, and Mariposa housing workers employed in Central Valley cities such as Sacramento, Stockton, Modesto, and Merced.

The Sierra Nevada region also shows relatively high proportions of employed residents working at home. In 1990, some 4.8% of Sierra Nevada employed residents worked at home, compared with 3.2% statewide. By 2000, the Sierra Nevada ratio had increased to 6.1%, while the statewide ratio stood at 3.8%. In 2000, notably high proportions of home workers were exhibited in Calaveras County (7.0%), Nevada County (7.6%) and Mono County (7.5%). The phenomenon of working at home in the Sierra Nevada region includes farmers and ranchers. However, the nature of the increase leads one to believe that it also includes professionals and entrepreneurs, known as “lone eagles.” The opportunities for such enterprises are often linked to innovations in communication and transportation, including the Internet, fax machines and rapid overnight delivery services such as Federal Express.

Based on the labor force, commuting, and workplace data, the Sierra Nevada region has potential for increasing diversity across industries. Table 2 presents payroll data on industry structure for the 1990s for all industry divisions except agriculture and mining, for which consistent data are unavailable. All industries show absolute expansion for the 1990-2000 period, with overall employment growth expanding by over 65%. Wholesale trade and services show rising shares of wage and salary jobs, reflecting increasing diversity and a widening economic base.

This shift in industry structure may be consistent with wider economic trends. For example, many wholesale trade activities are tied to Internet trading, for which the business-to-business component is recognized as having the greatest potential. Regarding services, the category is very broad, and includes lodging and entertainment, as well as repair services, business services, including those to high technology industries, and medical, legal and other professional services.

These industry trends are also related to other economic forces, including the de-concentration of metropolitan employment, improved highway systems, and the

use of information and telecommunications technologies in businesses, eliminating or reducing the need for a clustering of physical resources in many business sectors (SNEP, Vol. II, Ch. 11).

TABLE 2
California's Sierra Nevada Region
Nonagricultural Employment Growth and Industry Structure, 1990-2000

	<u>1990</u>	<u>2000</u>	<u>% Growth</u> <u>1990-2000</u>
Employment			
Construction	12,271	21,370	74.2%
Manufacturing	16,290	21,720	33.3%
Transportation, comm., util.	7,210	8,270	14.7%
Wholesale trade	3,530	7,320	107.4%
Retail trade	32,080	52,330	63.1%
Finance, insurance, real estate	7,480	11,470	53.3%
Services	34,570	70,060	102.7%
Government	<u>34,220</u>	<u>51,910</u>	51.7%
Total	147,651	244,450	65.6%
Industry Structure			
Percent of Total Employment			
Construction	8.3%	8.7%	
Manufacturing	11.0%	8.9%	
Transportation, comm., util.	4.9%	3.4%	
Wholesale trade	2.4%	3.0%	
Retail trade	21.7%	21.4%	
Finance, insurance and real estate	5.1%	4.7%	
Services	23.4%	28.7%	
Government	<u>23.2%</u>	<u>21.2%</u>	
Total	100.0%	100.0%	

Source: California Employment Development Department, Annual Average Labor Force and Employment, March 2002 Benchmark.

The Visitor Economy

A major component of the Sierra Nevada economy has been the visitor (tourist) industry. Visitors from California, other parts of the United States, and abroad contributed over \$3.2 billion in spending in 2000, as shown in Table 3. While substantial, these expenditures account for only about 5.5% of total visitor spending in California. Though showing an overall growth rate of over 52% over the 1992-2000 period (in current dollars), visitor spending in the Sierra Nevada continued to account for between 5% and 6% of statewide spending. Also, the region is a location for second homes, accounting for over 20% of such houses in California.

The Sierra Nevada region attracts substantial visitors from abroad, including Europe and Asia. These visitors see not only the scenic attractions such as Yosemite

National Park, but also attend some of the lesser-known areas, including the Owens Valley and nearby Death Valley. Indeed European visitors to Lone Pine and Mount Whitney (the highest point in the 48 contiguous states) can constitute up to 40% of all visitors during the spring months, based on discussions with hoteliers in the area.

TABLE 3
California's Sierra Nevada Region
Travel Spending and Lodging Trends

	<u>1992</u>	<u>2000</u>	<u>% Growth</u> <u>1992-2000</u>
Destination Travel Spending			
(millions of current dollars)			
Sierra Nevada Region	\$2,108	\$3,211	52.3%
State of California	\$40,100	\$65,999	64.6%
Sierra Region % of State	5.3%	4.9%	n/a
Sierra Nevada Lodging			
Number of establishments	136	141	3.7%
Number of rooms	10,074	12,207	21.2%
Rooms per establishment	74.1	86.6	16.9%
Average room rate (current dollars)	\$68	\$83	21.5%
Number of stars	2.6	2.7	2.6%
Lodging Rooms by Type			
First-class hotel	745	894	20.0%
Bed & breakfast	29	207	613.8%
Historic hotel	255	313	22.7%
All others (e.g., motels, cabins)	9,045	10,793	19.3%
Percent of Lodging Rooms by Type			
First-class hotel	7.4%	7.3%	n/a
Bed & breakfast	0.3%	1.7%	n/a
Historic hotel	2.5%	2.6%	n/a
All others (e.g., motels, cabins)	89.8%	88.4%	n/a

Source: Dean Runyon Associates, Destination Travel Spending by County: 1992-2000
American Automobile Association, California TourBook, 1992 and 2000

Table 3 also presents major lodging trends. Between 1992 and 2000, the number of rooms increased more rapidly than the number of establishments. Rooms per establishment rose from 74.1 in 1992 to 86.6 in 2000. The increases in rooms per establishment are associated with a quality increase attributed to the succession of older establishments. Lodging trends also show a transition in the mix of rooms with an increase in importance of first-class hotels, bed & breakfast and historic hotels. This transition of lodging to include somewhat larger proportions of bed & breakfast and historic hotels meets the demands of a more diverse visitor base, engaging in a wide range of activities.

Appropriative Water Rights and Riparian Rights

Water rights and use in California are influenced by several doctrines, which have been codified and affirmed by the courts. The first of these, the appropriative

right, came into existence during the gold rush and holds that “first-in-time, first-in-right.” The party diverting water first enjoys a priority (senior) over others following with “junior rights.” Among some of the elements of appropriative rights are a right to sell and transfer, divert and control water, and reasonable and beneficial use. A senior may not change water use if it damages juniors and the right can be enforced only if water is put to beneficial use.

The riparian right, based on English Common Law, concerns the right to use water by a property owner located next to the course of water (river, stream, lake, etc.). Water used must be on the parcel along the water course and there is no priority of use. This concept of reasonable use is implied and rights are not lost by non-use. The seeming conflict between appropriative and riparian rights was resolved largely by the California Supreme Court many years ago which held that, with some exceptions, the riparian rights are superior if the use is reasonable. Later it was determined that to establish his claim, a riparian must show that an appropriative right user interferes with a riparian’s reasonable use.

Dominance of the appropriative rights doctrine, when gold mining was intensive, was challenged with the introduction of hydraulic mining practices—a California innovation. One outcome was that approximately 3.6 billion cubic feet of debris accumulated in the Sierra Nevada streams and rivers. This created not only havoc for downstream users associated with deteriorating water quality and blockage of streams, but increased the danger of flooding in the San Joaquin and Sacramento Valleys where farming was emerging as an important economic activity. A long judicial battle ensued which, after many years of litigation, was resolved in favor of farming. The judicial process gave superiority to the riparian doctrine in legal disputes as long as all parties have reasonable claims.

Remnants of the turbulent past have left their mark on the Sierra Nevada. In areas where minerals were mined an extensive system of ditches, flumes and reservoirs was built. Many of these facilities remain and are in operation today even though mining has ceased. They serve communities and their surroundings whose population has increased in recent years, especially in the Gold Country. Also these facilities were incorporated in the region’s hydroelectric power system which was developed to serve clients outside the region in northern California.

Urban Demands for Sierra Nevada Water

The demands for Sierra Nevada water came from southern and northern California cities. Plans for accessing and transporting water began in the early years of the twentieth century. The Hetch Hetchy reservoir is located in Yosemite National Park and water did not become available to San Francisco from this source until 1934. However, this vast project includes a supply of water and electricity to areas inside and outside the city. Concerning Los Angeles, the first 230-mile aqueduct, on the east slope of the range in Owens Valley and completed in 1913, was extended to the Mono Basin in 1941 and supplemented by a parallel aqueduct. Both ventures required the collaboration of the federal, state, and local governments. The negative effects within the Sierra Nevada region included flooding of the scenic Hetch Hetchy Valley and the preemption of irrigated agriculture in the Owens Valley. These effects reflect the

demands of the large populations and politically more powerful forces in California's two major urban areas.

The two urban oriented water projects drawing on the Sierra Nevada were precursors for two later massive projects with a strong agricultural orientation. Cycles of drought followed by floods and increases in irrigated lands of California's farm areas, plus reduction in the groundwater table, created demands for greater stability and increased supply of water. This pressure provided an impetus for the Central Valley Project (CVP) started by the State of California, and taken over later by the United States Bureau of Reclamation during the 1930s. Large construction projects in or at the edge of the Sierra Nevada included dams, reservoirs, and canals at Shasta, New Melones, Folsom, and Friant, as well as smaller projects in other areas. Contracts with water districts and farmers for water were generous and amounted to handsome subventions, which only in recent years have been subject to partial correction. Among some of the consequences of low water prices in the past were excess quantities of water demanded and inefficiencies in its utilization

Even before the CVP came on stream in the 1940s and 1950s, pressures were exerted for a State Water Project serving areas not in the CVP. California voters eventually approved what became known as the Feather River Project including a very large dam at Oroville. One of its features is an aqueduct system on the west of the Central Valley, which extends all the way to southern California. This system in part is a replacement for water from the Colorado River serving California that has been reallocated substantially, by the courts, in favor of Arizona.

No large water projects drawing on the Sierra Nevada resources have been initiated in the last twenty years. Public opinion, policies and legal decisions have been running in the other direction as concerns to protect the environment and project costs have come to center stage. Action has been taken to raise the level of Mono Lake because its lowering threatened wildlife. New requirements also require the wetting of Owens Lake for control of particulate air pollution. Construction of a dam at Auburn was halted, several rivers were added to the national wild and scenic river system, and other measures have been taken that in the long run benefit Sierra Nevada residents at the cost of other regions.

Policy Orientation

Social and economic priorities at different times have substantially influenced the formation, implementation, evaluation and revision of policies affecting the Sierra Nevada. Our emphasis will be on public policies, “. . . defined as the sum of law, regulation, administrative programs and public projects together with their funding and implementation . . .”(SNEP, Vol. 2, p. 146). However, we are sensitive to the role of policy development in the private sector taking the form of covenants, contracts, and agreements with no or limited input from the public sector. The appropriative rights doctrine relating to water is an outgrowth of practices in the mining industry, which eventually were codified. As time progressed, policy emphases shifted. Early attention to the extractive industries was followed by concerns over the allocation of water to urban areas. Later, farming and ranching, the timber industries, recreation and more recently environmental quality and sustainability of the natural environment have received emphasis in that order.

However, emphasis should not be confused with exclusivity. To illustrate, Yosemite National Park was established in 1890 by the United States Congress, but had become a California park by 1964.

A goal in public policy is that as a consequence of policy implementation net social benefits should be maximized. An assumption is that commensurate measures of benefits and costs can be estimated which for obvious reasons is not easy when dealing with intangibles. Minimally, intangible benefits and costs should be identified and if feasible measured in non-commensurate terms. Attention should be directed to potential negative neighborhood effects (or other externalities) as a result of public policies and, if feasible, measures should be taken to mitigate the effects or to compensate those deleteriously affected.

Water Policy Issues

Water issues perhaps have been the most consistent and continuing subjects of public policy in the Sierra Nevada during modern times. The negative externality of debris clogging rivers and streams downstream and inhibiting farming led to the decision to restrain hydraulic mining. In retrospect this decision enhanced agricultural development in the Central Valley which in terms of the present value of the net benefits over the long run probably exceeded the value of long run losses in mining operations. Miners and mine owners were not compensated, but one cannot ignore the possibility that some miners eventually turned to ranching and farming in the region or in adjacent areas.

In comparison, the acquisition of water rights and the construction of storage and distribution facilities to serve Los Angeles City and the San Francisco area clearly benefited the growing populations in these urban areas. The modest compensation by Los Angeles to property owners in the Owens Valley and redirection of the water supply from others without compensation remained a bone of contention throughout much of the 20th century. The actions also prevented a potential new project by the U.S. Bureau of Reclamation. Over the years policy has shifted and the City of Los Angeles can no longer acquire and move water without considering the environmental impacts as in the cases of Mono Lake and “barren” Owens Lake.

San Francisco not only received permission to build the Hetch Hetchy project in a National Park, but was assisted by the federal government in its construction. The resulting water is, of course, available to the citizens of San Francisco. In addition, the city sells surplus water to surrounding communities. The flooding of a scenic valley in a National Park clearly has been a disbenefit to potential visitors and some groups in recent years have called for the demolition of this project on the grounds that an alternative supply is available from the Feather River. Nevertheless, in 2002, propositions were on the ballot for multi-billion dollar bond issues to rebuild the Hetch Hetchy water system on the grounds of neglect and under-maintenance, earthquake risks, and poor allocation of funds in the past.

The urban water projects and increments over the years have contributed to the growth of the Los Angeles and San Francisco areas by way of more jobs, residents and land development. Water agencies often were reluctant to view the problem in this fashion. A common assumption was that growth would occur anyway and

without an increased supply of water a growing population would be left high and dry. In part, this type of reasoning is related not only to water agents' role as public servants but also their concern about the viability and survival of their own agencies. The problem was further aggravated because future projections of water demands were made without reference to water prices. A position that higher water prices would curb demand or that lower prices would create excess demand was neglected. As long as low water prices prevailed, the results were projections for handsome additional storage and distribution facilities.

A related issue concerns the desire by agricultural interests for increased water supplies in order to expand irrigated farm output not so much for regional or even national consumption but for export abroad. Production of crops requiring large amounts of water and inefficient use of water in farming were symptoms of this tendency.

The Central Valley Project (CVP) is an example in point involving submarket water prices for many years to assist "family farms" with less than 160 acres. The subterfuge of related individuals each owning 160 acres working together in operating large corporate farms was a common practice. The practice is said to persist even though the acreage was increased to 960 in 1982. Only during the 1990s were adjustments made in water prices and to permit, within guidelines, transfer of water in water markets. The California State Water Project initiated during the 1950s and 1960s, drawing on one of the last large unallocated river supplies, found that the energy costs of moving water over long distances and consequent price structures reduced excess demand. No large new supplies including storage and distribution systems have come on stream recently. However, water from the Sierra Nevada is used in producing crops which, were it not for low water prices, would be raised in other areas of the nation or the world. This outcome raises questions concerning efficiency, equity, and optimality.

The conflicts surrounding water allocations in California continue notwithstanding the profligate use of water in many areas and economic sectors. New residential developments of 500 units or more must show where they obtain the water for prospective residents. Since few untapped or unallocated supplies are available this process presents opportunities for opposition to projects or reallocation of water from other areas. The latter is sought out by northern California communities who are invoking the "area of origin" laws passed in the wake of southern California's acquisition of most of the Owens River water (Vogel, 2002).

These laws give priority for water to communities near the "area of origin," as contrasted to those far distant—e.g., southern California—once the nearby communities reached a threshold in growth and an additional water supply was needed. In fact one Sierra Nevada county recently was successful in staking its claim in the face of opposition from environmental groups who preferred less growth within the region to retaining the water supply. Other northern California communities around San Francisco claim that being 90 miles from the Sierra Nevada water supply places them within the "area of origin" whereas more distant communities in southern California and the Central Valley are outside the area. Decision makers, or to be more specific

the State Water Resources Control Board, have the unenviable task of defining an “area of origin” as a matter of policy.

Growth Management Policies

Water issues substantially involve the distribution or redistribution of wealth and resources between the Sierra Nevada and other regions. Human settlement policies have similar effects but also raise questions on what types of settlement are stimulated or discouraged in the Sierra Nevada and where. When human settlements involve land conversion, the effects on fauna and flora include (a) habitat reduction; (b) fragmentation of habitat; (c) isolation of habitats by barriers –roads, fences, etc.; (d) harassment or destruction of wildlife by pets; and (e) invasion by non-native species. (SNEP, Vol. II pp.329-333). In addition a series of indirect effects on surface and underground water among others also play a role.

The policy responses to these perceived problems include a myriad of regulatory tools, mitigation, taxation (sometimes a form of compensation), and prohibition. Recently, the U.S. Supreme Court reached a decision in the Lake Tahoe area asserting that a temporary moratorium on a planned retirement/vacation home development was not a form of taking by a public agency requiring compensation in accordance with the U.S. Constitution (Savage, 2002). The purpose of the moratorium was to facilitate initiation of measures, which would avoid further pollution of Lake Tahoe.

On the face the decision seems reasonable except for the fact that the moratorium had been in place for many years and questions are raised on the meaning of “temporary.” The moratorium illustrates some of the difficulties in policy analysis of fragile environments. In part, growth management is a relatively recent approach, but often represents an alliance between public servants at various levels of government who must walk a fine line between divergent goals. They must satisfy the needs of the community and current residents convinced that land development will impair their life quality. Current residents in attractive growth areas usually neglect the fact that they may have contributed to perceived or prospective environmental problems when in-migrating in the past. But they are convinced of their role as gatekeepers in guarding the future against newcomers.

Growth management today includes the establishment of growth boundaries. It entails inducing higher densities in specified growth areas and requirements for lower densities within others. Most of the tools have an impact on land values and housing prices with taxes sometimes on induced increases in property values. (But usually there are no rebates for declines in value.) If the growth management tools selected reduce development and protect selected species’ habitat, there will be a benefit to society.

Current owner-occupant residents will benefit not only from improved environmental quality, but probably will also enjoy higher property values, which they may capitalize on at time of sale. However, those inhibited from development will lose or will pay a higher price for entry into the market. A question arises on how some of the redistributive effect may be mitigated. Taxes on those enjoying unintended benefits are one approach, but there are others.

Feasible modest development may be permitted at the same time as measures are taken to integrate human settlement with habitat protection or to establish new preserves. Caution has to be applied so that the approaches selected are not counterproductive. An illustration here is a common local approach, namely, to require larger lot sizes for homes. This approach induces the establishment of “ranchettes,” a type of gentleman’s farm, whose owner-occupants may grow crops but for the most part have little commitment to be efficient. The approach also redistributes income and wealth in favor of upper income and wealthy populations. It essentially inhibits modest income populations from moving in or requiring them to consume and maintain a great deal more land than they desire. Large lots often aggravate, rather than reduce, environmental pollution. Planners are averse to ranchette-type developments because they are typically built under existing zoning and require no developer fees to provide urban infrastructure, especially roads and intersection improvements.

Importantly, growth management policies are substantially within the authority of local jurisdictions. They will be applied in regulating development and land use on private lands, but not land owned by the State or the Federal government. To be sure, state and federal laws concerning environmental quality and wildlife override local regulation. Considerable discretion, however, remains in the hands of local authorities and their support of or opposition to land development varies. Local policies may produce positive or negative neighborhood effects but they are usually not compensated or charged. This result is a pervasive issue throughout the United States. But it is especially problematic when dealing with a complex environmental system evidencing extraordinary diversity and complexity over short distances by height and terrain as in the Sierra Nevada.

Recreation in a Policy Framework

Recreational and leisure-time activities and industries play an important role in the Sierra Nevada. The area’s unique natural resources and intriguing history attract visitors from throughout the world. However, in view of the relatively large number of retirees living in the region and others relying on transfer payments, demand for recreational and leisure-time activities from this source is also consequential. Strong demand exists both during the winter and summer seasons. Recreational and leisure activities and industries are often considered benign, but to say they are a mixed bag would be more appropriate.

The volume of traffic generated along the Sacramento/Lake Tahoe axis is particularly heavy because it includes tourists, commuters, and interstate travelers. In contrast, traffic in the direction of Yosemite National Park, also a high volume axis, includes primarily tourists. The construction and maintenance of fast and safe highways, associated air pollution, and occasionally fire problems, plus the necessary service facilities add to environmental pollution. Additionally, hordes of visitors themselves have a negative impact on attractive sites and vistas. Tourists don’t come to see other tourists!

Today’s travelers desire urban services in and around tourist attractions. Their behavior is an example of the so-called “tragedy of the commons.” Nature and

wildlife are collective goods. Such goods belong to all of us and should be treated accordingly. Since the mission of public agencies includes facilitation and support of visitors (for example, the U.S. Forest Service and the U.S. National Park Service), these agencies must develop policies to protect and conserve fragile environments while also establishing facilities and providing services for tourists. With around 15 percent of the regions' payroll serving tourism as compared to 3 percent for all of California a strong vested interest also exists to maintain the viability of the industry (Sierra Business Council, 1999, pp 64-65).

The difficult choices are illustrated by Yosemite National Park. Its visitors declined from 4.2 million in 1996 to 3.5 million in 2001 (Craft, 2002). A serious flood in 1997 may have contributed to the drop since the flood washed away some overnight facilities. Another factor was the closing of the park's gates to cars in 1996, but not thereafter. The closing received widespread news coverage and may have discouraged potential visitors. Similar declines occurred followed after restrictions on driving and parking were imposed in earlier periods. The National Park Service has tried to encourage walking and the use of shuttle buses, but is now concerned about loss of visitors. The loss also matters to the commercial concessionaires who provide services at a profit.

In view of the mixed experiences of managers of tourist facilities and enterprises, a cautious and less doctrinaire note has crept into the debate about the role of recreation in recent years. Managers have become sensitive to a variety of voices and goals. This position is an outgrowth of the finding that much uncertainty and riskiness surrounds decision-making in recreation. Scientists, managers, and the general public are seen as participants in an integrated approach to problem solving now designated as "adaptive management". The new approach involves continuous input from and consultation with participants and, hopefully, mutual respect. In the final analysis careful scientific research is viewed as just one component in regional and recreational management. Thus, in many ways "adaptive management" amounts to what used to be known as muddling through and such muddling may be the destiny of 21st century regional management.

Conclusions

A significant part of California's valuable natural and extractive resources are concentrated in its hilly and mountainous Sierra Nevada region. The state's development was - and will be - substantially dependent on these resources. Demand for export of the resources to other regions has grown together with rising demand from developments within the Sierra Nevada. Increases in demand and competition for water, lumber, visitor opportunities, land for residents and non-residential activities and other resources have been accompanied by searches for policies to advance solutions to benefit Californians over the long run. In reviewing policies and implementations some broad conclusions are apparent:

- Policies affecting the Sierra Nevada often are designed without reference to the intricate interrelationships that connect human settlements to the natural environment.
- The future role of the Sierra Nevada as (a) a base for natural and extractive resources, (b) an attractive region for human settlements and (c) a supplier of

recreational opportunities is closely related to Federal and State policy on population and economic growth influencing California and all of its regions. California is not a sink whose population can grow rapidly compared to other states without eventually compromising economic opportunity and environmental quality.

- Historical and recent policies concerning investment and location of transport systems serving the region have had selective and often unanticipated and unintended impacts on the quality, competition and allocation of Sierra Nevada resources. Pollution along highway systems provides an example of problems that public policies should address.
- Policies designed to rely on Sierra Nevada resources for development in other regions must consider efficiency and equity criteria in their use. This stricture applies especially to the Sierra Nevada water supply that is exported to other regions.
- Biodiversity, environmental quality and sustainable development, are terms frequently invoked in deliberations of future policy for the Sierra Nevada. They are neither slogans nor scientific platitudes intended to protect and preserve nature. Their concrete meaning has a direct or indirect bearing on maintaining and evaluating the quality of human life, human settlement patterns, and real economic development.
- The Sierra Nevada provides examples of market and non-market failures in decision making with often undesirable consequences for future development and for long-run damage to fragile resources. Policy formulation for the future must examine comprehensively the potential consequences in reaching a consensus because costs of major failures are rising. Past policies affecting Mono Lake, Owens Lake and Lake Tahoe offer important insights.

The role of regional bodies to monitor and review regulations and decisions of local jurisdictions in the Sierra Nevada should be expanded to reduce the potential of “beggar thy neighbor” policies. Such policies neglect complex inter-relationships among areas sometimes distant from each other. The migration of wildlife from winter to summer ranges and vice versa illustrates the problem. Wildlife must have the opportunity to roam in different areas during the seasons; migratory paths to these areas as well as resting places must be available.

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Appendix: Figure 1. Sierra Nevada Regional Area (Excluding Foothills and Gold Country)

