Sustaining the Sierra Nevada bioregion's integrity under growing human population pressure: Policy issues brief

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I. INTRODUCTION

The Sierra Nevada figures boldly in the earliest American articulations of environmental conservation and protection and civil organizing around this concern. The founder of Sierra Club, naturalist John Muir, focused attention on these mountains and since then they have been kept on or near center stage by environmentalists. It is from the early 1990s however, that Californians more generally began to be aware of the threat of growth and development to the Sierra Nevada bioregion and the relationship of conditions in these mountains to their own well-being. The national debate over the extinction of a small bird, the Spotted Owl, and a Pulitzer Prize winning series in the Sacramento Bee by Tom Knudson, "Sierra In Peril," heralded an increased level of awareness and concern over the future of this unique place. In 1993 the US Congress sponsored the $6.5 million Sierra Nevada Ecosystem Project (SNEP) to report on the state of the bioregion. Completed in June, 1996, this study is one of the most comprehensive ecosystemic assessment of a region in the world.

SNEP brought together extant information on the Sierra Nevada, undertook assessments, summarized them in a set of critical findings, and then formulated a number of likely future sub-set conditions and related strategies. It does not offer a single plan or overarching strategy, preferred alternatives, nor range of options for implementation. It does however, clearly support and restate that a considerable threat to the integrity of the Sierra Nevada's ecosystem and resources exists, and downstream, to the quality of life of a large number of the state's inhabitants. It should remove doubt that a serious and complex need exists to considerably improve protection of public and private lands while managing the impacts of increasing population growth, principally through ecosystemic management of the bioregion. But how to bring this about?

Most of the information I had access to, and the key stakeholders I spoke with, for this brief think that little or no progress has been made toward answering this question since SNEP opened and identified the contents in the black box. Even the functional perspective is still not in place. Yet, my analysis indicates

positive developments are taking place, especially evident in local communities, and expanding to the sphere of watersheds.

SNEP is a comprehensive source of information which I have drawn upon extensively for this brief. In addition I relied upon other secondary sources, information from an ecosystemic management project I am involved in for the Sumava Bioregion, Czech Republic, along with limited key informant interviewing and field observations in the Californian Sierras I undertook between March, 1998 and January, 1999.

Sustaining the Sierra Nevada ecosystem and natural resources faces a very complex and dynamic condition. What follows is a short historical and ecological profile of this bioregion, then seven overarching conditions are identified as posing ecological region-wide opportunities and threats, and a construct strategic to the bioregion is introduced --"amenity migration." Subsequently, key stakeholders are identified and eight key issues for sustaining ecosystems are outlined. Following each of these outlines a few preliminary suggestions are offered for policy research or related institutional action.

Profile of the Sierra Nevada

The SNEP delineation of the Sierra Nevada bioregion is appropriate for the purposes of this brief. It is a large area of some 20.66 million acres extending 400 miles north-south, and up to 100 miles east-west. It includes the headwaters of 24 major river basins and 5 of the loftiest peaks in North America (see SNEP fig.1.2). The superlatives used to describe the Sierra Nevada's beautiful and varied landscapes are justified, and attested to by the enormous number of publications about this place, including the works of Emerson, Thoreau and Muir, Stegner and Snyder. And their magnificence has been a corner stone of more than a few photographers' and painters' fame. I refer you to these works for images much finer than I could create here. Better, go up into the Sierra Nevada.

Its landscape is governed by strong seasonal Mediterranean patterns, high annual variability of climate, and the natural aridity of its eastern flanks. It harbors more than 50% of the plant diversity of California, some 3,500 native species, including hundreds that are rare; one of which is the largest living in the world today -- the giant Sequoia tree. About 400 species of terrestrial vertebrates use the Sierra Nevada for parts of their life cycle. Humans are an integral part of the bioregion's ecosystem, having lived at various elevations there for at least 10,000 years. Archeological evidence indicates that Native Americans practiced localized and harmonious land management for more than 3,000 years, including animal hunting, forest burning, seed harvesting, pruning, irrigation and vegetation thinning.

From the early 1800s immigration of non-Native American settlers began a period of increasingly intensive resource use. During the next century agriculture, mining, logging, grazing and the concomitant human settlements brought about marked transformation of the land, including considerable reordering of natural hydrological processes. By the early 1920s resource extraction was becoming more regulated as forest and range protection was emphasized and fire suppression became a public and private primary goal. The natural and scenic landscape conservation ethic emerging in 1890s America was instrumental in the subsequent increasing shift of the public's perception of California's Sierras, so that their recreation and aesthetic value became well established.

Beginning in the early part of the 20th century wealthy elite summered in resorts and small subdivisions, especially in the Lake Tahoe basin. This remained characteristic until after World War II, when California's population boom, middle class expansion and accompanying increase in private automobile ownership brought many more to recreate in the Sierras. The growth in legal gambling at the Nevada state line was an additional motive for the influx. This and the 1960 Squaw Valley Winter Olympic Games marked the establishment of year round communities in the Lake Tahoe basin, the leading area in the bioregion's shift of housing from seasonal to year round amenity and recreational use.

Between 1970 and 1990 the population of the Sierra Nevada bioregion doubled, some 40% occurring in the Sierra portion of three adjacent and wealthiest counties, Nevada, Placer and El Dorado. The bioregion's population is now growing faster than California's, numbering about 650,000, and projected by the California Department of Finance in 1993 to triple by 2040. Some live in remote and frequently isolated places, while many reside within easy commuting distance of rapidly growing metropolitan regions. Within 100 miles of the bioregion's western foothills are San Francisco, Los Angeles, Sacramento, Fresno, and Bakersfield. Reno and Carson City are nearby to the east. In the Central Valley on its western boundary are rapidly growing urban centers, 6 of which are continuing to add to their 1990 populations of 100,000 plus. Key to the bioregion's future human settlement will be the performance and make-up of the economy of the San Francisco Bay Area and its continuum in the Central Valley, and maintaining the amenity resources of the Sierra Nevada.

Communities in the bioregion are dependent on its ecosystem for a combination of direct and indirect natural resource benefits, including "non economic" ones. Today a growing part of this dependency is occurring with no apparent economic relationship to the ecosystem per se. "Many residents choose to live in Sierran communities because of the aesthetics, the symbolism, and even the perceived sacredness of the natural landscape. The Sierran landscape in this vein is highly valued, albeit not economically, and is a vital part of a human sense of place and community" (SNEP Vol. 1, 1996, p.35).

Income earned by commuters, interest, dividends, and transfer payments to retired and other households now constitute more than half the total personal income in the Sierra Nevada, and is having a much greater impact on the economy than the large commodity-based industries. This suggests that the bioregion's economy is now less influenced by fluctuations in local employment in the more cyclical commodity, construction and tourism/recreation sectors.

While job generation paralleled the population growth by doubling in the 1970-1990 period, the relative proportion of commodity producing and service producing jobs remained constant. The major commodity-based sectors (agriculture, timber, and mining) experienced little or no growth in employment as few local economies depend exclusively on resource extractive activities any longer. Ecosystem dependent commodities grew due to the expansion of private sector recreation and capital intensive agriculture, such as fruit and associated value added enterprises like wineries.

Manufacturing remained a stable proportion of bioregional employment mainly because of growth of non-extractive manufacturing in the western foothills. The information and communications (I&C) sector merits particular mention, although its location and character does not seem to have been specifically analyzed to date. Knowledge intensive activity is growing within the bioregion, mainly within commuting distance to and linked with the greater Sacramento area. In this area it accounts for at least 15,000 jobs at Packard Bell, Hewlett-Packard, Intel, NCR and Apple Computer (Grass Valley Union, 1995). My key informant findings and other published information clearly concur with the SNEP 1996 statement that "Access to the residential amenities of the Sierra Nevada appears to have been a primary factor in the location choices of Bay Area firms relocating manufacturing facilities outside the Bay Area" (Duane, SNEP, 1996, Vol. II, p. 267).

Stewart points out that the "recreation and tourism industry" is the largest employer within the bioregion, some 3,000 businesses with 23,000 employees, and that it has grown at a significant rate during the 1990s (Stewart, SNEP Vol. III, 1996, p.1038). Thus the amenity of the bioregion, especially the comparatively high quality of its natural environment, appears again primary. Yet, the systemic interdependencies of growing I&C activity, recreation, tourism and residential settlement with this attracting factor, while recognized, is still quite poorly understood, especially from a public policy perspective. Changing this condition appears critical for sustaining the bioregion's ecosystem and natural resources.

Unemployment rates are higher in many counties than for California as a whole, with nearly all the difference due to unemployment during the non summer months. Individual recreation and tourism workers earn lower hourly wages and work fewer hours per week on average than most commodity

production workers. Bioregion residents living in poverty are concentrated in the larger human settlements.

Management practices for many forms of resource utilization over the past few decades have been altered to improve the complementary between resource extraction and ecological conditions. Yet, the new amenity valuation and its increasing impacts, along with rapid population growth are not adequately reflected in existing public land use and environmental management paradigms, skill, organization and activities. There is however a growing public understanding that their continued well-being depends upon improvement in maintaining and rehabilitating the bioregion's ecosystem. In its recent analysis of the Sierra Nevada's natural, social and financial capital, the Sierra Business Council (SBC) concluded:

"...it is imperative that we understand the state of our natural capital, for it is the very qualities most valued by our citizens and businesses that are most threatened. Agricultural lands are diminishing and we are witnessing a decline in the quality of our river water, stream water, and ground water. Only a small fraction of our fabled lakes and reservoirs are in good condition; the clarity of Lake Tahoe continues to decline. Less than 30% of our forests are considered to have either medium or high quality habitat. And aquatic habitats, particularly at lower elevations, are severely degraded. These are not isolated environmental facts -- they are trends that in the long run will undermine the appeal of our region as a place to live and do business." (Sierra Business Council, 1997, p. 5.)

In concluding this profile, it should be understood that there is considerable sub-regional differentiation within the bioregion, so that SNEP found it appropriate to divide it into six sub-regions, and the SBC into four.

Overarching Opportunities & Threats for the Bioregion

Opportunities

Four principal opportunities may be taken advantage of:

1.) The Sierra Nevada is recognized in California, the nation and more globally as a rare natural and spiritually attractive place. This relies partially on fact and partially on image and together results in increasing human activity in the Sierras. Concomitant pressure on the environment is eliciting a concern for sustaining the attributes that attract these activities, and while this concern may not be manifest by commensurate conservation and protection to date, it is an advantage or opportunity to be harnessed.

2.) Within the Sierras, and California and the nation more generally, with the growing awareness of the comparative uniqueness of the Sierra Nevada

bioregion and threats to it, environmental and social advocacy groups, particularly local ones, are beginning to lead communities, business and government in innovative ways of addressing the negative aspects of development in the bioregion and in maintaining or revitalizing local communities.

3.) The bioregion is part of one of the world's "hot spots" -- California. This larger region has a national and global successful cutting edge economy, and is inhabited by highly skilled and innovative people and institutions, including some of the world's outstanding knowledge institutions. What better strategic environment for formulating and implementing strategy for sustaining the Sierra Nevada's natural and cultural integrity?

4.) The quality and magnitude of information about the Sierra Nevada, particularly that of SNEP, along with the skilled people that developed this knowledge.

Threats

There appear to be three major threats to be ameliorated:

1.) Considerable and rapid population growth having a predominant land-extensive development pattern combined with inadequate or inappropriate planning and management to sustain the quality of the bioregion's resources and ecosystem.

2.) A predominant ignorance about regional ecosystemic management in the context of a fragmented and Byzantine complexity of jurisdictional authority in which ecosystem policy may be best characterized as underdeveloped.

3.) The degradation of public lands from amenity/recreational, logging and grazing uses, and facilitating road building, paralleled by aquatic and riparian systems degradation along with the threat of new impoundments and diversions.

Amenity Migration

Since the amenity migration paradigm was first articulated in 1987, I am aware of 5 specific amenity migration case studies and several other quite relevant analyses of specific places having been undertaken (case studies: Santa Fe, New Mexico, USA; Okanagan Valley, BC, Canada; Baguio bioregion, Luzon, Philippines; Chiang Mai bioregion, Thailand; Sumava bioregion, Czech Republic (see the summarized findings in Price, Moss, Williams, 1997); and a 6th, of Sunriver, Oregon, USA, in process). All the case studies indicate advanced characteristics of the phenomenon with the exception of the Sumava bioregion, Czech Republic, where amenity migration is being constrained principally by

prohibition of foreign nationals owning land (Glorioso, forthcoming). Again with the exception of the Sumava case, all indicate that the amenity resources attracting these migrants are being seriously degraded as a result of their in-migration. They also suggest amenity migrants can be generally characterized as resource conserving and resource consuming types, and that the latter predominate to date.

The Amenity Migration Paradigm

The term amenity migration refers to the contemporary societal phenomenon of significant numbers of people migrating due mainly to the attractiveness of the natural environment and/ or culture, the amenity resources, of their destinations. For some, the contemporary urban condition is a significant push factor. The destinations have been typically rural in character, and their amenity resources comparatively undisturbed during the industrial period typically because of their former remoteness. I coined the term in 1986 based on a study of the economic success of the Santa Fe area of New Mexico, which was, and continues to be propelled mainly by amenity resources (Moss, 1987). These migrants may be, classified into three types: permanent, seasonal, and intermittent. The permanent reside most of their time in the high amenity place; the seasonal, for one or several periods each year, such as the summer, the ski season, or the Opera season; and intermittent ones move between their residences more frequently.

The construct assumes that the "information age" is becoming characteristic, and in the emerging post-industrial society information and knowledge is replacing land and labor in the production of goods and services. Six key factors have been identified which synthesize into two societal driving forces (SDF) resulting in amenity migration:

Increasing motivation for amenity migration (SDF 1.)

1) higher valuing of the natural environment;

2) higher valuing of cultural differentiation; and

3) higher valuing of leisure, learning and spirituality.

Greater facilitation of mobility (SDF 2.)

4) increasing discretionary time;

5) increasing discretionary wealth; and

6) increasing access through improving and less expensive information and communications (I&C) and transportation technology.

Not all these factors need be present to generate amenity migration. Regarding the three factors that increase mobility (SDF2), further study of the phenomenon in the USA over the past two years suggests that amenity migrants' discretionary time and the time they pass in their amenity place need not result from an I&C based economy, but may have as much to do with choosing between income and non-work time. Analysis of USA work patterns over the past decade indicates that as a result of new I&C technologies, such as cell phones, laptops, home computers and beepers, millions of Americans have extended their work at home into the night (Goozner, 1998; Rifkin, 1995). In addition, results of Harris polls taken periodically over the last 25 years show that the average work week for most Americans has steadily risen, from 40.6 hours in 1973 to 50.8 hours in 1997, and hours devoted to leisure and hobbies showed a decline from 26.2 hours to 19.5 hours (Bureau of Labor Statistics, 1998; Louis Harris & Assocs., 1998). This condition appears to be manifest in non-telecommuting amenity migrants who choose to work longer hours staying in their amenity locale for shorter periods and inclined to be intermittent and seasonal amenity migrant types. Moreover, they have more discretionary money to adopt this travel pattern which typically has higher transportation costs. On the other hand, amenity migrants who characteristically telework, or who choose more discretionary time in lieu of additional discretionary money, seem to stay longer or reside permanently in their high amenity residence.

Recent information also indicates serial amenity migration in the USA may be more common and important than I previously understood. People attracted to a place, move on to another as the amenity that drew them becomes dissipated in the earlier location. There is also limited evidence that American amenity migrants residing in high amenity places in poorer counties of the world have previously resided in an American one or more. A Los Angeles Times editorial last year about the Sierra Nevada suggests some explanation for serial amenity migration:

"The pattern is sadly familiar. People move to an area for its wild and scenic setting and its serenity. Local governments, often dominated by independent-minded business people, resist strongly planning and zoning as an invasion of property rights. Growth accelerates helter-skelter. Soon, chain stores pop up on the edge of town. Fast-food places, supermarkets and acres of parking lots follow. The old core withers and historic buildings are razed. Finally, people who moved in for the natural beauty and lifestyle find the beauty despoiled and the lifestyle degraded. They move on to the next beauty spot and the pattern repeats.

Rural towns and small cities decry this type of development, but they usually fail to initiate good planning until it is too late. The Sierra Nevada is especially susceptible because of strong population growth in recent years. Cash-strapped

communities are forced to scrabble to meet the demand for public services. Often they recognize the need for sound planning but don't know how to go about it. (28 July, 1997)

While an oversimplification, this description has elicits concurrence from most informants I have questioned on the subject. The city planner of an amenity migrant center, Prescott, Arizona, in 1994, drew my attention to an important additional monetary motivator when he stated that it was not uncommon for amenity migrants there to be on their third "turn over," as they take advantage of equity gains from their dwelling with each amenity migration.

The very limited amenity migration analyses undertaken to date indicate a difficulty in distinguishing the impacts of tourists from those of amenity migrants in the same places, and differentiating at the margins between migration principally for amenity and economic reasons. The information also shows that concentration of amenity migrants is an important cause of subsequent immigration for primarily economic reasons, and a further attractor of tourists, at least at the earlier phase of amenity migration in a location. At the same time, in places with limited land giving access to local attractions, such as in mountainous or coastal areas, amenity migrants over time tend to reduce tourist access, especially that of mass tourism.

II. KEY STAKEHOLDERS

A stakeholder is an individual, a coalition of people, or an organization involved in or affected by an act, a decision or a process and its outcome(s). As anticipated, there is a very large number of stakeholders in the development and conservation of the Sierra Nevada. For example, The Wilderness Society's 1998 publication, *Sierra Nevada Conservation Directory* lists 319 organizations, agencies, and institutions concerned with the Sierra Nevada's environment. Using a strategic analysis technique I attempted to identify only key stakeholders. Although it was not possible to undertake a full key stakeholder analysis, I believe the list below is close to complete, with some unidentified in especially the volunteer and private enterprise sectors.

In the descriptions below the focus is on organizations. Where individuals have been identified they are noted within organizational context, as this appears to be the predominant characteristic of stakeholder action in the bioregion. If a key stakeholder's mission includes research, this is noted. The key stakeholders in the Sierra Nevada may be divided into 5 major categories: 1) private land owners; 2) intergovernmental agencies; 3) governmental agencies; 4) environmental and social advocacy groups; and 5) knowledge and financial support institutions.

1. **Private Land Owners** (37% of the bioregion's land)

The 5 counties that have comparatively high proportion of private land relative to their total areas are Nevada at 70%, Placer 70%, El Dorado 49%, Amador 76%, and Calaveras 75%. There are numerous individual private small landowners in the bioregion but they are clustered in relatively small percentage of the total private land ownership. For example, in El Dorado County, the 66,159 landowners of less than 5 acres account for 84.26% of the owners but hold only 6.06 of private land. In contrast, the 300 land owners who own 160 acres or more control 55.89% of the private land in El Dorado County and much of this land is owned by industrial timber companies.

1.a. *Residents* There is no information in SNEP on the number of residential landowners or acreage devoted to residential use in the whole bioregion. However the Sierra Business Council's (SBC) "Sierra Nevada Wealth Index", where 12 counties in the bioregion were analyzed (Plumas, Sierra, Nevada, Placer, El Dorado, Amador, Calaveras, Tuolumne, Mariposa, Alpine, Mono and Inyo), indicates that there are 887, 393 residential acres in these 12 counties;

about 5% of its total land area or 22% of total private land. To what degree bioregion residents are functional KSHs has not yet been determined.

1.b. *Tourism and Recreation Industry* There appears to be no information on how much private land is used for recreation and similar purposes in either SNEP or other available secondary sources. However SNEP mentions that significant recreational resources in the Sierra Nevada are located on private lands. Much of the shoreline of the lakes and rivers of the Sierra Nevada is on private land, and recreational activities in the bioregion are often focused around water resources. Access to the Sierra Nevada's spectacular national parks and other public lands is primarily through gateway communities.

Based on SBC's study, more than 2,500 private businesses in the Sierra Nevada provide recreation and tourist-related services based on a conservative estimate from business telephone listings. These businesses employ over 30,000 workers, approximately two thirds of which serve visitors and tourists while the rest of the employees are assumed to serve local residents. This estimate is very conservative since it does not include any of the retail, gas stations and other businesses that derive a large fraction of their business from tourists. The recreation and tourist industry constitutes the single largest industry in terms of employment and payroll. Approximately half of the businesses are located in the greater Lake Tahoe area.

1.c. *Land Developers* Land developers having a considerable impact on the environment are those owning large tracts of land. Many of these are

owned by timber companies who are increasingly considering the potential of land conversion from forestry. Several Sierran counties have earmarked such land use change in their general plans. For example, the Nevada County General Plan proposes designation of some forest private lands for high density development near Donner Summit and Castle Peak along Interstate 80. In addition, many other forest lands could be classified to allow one housing unit on every 40 acres, which may lead to subdivision of industrial forestlands and conversion to recreational or residential uses.

SNEP identified 3 largest land developers/ owners, one in each of Nevada, El Dorado & Placer counties, which because of their huge landholdings will likely have considerable impact in the environment : 1) Cook Ranch Partners of Rancho Cordoba in Cinnabar Ranch, El Dorado County, which owns 7,771 acres on 27 parcels and have proposed 569 units in 4,975 acres on the site; 2) Gold Country Ranch in Nevada County which covers 8,232 acres in 24 adjacent parcels but unlike the Cook Ranch Partners, Gold Country Ranch has not yet proposed the number of residential units; and 3) Del Webb corporation, which is building its first "Sun City" retirement community in northern California in Roseville, Placer County, built 3,500 homes and sold 629 homes between August - February, 1994.

1.d. *Private Timberland Owners* The Sierra contains 4,450,000 acres of private timberlands, one third of the region's commercial timber holdings. Two-thirds of the private timberlands are managed by industrial landowners with Michigan-California Lumber and Sierra Pacific Industries as the two largest holders. Virtually all of the ancient forest on these lands has been logged (also see Land Developers).

1.d.e. *Information & Communication Industry* Based on SBC's "Wealth" study, employment in electronics, industrial equipment, publishing, and specialized manufacturing has grown much faster than overall regional employment. Most of the new manufacturing and high technology jobs are located in Nevada, Placer and El Dorado counties, with some 10,600 high tech related jobs. However, there does not seem to be specific research on the subject of this sector's location, activity and key stakeholders in the bioregion.

2. Intergovernmental Agencies/ Organizations

2.a. *California Biodiversity Council (CBC)* is an interagency organization of leaders from the federal and state land management agencies in California. Its main function to date has been exchange of information

and encouraging involvement of local officials by highlighting local collaborative conservation initiatives. A major goal of the CBC is to promote integrated planning across jurisdictional boundaries to protect biodiversity, though direct accomplishments in this area are not readily apparent to date. However, it continues to provide a good forum for raising regional, biodiversity-related issues. CBC's interest in the Sierras has grown recently and some believe it has considerable potential for promoting regional conservation.

Individuals: James Gaither, Advisor (Sacramento, CA)

2.b. *Tahoe Regional Planning Agency* is a bi-state, multi-county agency, which was created to strictly manage growth and development in the Greater Lake Tahoe basin, which includes the lake basin itself and the city of Truckee. It is the only functioning regional planning institution in the Sierra Nevada.

Individuals: James Baetge, Executive Director (Zephyr Cove, NV)

3. **Governmental Agencies** (63% of the bioregion's land)

3.a. Federal Government

3.a.i. *Department of the Interior* includes the following most relevant agencies: U.S. Fish and Wildlife (responsible for conservation, protection, enhancement, and management of wildlife and fish, and their habitats); Bureau of Land Management (manages 13% of the bioregion's land); Bureau of Reclamation (develops water resources for multiple purposes and manages 12 facilities in the bioregion), U.S. Geological Survey (prepares topographic, geologic, and hydrographic maps; makes inventories of surface and groundwater; studies areas with special water-related problems and sponsors water resources research and water technology transfer activities with the purpose of developing new or improved methods for solving water resource problems); and National Park Service (responsible for governance of Yosemite, Kings Canyon and Sequoia national parks and the Devil's Postpile National Monument which account for 6% of the bioregion's land).

Individuals: Edward. L. Hastey, State Director, BLM (Sacramento, CA)

3.a.ii. *Department of Agriculture* has 7 agencies of which the most relevant is the Natural Resources and Environment where the Forest Service (USFS) and Natural Resources Conservation Service are located. The USFS provides leadership in the management, protection and use of

the nation's forests and rangelands. The agency is dedicated to multiple-use management of these lands for sustainable yields of renewable resources such as wood, water, forage, wildlife, and recreation to meet the diverse needs of people. It directs management of 8 national forests in the bioregion: Plumas, Tahoe, Sierra, El Dorado, Stanislaus, Sequoia, Inyo and Toiyabe and the Lake Tahoe Basin Management Unit, which account for two-thirds of publicly owned lands in the bioregion and 40% of all lands in the bioregion.

Individuals: G. Lynn Sprague, Regional Forester, Region V (San Francisco, CA); Kent Connaughton, Director, USFS Sierra Nevada Framework for Conservation and Collaboration (San Francisco, CA)

3.a.iii. *Environmental Protection Agency* coordinates government action to protect the environment and human health by abating and controlling pollution. In general, environmental laws are not implemented directly by EPA, rather the agency sets standards and defines what needs to be done for compliance and to carry out specific programs aimed at controlling pollution, which are subject to EPA review and approval. The agency has split accountability; to both executive and legislative branches of the federal government which creates problems for achieving its mission.

3.a.iv. *CalFed Ecosystem Restoration Program Plan* is an integrated approach to resolve water management issues. The CalFed solution area covers most of California, its near-shore ocean and all Bay Delta system watersheds. The Bay Delta watersheds include those extending from the crest of the Sierra Nevada in the north to portions of the Tulare Basin in the south and to the east and west sides of the Central Valley.

Others: relevant standing congressional committees.

3.b. California State Government (1% of the bioregion's land)

3.b.i. *State Resources Agency* is responsible for the protection and administration of the state's natural resources. It assists the governor in establishing the administration's objectives and in formulating programs and policies governing the acquisition, development, and use of the state's resources to attain these objectives. The Agency's most relevant bodies include: the Department of Fish and Game, the Department of Parks and Recreation, the Department of Conservation, the Department of Water Resources, the Department of Forestry and Fire Protection, Board of Forestry, the California Tahoe Conservancy, and the California Biodiversity Council. The Resources Agency is very interested in the Sierra Nevada and in 1991, convened the "Sierra Summit", a broad dialogue meeting that produced recommendations for providing better

information and coordination in local communities. It was involved in the SNEP Project principally through its Department of Forestry & Fire Protection (discussed below). Also, due to their importance, the California Tahoe Conservancy and the Board of Forestry are detailed below.)

Individuals: Douglas Wheeler, Secretary of Resources (Sacramento, CA); James Gaither, Assistant Secretary for Conservation Matters, Advisor to CBC (Sacramento, CA)

3.b.i-i. *California Department of Forestry & Fire Protection (CDF)* is singled out from the Resources Agency for further detail due to its important stakeholder role. The CDF's mission is three fold: a) to protect the people of California from fires; b) to provide varied emergency services in 34 of the State's 58 counties via contract with local governments; and 3) to protect and enhance the over 31 million acres of California's privately owned wildlands. This includes a) planting trees; b) preventing the spread of disease by identifying and removing infested trees; c) working on the rehabilitation of burned areas by assessing and implementing reseeding where necessary; d) overseeing enforcement of California's forest practice regulations, which includes review of the Timber Harvest Plans submitted by private landowners and logging companies who want to harvest trees on their property; and e) operating six Demonstration State Forests where research and experiment in forest management is conducted.

Individuals: Richard Wilson, Director, CDF (Sacramento, CA)

Within CDF the *Fire and Resource Assessment Program (FRAP)* unit is further identified as important due to its mission and skilled professionals. It performs strategic analysis for CDF, including analysis of trends in the State's natural, social, and economic systems, monitoring and assessing the conditions and availability of wildland resources, and identifying alternative responses to changing trends and conditions.

Individuals: William Stewart, Director /Economist, FRAP, SNEP Special Consultant; Gregory Greenwood, Research Manager/Ecologist, FRAP, SNEP Special Consultant (Sacramento, CA)

3.b.i-ii. *California Tahoe Conservancy* is an independent State agency established in 1984. Its jurisdiction extends only to the California side of the Lake Tahoe basin. It is not a regulatory agency but develops and implements programs through acquisitions and site improvements to improve water quality in Lake Tahoe, preserve the scenic beauty and

recreational opportunities of the region, provide public access, preserve wildlife habitat areas, and manages and restores lands to protect the natural environment.

Individuals: Dennis Machida, Executive Officer, SNEP Special Consultant (South Lake Tahoe, CA)

3.b.i-iii. The *State Board of Forestry* promulgates the Forest Practice Rules which regulates timber harvest on private and state land.

3.b.ii. The *State Water Resources Control Board (SWRCB)* and its nine regional boards are responsible for water quality in the state of California, serving as the Governor's designee for the EPA under the Clean Water Act. SWRCB administers the Clean Water Grant Program, which funds construction of waste treatment facilities.

3.b.iii. *California State Parks* the Sierra Nevada contains 10 state parks and 8 state recreation areas. Most of the SCP's 300 parks are in the coastal area of the state.

3.b.iv. *Office of the Secretary for Environmental Protection* was established in 1991 as the state's environmental enforcement agency, it incorporates units formerly under the Department of Food and Agriculture and the Department of Health Services. The Office coordinates functions that cut across the various Agency programs designed to address pollution in specific media (e.g. air, water) and serves as the primary point of accountability for the management of environmental protection programs. It oversees the Air Resources Board, the Office of Environmental Health Hazard Assessment, the California Integrated Waste Management Board, the Department of Pesticide Regulation, the Department of Toxic Substances Control, and the State Water Resources Control Board.

Individuals: Peter Rooney, Secretary for Environmental Protection (Sacramento, CA)

3.b.v. *California State Assembly* has the following more relevant Committees: Water, Parks and Wildlife; Environmental Safety and Toxic Materials; and Natural Resources.

3.b.vi. *California State Senate* has the following more relevant committees: Agriculture and Water Resources; Natural Resources and Wildlife; and Toxics and Public Safety.

3.b.vi. *California State Senate* has the following more relevant committees: Agriculture and Water Resources; Natural Resources and Wildlife; and Toxics and Public Safety.

There are other candidates for KSH, particularly Nevada State governmental bodies with strong interests in the eight key issues identified in this brief.

3.c. Local/ Regional Government

3.c.i. *Municipal & county government*. There are 18 counties in the bioregion of which 10 counties have jurisdictions principally within the bioregion. SNEP identified 180 communities within the bioregion.

3.c.ii. *Regional Council of Rural Counties (RCRC)* is a non-partisan association of rural counties whose members are County Supervisors. RCRC was formed to coordinate and enhance the influence of rural county governments on the Legislative and State Government Process. It champions rural interests and wishes to lead the debate over many important related concerns: urbanization of counties, use of natural resources, the enhancement of housing and technology in rural California, access to healthcare, demographic and economic impacts on rural California, among others. RCRC in the Sierra Nevada is beginning to work at implementing SNEP recommendations, especially related to watershed rehabilitation and protection and in collaboration with the Sierra Business Council and the Sierra Nevada Alliance, partially funded by the State Resources Agency.

Individuals: Ray Nutting, El Dorado County Supervisor; Fran Roudebush, Plumas County Supervisor; David French, Director of Governmental Affairs.

3.c.iii. *Councils of Government* have been created in areas covering all but eight counties of the state to stimulate intergovernmental cooperation in planning and development activities and to ensure better coordination of federally assisted projects. COGs must review applications of local and regional agencies for federal grants under more than 100 programs such as transportation and open space planning, waste control, water basin studies, as well as carrying out research in demographics and economics. This stakeholder's role appears to be more one of future potential.

3.c.iv. *Tahoe Regional Planning Agency*, see Intergovernmental Agencies above.

4. **Environmental & Social Advocacy Groups**

4.a. *California Ancient Forest Alliance (CAFA)* is a state-wide coalition of groups and individuals active in ancient forest protection activities. After adoption of President Clinton's forest plan for northern California and the Pacific Northwest, CAFA's focus on the Sierra increased significantly. The primary role for the CAFA has been information exchange, coordination, and networking. Currently, the group is developing a multi-year campaign and funding proposal for Sierra Nevada forest protection and has received funding from The Pew Charitable Trusts for this.

4.b. *Forest Community Research (FCR)* is a non-profit organization, headquartered in Taylorville, CA, one of whose prime objective is to work with community groups to advance sustainable resource management and community well-being through research, education, and facilitation of collaborative approaches to natural resource management. FCR projects build on the reciprocal relationships of communities and ecosystems in place, and promote sound stewardship based on the understanding that forest and community health are intrinsically and inevitably linked. FCR coordinates and facilitates the Lead Partnership Group discussed below. FCR undertakes applied research, natural resources feasibility studies and sponsors workshops.

Individuals: Jonathan Kusel, Director, FCR, SNEP Special Consultant (Taylorville, CA)

4.c. *Lead Partnership Group (LPG)* is a consortium of bioregional watershed and local community based groups from northern California and southern Oregon, comprised of representatives of the timber industry, environmental groups and local citizens working together to improve their communities and protect and restore the land on which those communities depend. The LPG members are: Applegate Partnership, Butte Creek Watershed Project, Butte Environmental Council, Forest Community Research, Jefferson Center, Plumas Corporation, Quincy Library Group, Shasta-Tehama Bioregional Council, Rogue Institute for Economy & Ecology, and Watershed Research & Training Center.

The LPG's capacities to develop appropriate technologies and appropriate scale strategies for correcting past poor management practices continues to evolve. It seeks all-party dialogue to increase mutual understanding of various interest groups and to further the recognition of the potential, legitimacy and value of local communities' perspective and voice in land management planning and policy. The Group undertakes applied research individually and jointly.

Individuals: Jonathan Kusel, FCR (Taylorville, CA); John Sheehan, Plumas Corp. (Quincy, CA)

4.d. *Natural Resources Defense Council (NRDC)* headquartered in Washington, D.C., has a long history of activity on Sierra Nevada forest issues, and was a key player, along with The Wilderness Society, in the process leading to the adoption of protective interim California spotted owl guidelines, known as "CASPO". NRDC also undertakes research and recently published a study of timber economics in the bioregion. Currently NRDC is exploring market-based economic strategies related to stimulating demand for sustainable forest products and practices including the certification of sustainably produced wood.

Individuals: David Edelson (San Francisco, CA)

4.e. *The Nature Conservancy (TNC)*, an international organization with headquarters in Washington D.C., is devoted to "protection of ecologically significant areas and the diversity of life they support." TNC is focusing protection efforts on a number of identified priority ecological sites in the Sierra foothills. In the northwestern Sierra it is working with local watershed conservancies, private landowners, and others to protect a large intact, relatively unfragmented natural community mosaic. TNC intends to expand its ecoregion work over the next year to assess conservation priorities in the southern Sierra foothills. This organization owns some 31,340 acres of land in the bioregion.

Individuals: Mike Eaton (Sacramento, CA)

4.f. *The Planning and Conservation League*, founded in 1965, is an alliance of over 100 conservation organizations and 10,000 members devoted to promoting "sound environmental legislation in California". It is the oldest environmental lobbying group in California. The league actively lobbies for legislation on a broad range of issues, including forestry, transport, air and water quality, energy pricing, and land use. It has successfully sponsored four state-wide ballot initiatives since 1988, including the Parks and Wildlife Initiative and the Wildlife Protection Act of 1990. PCL publishes Citizens Guide to the California Environmental Quality Act. The League's publication "California Today," provides an on-going legislative update.

4.g. *Quincy Library Group (QLG)*, founded in 1992, is a local collaborative natural resource planning group focused on Lassen, Plumas and Sierra Counties. In Aug. 1993, QLG completed an alternative

management plan for Lassen N.F., Plumas N.F., and the Sierraville Ranger District of the Tahoe N.F., which is now before the US Congress as proposed legislation (the QLG Forest Health Recovery and Community Stability Act, H.R. 858 and S. 1028). The bill will direct National Forests in the QLG area to do 40 to 60 thousand acres per year of strategic fuel reduction in defensible fuel breaks in five years, to implement group selection silviculture on an area-wide basis, to implement the Scientific Advisory Team guidelines for riparian area protection, remove 494 thousand road less acres from road construction and harvesting, protect California Spotted Owl, adhere to California Spotted Owl Interim Guidelines that precludes the harvest of trees greater than 30 inches and monitor the results, with yearly reports to Congress. Equally important, the QLG Bill would require the Forest Service to initiate revision and/or amendment of its Land and Resource Management Plans in the area, providing opportunity for QLG to argue for long term inclusion of key proposals. This bill has generated significant opposition from, and controversy within, environmental organizations nationwide.

As a result of QLG initiatives, these National Forests have already received supplemental funding to implement some aspects of the QLG Proposal in a "Forest Health Pilot" program. QLG also co-sponsored, with the National Renewable Energy Laboratory, a feasibility study examining a potential commercial-scale demonstration project of converting forest biomass to ethanol transportation fuels. The study was completed in November 1997. It has also initiated a campaign to create funding for watershed management activities on the public lands in the sub-region by assessing a maintenance fee on down-stream water users, in part, through funds provided by Proposition 204.

Individuals: Linda Blum, Michael Jackson (Quincy, CA)

4.h. *The Sierra Business Council (SBC)* is an association of over 450 member businesses working to secure the economic and environmental health of the Sierra Nevada for this and future generations. Founded in 1994, the Council is led by a Board of Directors of business leaders representing a spectrum of large and small enterprises from throughout the region, but typically not timber and mining. The Council's work includes research, policy analysis, public education, and leadership development. The Council explicitly rejects the notion that Sierra communities must choose between economic and environmental health but instead views environmental quality as a cornerstone of economic health. In 1996, SBC released its "Sierra Nevada Wealth Index" which provides the first comprehensive assessment of all social, natural and financial assets to assist business leaders and policy makers throughout the Sierra Nevada to understand and increase the "region's wealth". SBC published the *Planning for Prosperity: Building Successful Communities*

in the Sierra Nevada" in 1997, "to help Sierra Nevada communities plan wisely and effectively for their own future," and in Oct 1998 will begin follow-up local community work shops to assist in implementing its recommendations.

Individuals: Lucy Blake, President, SBC; Tracy Grubb, Associate Director, SBC (Truckee, CA)

4.i. *The Sierra Club* (SC) was founded in 1892 by John Muir originally to preserve the Sierra Nevada, and has now expanded a variety of environmental issues which it pursues countrywide. The organization has many functions from legal and scientific, to educational and lobbying. The Sierra Club Local Defense Fund works on legal issues and the Sierra Club California monitors state agencies and lobbies on environmental legislation. It has an historic involvement in Sierra forest issues. Along with the Wilderness Society, it has been instrumental in securing wilderness designation in California. Currently, it is active in CAFA and in efforts to protect the public forest lands in the bioregion. It has established a "Sierra Nevada Eco-Region Task Force" (SNERTF), which to serve as a forum for information sharing for Sierra Club activists in the Sierras. It has raised funds to study potential alternative funding mechanisms to promote sustainable logging practices and watershed restoration.

Individuals: Barbara Boyle, Head, SC California State Office (Sacramento, CA); Frannie Hoover, Head, SC Northern California/Nevada/Hawaii Field Office (San Francisco, CA)

4.j. *Sierra Nevada Alliance (SNA)*, founded in 1993, is a regional coalition of some 46 grassroots and regional groups working in the Sierra to protect and restore the natural and community values of "California's most cherished mountain range." Its two broad programs are 1) to provide the grass roots networking, clearinghouse and other support systems and to develop/maintain involvement with state and federal initiatives, and 2) to build coalitions between community leaders and grass roots groups through sustainable community activities.

Individuals: Laurel W. Ames, Director & founder (South Lake Tahoe, CA)

4.k. *The Wilderness Society (TWS),* a national organization founded in 1935, works to "secure the preservation of wilderness; to carry on an educational program concerning the values of wilderness and how it may best be used and preserved in the public interest; to make and encourage scientific studies concerning wilderness; and to mobilize

cooperation in resisting the invasion of wilderness." TWS sponsors conferences, seminars, and workshops across the nation, testifies at Congressional hearings regarding public land policies, and undertakes research, and in this context has GIS capability. Recent publications are: The Federal Forest Lands of the Sierra Nevada: A Citizens Guide to the Sierra Nevada Ecosystem Project Report (1997), Protecting the Sierra Nevada: Preserving Biological Diversity and Ecological Health, A Regional Reconnaissance (1997), Economic Profiles of the Sierra Nevada (1998), and Sierra Nevada Conservation Directory (1998).

The California/Nevada office of TWS has a history of leadership in Sierra forest issues, and the Sierra Nevada is a long-term organizational priority. It is conducting a comprehensive regional campaign to protect landscape conservation and biodiversity in the Sierra. It has also provided behind-the-scenes support for California Ancient Forest Alliance (CAFA), including fund raising, established continuing interaction between forest activities with the Regional Office of Forest Service, and lobbied Congress and the Administration (along with Natural Resources Defense Council and Sierra Club). TWS has assembled a multi-interest, bi-partisan coalition seeking increased funding for Forest Service fire risk reduction work. TWS has also established a "mini-grant program" in the Sierra through its New Voices Program which assists citizens and local groups to encounter "wise use" activity and proactively broaden public support and constituencies supporting environmental stewardship.

Individuals: Jay Watson, Director, and Louis Blumberg, Assistant Director, California and Nevada Regional Office, TWS (San Francisco, CA)

4.l. *The Yuba Watershed Institute* is a group of citizens, mostly residents of San Juan Ridge in Nevada County, who are concerned with the maintenance of long-term biological integrity and the wise use of natural resources of the Yuba River watershed. The Institute shows this concern by cooperating with public land management agencies, private landowners, professional associations and community organizations. It co-manages with the BLM 3,000 acres of public land. It also serves as an educational resource, sharing its information and historical and cultural perspectives with all concerned citizens. This innovative organization may not be a key stakeholder per se, and is included here principally as representative of a type.

Individuals: Gary Snyder, Professor, UC-Davis, writer & poet (Nevada City, CA)

There are other national, state and local environmental advocacy organizations that may become key stakeholders depending on the specific aspects of issues addressed. Prominent ones are *The California Council on Environmental and Economic Balance,* and *The California Farm Water Coalition.*

5. **Knowledge & Financial Support Institutions**

The environmental and social advocacy groups, type 4. Above, undertaking research may also be considered part of this group. There are also significant pools of knowledge in the private consulting sector which have not been assessed for this brief.

5.a. *University of California* through its research and individual faculty members plays a major role in research on the Sierra Nevada. For example, the Water & Wildland Resources Center at UC-Davis managed SNEP, and many of its scientists were from UC (please see SNEP report for specifics). Other UC knowledge institutions includes: the California Water Resources Center, the Center for Environmental Design Research, the Cooperative Extension, the Natural Reserve Center, etc. Other universities, especially in California and the Western USA, are a considerable Sierra Nevada knowledge resource.

Individuals: Don C. Erman, Professor and Director, Center for Water and Wildland Resources, UC-Davis, Board Member, Packard Foundation, SNEP Team Leader (Davis, CA); Frank Davis, Professor, Dept. of Geography, UC-Santa Barbara, SNEP Scientific Team Member (Santa Barbara, CA)

5.b. *The David and Lucile Packard Foundation* was created in 1964. This Foundation supports non-profit organizations with the hope that they can help people through the improvement of scientific knowledge, education, culture, employment opportunities, the environment and quality of life. The Foundation provides grants in the following broad program areas: science, children, population, conservation, arts, film preservation, community and special areas in organizational effectiveness and philanthropy. It provides national and international grants and also has a special focus on the northern California counties of San Mateo, Santa Clara, Santa Cruz, and Monterey. The Foundation has assets of $9 billion in December, 1997. In early 1998, the Foundation launched a $175 million 5 year project "Conserving California Landscapes", to preserve California open space. This gift is one of the largest environmental grants in U.S. history, targeted for preservation is land along the state's Central Coast, in the Central Valley and in the Sierra Nevada.

Individuals: Michael Mantell, California Environmental Trust (Sacramento, CA)

5.c. *The James Irvine Foundation* was established in 1937 to promote the general welfare of the people of California. It is dedicated to enhancing the social, economic, and physical quality of life throughout California, and to enriching the State's intellectual and cultural environment. Within these broad purposes, the Foundation makes grants in 7 categorical areas: arts, children, youth and families, civic culture, health, higher education, sustainable communities, and workforce development.

5.d. *The William and Flora Hewlett Foundation* was incorporated as a private foundation in the State of California in 1996. The Foundation's broad purpose is to promote the well-being of mankind by supporting selected activities of a charitable nature, as well as organizations or institutions engaged in such activities. It concentrates its resources in education, performing arts, population, environment, conflict resolution, family and community development and US-Latin American relations. In environmental arena, grants are directed to organizations working on issues that affect the fragile ecosystems lying west of the 100th meridian, the traditional boundary demarcating the arid West from the temperate Eastern weather zone of North America. Priority is given to organizations serving the entire region or whole ecosystems within the region. The environmental program's specific components are: policy analysis, education of decision makers and the general public, decision-making processes, rural communities and the environment, growth management, and land preservation.

A number of other philanthropic institutions have contributed comparatively small amounts to the financial support of particularly not-for-profit groups involved in the subject of this brief. The following are those identified to date: *The Columbia Foundation, The Compton Foundation, The Mary A. Crocker Trust, The Wallace Alexander Gerbode Foundation, The Homeland Foundation, The Pew Charitable Trusts, The Rockwell Foundation,* and *The True North Foundation.*

III. KEY ISSUES

From a review of the Sierra Nevada condition there appears to be eight key issues to be addressed. They are outlined below. The bounding of each issue is approximate, as they are components of a highly interdependent and dynamic web. However, at the core of each are strategic elements which if successfully addressed should result in advancement in maintaining and rehabilitating the bioregion's natural resources and ecosystem while supporting a high quality of life for humans. This outcome should improve the more the issues are considered in a systemically integrated manner. At the end of each issue

outline are derived policy research topics or associated institutional actions that I perceive as most important, however, it should be noted that I would have wished to give more time to this component of the brief.

Key Issue #1: A Vision for the Bioregion ?

Is there a need for a vision or more explicit societal agreement on the future character of the Sierra Nevada bioregion as a single entity? Or is this only meaningful at a "sub-regional" level, either the six presently defined by SNEP or others in lieu of or in addition to; for example, a region consisting of the Sacramento metropolitan area and the Sierra Nevada foothills? Or are there benefits to be obtained from both? Also, who will decide, and how? Of the eight key issues outlined here this one may be considered the most overarching, and perhaps of greatest difficulty to approach and resolve.

There appears to be significant differences on how to proceed. The synthesizers of SNEP's analyses and recommendations suggest that a societal vision and resulting policy on the whole bioregion's future is needed before that project's strategies for improved management can be acted on in a significant manner (SNEP, Vol. I, 1996). This single entity approach also appears to be preferred and the intent of key federal agencies and characteristic of national environmental organizations. On the other hand, it is argued by some members of the SNEP team and Californian regional and more local environmental organizations, that a single bioregion policy for development and protection is neither appropriate nor can it be the basis for effective follow-on action. These critics suggest that it is self-serving of large scale external institutions, and does not adequately take into account the significant differences in ecosystems and their human culture that are best represented at a smaller scale, such as SNEP's six sub-regions. Correspondingly, some contend that it is from smaller scales of experimentation and practice that solutions to the still problematic ecosystemic approach to regional management will most likely come. There seems to be different basic paradigms of science involved in this discussion.

While there is no agreed upon alternative, and the above characterization is an over simplification, woven into much of the criticism I have been able to review is a strong concern that the macro and single entity Sierra Nevada bioregion perspective will lead to attempts to institutionalize policy and action that will characteristically be centralized and top down, mechanistic and reductionist, and after considerable expenditure of resources and time, ineffective.

Suggested Institutional Action & Policy Research

1.) There is an important need for one or several well-coordinated institutions to undertake a non-partisan task of exploring alternative plausible approaches to resolving this issue and making recommendations.

2.) Alternatively, or as part of the above activity, an institution could play the lead role of convening and seed funding a key stakeholders group to undertake such action.

Key Issue #2: Human Settlement Pressure on Ecosystems

At the core of this issue is (1) the magnitude and character of recent and anticipated population growth, especially important now in the bioregion's foothills, and (2) the impacts of the resulting development on comparatively fragile mountain ecosystems. It is a considerable and complex issue which I only strategically outline below.

The bioregion's population of some 650,000 people is expected to double by 2020, and triple by 2040. But from the perspective of an alternative" trends continue" scenario, these forecasts may still error on the conservative side due to insufficient weight being given to a.) spatial implications for economic activity generated by post industrial information and communications (I&C) technology, b.) a residential locational preference and options as manifest especially by amenity migrants, and c.) the north Central Valley and adjoining Sierra Nevada foothills as a principal location of California's future population growth.

Although there is some evidence that many people are migrating to the bioregion because of its "amenity resources" -- environmental and cultural attributes (the latter here referring principally to a perceived small town rural life style and social ambiance), information about the Sierra Nevada amenity migrants is quite limited, especially their values and lifestyles. SNEP concluded, "New residents are increasingly drawn by the amenity values of the Sierra Nevada resources" (SNEP Vol. 1, 1996, p. 21). A 1995 sample survey of 1000 registered voters, 90.3% of whom were immigrants, on why they live in the Sierra Nevada indicated the same (with a +/- 3.2% margin of error). Respondents stated major reasons were: 80.9% for "the beauty and charm of the community;" 80.9% to "get away from urban, city life;" 77.8% to" live in a rural area;" 76% for "the quality of life;" 73% to be part of a small community; “71% for "the quality of the environment." Thirty-four point six percent stated it was "for closer access to developed recreation such as skiing, golfing and boatable lakes;" and 21.6% for "lower cost of living” (J. Moore Methods, Inc., 1995).

From the secondary information and limited key informant interviewing and observation I undertook for this brief, the Sierran amenity migrants' general characteristics appear to correspond to global ones; they are more educated, wealthier and older than existing residents, and considerably less economically dependent on natural resource extraction. The permanent amenity migrants mainly consist of retirees, commuters and teleworkers. Together they bring outside sources of income or wealth with them and some establish local

enterprises that are commonly local amenity-dependent, such as tourism and recreation facilities and services. As elsewhere, they also appear to be initiating or transferring foot loose I&C enterprises, such as an R&D node of a major computer components manufacturer locating in Grass Valley.

The two other types of amenity migrants, intermittent and seasonal, may or may not have their primary residence or be economically active in the bioregion. These types of amenity migrant in particular, like the tourist, seem to exhibit little sense of belonging to communities they have moved to and appear marginally, if at all, involved in local place-based environmental and social action groups. On the other hand, among the permanent amenity migrants are very active members of these organizations (see Key Issue # 4 below). Data is not available on the numbers of the amenity migrants and their sub-types, nor their relationship with new immigrants principally locating in the bioregion for economic reasons.

Population growth is having a negative impact on the bioregion's natural environment, especially degrading its biodiversity and aesthetic quality. This is most evident in the west-side foothill area, where some 70% of the total Sierran population resides. And as the three population location factors noted in para. 2 above come more into play, settlement should also increase in the higher alpine zone. The future settlement pattern will be a product of the complex interrelations of public policy, infrastructure, economics, the considerable size and location of federal land, and values and attitudes particularly identified in the amenity migration model (see above in Introduction).

Generally, the built environment clusters around critical road intersections and in small villages and towns with most of the Sierran landscape still uninhabited or sparsely populated, especially above 3000 ft. elevation. In this context SNEP and others characterize the development pattern as "sprawl," with high and rapid land conversion to human settlement occurring. In the context of the dominant ex urban condition, much of the overall population growth in the bioregion nevertheless appears to be "suburban". This is especially so of higher-density single-family home development along the I-80 and US 50 corridors. The result is an over all pattern of low-density, land-intensive, large-lot ex urban sprawl, dependent on well water and septic systems. (see especially Duane, SNEP, Vol II, 1996). Exceptions are the result of limited individuals' decisions. Compact development for example is not generally promoted or supported by buyers, developers, or local general plans. The SBC may be influencing this situation, and anticipates doing so through such tools as its recent publication of recommended development principles and associated workshops (Sierra Business Council, 1997). Also some think that the high and increasing costs of infrastructure and loss of rural landscape is now motivating county governments to try to constrain the extent of residential development. However, this impression has yet to be assessed.

Land use planning appears typically to be ratifying rather than guiding change. One analyst characterizes the situation as, "Almost all public institutions in the Sierra Nevada region simply avoid dealing with population growth and its effects on the resources, lands and ecosystems for which they are responsible" (Ruth, p.6, 1998). He, and others, further suggests that improved land use planning for foothill communities, where incremental construction of individual homes dominates, is in particular now a critical and major problem.

Land conversion to human settlement commonly causes environmental degradation, and the Sierran pattern appears to increase this outcome in its mountainous landscapes. While significant additional empirical work is needed on both existing and future impacts, here is a partial list of ecological implications of land conversion on vegetation and wildlife:

1. reduced total habitat area through direct habitat conversion;

2. reduced and isolated habitat patch size and increased fragmentation;

3. harassment of wild life;

4. biological pollution from non-native vegetation alleles; and

5. negative impacts on hydrologic regimes, such as

a) increased impervious surfaces causing increased run-off of storm waters, heavy

metalsand oil,

b) increased risk of ground water and/or surface water contamination from septic

effluent, and

c) modified surface water flows due to irrigation, septic systems effluent disposal

and treated waste water discharges, along with decreased ground water flow to

surface water system due to ground water pumping. (Duane, Vol II, 1996, p. 331)

6. problems for public lands in particular from increasing and easier access to terrestrial and aquatic recreation and increased demand for local recreation and open space; and

7. increased fire hazard in fragile alpine ecosystems.

A fundamental question is how to shift to development process and product that will not destroy the characteristics that make the bioregion a preferred place to live. Within a "trends continue" scenario, with high and low variations, Dune outlines examples of ecologically sound growth management policy and techniques for mitigating the negative impacts identified above, and preferred institutional setting for these recommendations. But states that there are significant constraints to adapting these. He further points out that "proper evaluation of alternative policies requires a better understanding of relationships between alternative patterns of human settlement and a wide range of impacts" (Duane, SNEP, Vol II, 1996, p. 334).

To a degree SNEP follow-on research at the University of California has been addressing this subject through mathematical modeling of urban growth to predict natural resource impacts. Also, much of the university's activity is focused on the development of a Sierra Nevada bioregion research program in conjunction with a new campus to be built at Merced, California.

It is reflective of the general condition that both the now traditional contenders in the land use and environmental dispute appear to have virtually ignored a rapidly strengthening third challenger for the Sierra Nevada -- the new migrants. While some may readily align with the existing camps -- conserving land-belonger with the environmentalists, realtor with the extractionists -- most may not belong in either. Are they a new faction, or perhaps the catalyst for a new deal or the new societal vision? Ed Marston, Editor of the *High Country News*, recently stated for a meeting on community-based strategies in forest stewardship and sustainable economic development, that although his prejudice suggests that the new comers and their amenity economy are liabilities rather than assets, "Neither the old extractive interests nor we the environmentalists have thought very hard about the new people moving into the West " (Marston, 1998, p. 4). In the 1995 J. Moore Methods Inc. survey cited above, 55.8 % of the 1000 registered voter sample considered themselves environmentalists and 34.4% had lived in the Sierra Nevada 10 years or less.

It seems appropriate to conclude this outline of a very complex issue with the following quote about the new migrants to the interior West:

> " They may view the fights over grazing and logging and dams as Hatfield-McCoy feuds -- quaint and fun and very Old West, but irrelevant. Loggers and Earth First!ers alike may strike them as Pistol Pete relics that have survived into the 21st century. The newcomers may be grateful to environmentalists for slowing down extraction and its damage and for

converting the West's small towns to places they can live. But they may relegate those causes and us to history, as dated as the old prospector with a burro looking for a rich strike...."

"The more informed among them say, yes, there are still open pit mines, and there are cows in the streams. But the back of the extractive culture and economy has been broken. A new economy is rolling in. It is time to take a larger look at the West. We newcomers who live here in the rings of new homes around the region's small towns and cities have different concerns. We weren't drawn here by the love of the land, or by a desire to make a killing off its resources. We don't share your passions or your extractive desires or your feuds. So get out of the way, and let us move ahead with our concerns." (Marston, 1998, p. 6.)

Policy Research Suggestions

3.) Ascertain the impacts of alpine and piedmont human settlement patterns on surrounding ecosystems. A survey of extant knowledge would be a logical first step, but I doubt that much of policy value will result from then generalizing further about impacts. Rather, analysis should focus on proven and experimental prototypes, and associated regulatory innovation, legislation and incentives to bring about more benign human settlement within the Sierra Nevada sub-region's ecosystems.

4) Ascertain who are the new migrants to the Sierra Nevada, and particularly what are their values, life styles and behavior most relevant to sustaining the bioregion's integrity. Also, what are means of promoting more complimentary behavior. Aspects of this topic are suggested research topics in Key Issues #3 and #5 below, as there are several ways to approach this strategic topic.

5.) Despite the considerable "sustainable development" dialogue since the Earth Summit in 1992, the recent 5 year assessment indicated advancement has been modest at best. Since the Brutland Report one important component for aiding and assessing progress, or lack of it, is the formulation and institutionalization of local sustainable development indicators (LSDI). These are not single sector, but integrated sets of physical, economic and socio-cultural, as well as quantitative and qualitative indicators. Very little has also been achieved on this important objective, a condition well reflected in the USA (with the Metropolitan Seattle exception) generally and in the Sierra Nevada more particularly. A local community or bioregional precedent, demonstration case, should be developed and institutionalized.

6.) As pointed out in the Introduction to this brief, a considerably greater understanding is needed of the systemic interdependencies of the bioregion's I&C activity, recreation, tourism, residential development and the apparent primary attractor, the natural environment. This is poorly understood in

general and for the Sierra Nevada, but seems essential for formulating successful policy and action to maintain and rehabilitate the bioregion's ecosystem.

A significant aspect of this research would be the clarification and relationships of terms and constructs being used to describe or explain aspects of this subject: the new economy, the amenity economy, tourism, recreation, the visitor industry, the travel and hospitality industry, and amenity migration. Another approach to this specific topic is through the perspective offered by the amenity migration construct (see Key Issue #3 below).

Key Issue #3: Amenity Migration

Although amenity migration appears to be an emerging societal driving force, there is very little knowledge about it, both for the Sierra Nevada and globally. Most of the information available comes from 5 limited global case studies undertaken between 1986 and 1996 (Price, Moss, Williams, 1997). Amenity migrants are quite difficult to identify and analyze within existing statistical regimes; even their magnitudes, but especially economic and cultural (values and life styles) characteristics.

From the information available for this brief, as indicated in Key Issue #2 above, amenity migration, and relocation of those who follow principally to make a living from the amenity migrants, appears a key issue in sustaining the quality of the bioregion's ecosystem. Because of this and the dearth of knowledge about amenity migration it is identified as a key issue per se.

Policy Research Suggestion

7.) Undertake research on amenity migration in the Sierra Nevada, focusing on better explaining the phenomenon, and how this apparent strategic population group is an opportunity and threat for maintaining the bioregion's attributes. This analysis should include ascertaining their values and life styles and their leadership role in the bioregion. See also research suggestion #6 above.

Key Issue #4: Bioregion Governance & Management

There appears to be considerable agreement that sustaining and rehabilitating the bioregion's ecosystem faces a considerable human institutional constraint. Some characterize this as a system-wide crisis. The SNEP "critical findings" on Sierra Nevada institutions defines the core of this issue well:

"**Institutional Incapacities** Many Sierran ecosystem declines are due to institutional incapacities to capture and use resources from Sierran beneficiaries for investment that sustains the health and productivity of the ecosystems from which the benefit derives.

Sources of Institutional Incapacities Institutional incapacities arise from four primary sources: (1) fragmented control of ecosystems among different jurisdictions, authorities, and ownerships, (2) absence of exchange mechanisms among these entities to sustain rates of investment and cooperative actions that reflect ecosystem values, (3) detachment between those who control ecosystems and communities that depend upon and care for them, and (4) inflexibility in the response to rapid changes in population, economy, and public interests.

Regionalism The sources of institutional capacity and the potentials to improve upon capacity differ among the regions of the Sierra, which vary greatly in their institutional a well as ecological, demographic, and economic characteristics." (SNEP, Vol II, 1996, p. 48)

Ruth further describes the condition:

"The institutional landscape of the Sierra is diverse, complicated, and also fragmented. Hundreds of federal, state and local governmental entities with various responsibilities that relate in some way to the environment or natural resources exist throughout the Sierra..."

"Across the Sierra itself, a panoply of institutions operate in different jurisdictions with diverse missions. Each responds to, and implements, a different array of policies. The picture that emerges is one of Byzantine complexity in which a host of institutions involving every layer of government, focus on single component or process of the ecosystem. (Ruth, 1998, p.1-2.)

This description reflects the fact that some two thirds of the bioregion's land is within the jurisdiction of governmental agencies. The situation is even more complex due to the large number of private stakeholders and their growing dissatisfaction with public stewardship in the Sierra Nevada, and their parallel demands for a greater and more direct role in this responsibility.

Contention over use of the bioregion's resources among the key stakeholders appears to be at the heart of this issue. And basic to this condition is that they are operating with different understandings of the subject, too few of which are ecosystemic. Without a general acceptance of the ecological paradigm it seems unlikely the situation will move far from the characteristic short run, fractionalized, and tactical actions that have added up to inadequate

protection and conservation. Therefore, while what is outlined below seems strategic, behind it is the need for a general shift to an ecosystems paradigm.

This paradigm is the foundation of SNEP's strategies, as they singularly and collectively address the Sierra Nevada as a whole system or major sub-systems, and emphasize sustainable management over entire landscapes. Further, the bioregion is considered a dynamic web of biological and social issues that need addressing at different scales within and beyond the Sierras, such as county buildout in the western foothills, air quality in southern Sierras, water conservation strategy in California's metropolises and congressional legislation. But even given that this strategic paradigm becoming generally accepted, what then? Agreement on this issue then extends to the generic solution -- institutional innovation is an imperative. This is beginning with new organizational forms and relationships emerging in the bioregion.

Prominent in this innovative change, and its underlying principles, is a new and evolving approach to maintaining and rehabilitating local communities in the Sierra Nevada that are forest and watershed dependent, frequently called natural resources dependent communities (NRDC). Importantly, this concept of dependency extends beyond the traditional relationship with forestry. It now includes the political-economic and social aspects of amenity and recreation, such as amenity migration and tourism, the rehabilitation of watersheds, and the sustainable harvesting of valuable wild crops below the forest canopy, including mushrooms, herbs and floral greens. These communities are also exploring natural resources and environment joint management by three primary stakeholder groups; the public, scientists and managers. Place-based community action groups are being established that to greater and less intent are based on the principles of adaptive ecosystem management and evolving perspectives of community well-being. Some of these groups are referred to as "CRMS" -- Coordinated Resource Management Groups.

The work of the Forest Research Group (see Key Stakeholders) may best represent the community well-being perspective and associated evolving analytical tools. Local well-being is being assessed through 3 techniques: "community capacity," " socioeconomic status" and an "isolation scale." The first assess the collective ability of residents to respond to external and internal stresses, to create and take advantage of opportunities, and to meet the needs of residents, diversely defined. This capacity consists of three components; physical capital, human capital and financial capital. (Kusel, SNEP, Vol II, 1996, pp 361-373.) For SNEP 180 community aggregations were identified from census block groups delineated with the SNEP 6 sub-regional units. The socioeconomic status was developed from a scale based on a diverse set of 1990 census measures for the aggregations. Aggregations were also characterized geographically by spatial relations to population centers, transportation corridors, and areas dominated by public lands, and a scale of isolation

developed from these spatial variables. (Doak and Kusel, SNEP, Vol II, 1996, p. 375).

In exploring the resulting information, community capacity and socioeconomic status in the Sierra Nevada showed a positive but weak correlation, and there was considerable variation among the 6 sub-regions. Of the 180 communities, 28 ranked low and 31 ranked high in well-being. Some poor communities were found to have high capacity, while economically well off ones had lower capacity than anticipated.

Such experimental tools are being used in local communities with more and less rigor in the Californian Sierra and further afield, especially in the forest dependent North West states and they are typically closely associated with local community self-help and ecosystem management. The dominant model for this activity appears to be "adaptive ecosystem management." Its underlying premise is that knowledge of the systems managed is both incomplete and elusive. This is considered to be particularly relevant to managing ecosystems that are highly dynamic and scientifically daunting, such as the Sierra Nevada's. Within this uncertain context, management actions must be designed to a.) meet specific objectives, while b.) yielding knowledge and addressing social goals. "Thus, at its core, an adaptive process both focuses and accelerates learning to create more effective management "(Walters and Holling, 1990). These are also core premises of strategic analysis and planning, a methodology particularly suitable to ecosystems management but neither used nor discussed in SNEP.

In applying the above constructs and techniques there is also a move from involving the public through consultation and conflict resolution and management to collaborative problem solving. "Collaboration suggests going beyond seeking advice or obtaining compromise to processes of consensus building in which, parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible." (Gray, 1989).

Collaboration among stakeholders for governing and managing the Sierra Nevada seems to be the focus of much recent discussion of the institutional problem. SNEP considers it "is the most significant principle that emerges from the SNEP strategies" (SNEP, Vol I, 1996, p. 169). Against a background of conflicting interest group lobbying and litigating, this approach looks like a promising alternative, and there is more than discussion of it occurring within the bioregion. Probably the most well know activity is of the Quincy Library Group's. Its members come from the private forest industry, governmental agencies and local residents who want to continue to live and work in their community. Their controversial plan for the future of the two national forests

the community is dependent upon is presently before the Congress as legislation (see Key Stakeholders for details).

The collaborative approach raises questions. Environmentalists and extractionists both, while in part supporting collaboration, say it is only a partial solution, as there is compromise of principles involved even if there is so-called consensus decision making. Collaborative groups are criticized for being ad hoc, ending with the particular issue that brought the participants together, and being too narrowly focused, do not deal with local problems of education, welfare, racism, etc. Scientists and policy makers in particular appear skeptical about relating local scale collaboration to the need for specialized legal, financial, and technical expertise. The large national environmental organizations and philanthropic foundations are reportedly not generally supporting this local institutional innovation, perceiving it as having little impact beyond a local community scale. Some suggested that these environmental organizations are also concerned that their support base may be eroded.

Also, the public and forest industry bureaucracies involved seem to be at the table principally because of community and associated pressures, and their internal reward systems typically do not support such activity. However, the stakeholder groups are diverse, having within them "some individuals, some companies and some organizations [who] will come to the table in search of their solutions. At the moment, the vast majority on each side is not yet ready to take the consensus route." (Marston, CGBD, 1998). I suggest it is still early in a developmental process. For example, NRDCs and CRMS are now beginning to netweave at the regional level, as well as inter-regionally in the USA and Canada. This development is discussed in Key Issues # 5 below,

My analysis also indicates that there is a sub-group of permanent amenity migrants that are instrumental in this local institutional innovation. They are typically younger, well educated, understand the external political-economic environment, know how to "work the institutions," and are committed to their new local communities. They have also found ways to avoid the split that commonly occurs between new comers and earlier inhabitants in smaller rural communities. This includes functioning as an equal and integral part of the community and applying their skills to basic problems being faced by the earlier inhabitants, such as the demise of traditional extractive jobs. Amenity migrants are also important participants in other volunteer organizations pressing for institutional change in the bioregion, such as the region-wide Sierra Business Council (see Key Stakeholders).

The SNEP community well-being findings offers some further insight into the role of amenity migrants. The ability of communities to sustain volunteer efforts is often negatively affected by increasing numbers of commuters and retirees. However, in a few communities the knowledge, experience and

willingness of retirees to help their new community was particularly noted as a positive addition to community capacity (Doak & Kusel, SNEP Vol II, 1996, Ch 13).

The bioregion's public key stakeholders have significant institutional shortcomings, both internal and inter-agency, constraining their contribution to protecting the bioregion. Most frequently identified was the United States Forest Service (USFS), responsible for the planning and management of eight national forests in the bioregion; 41% of the total area. Critics of differing alliances characterize this agency as an inflexible bureaucracy whose culture is not a learning one, nor is it disposed to cooperation and collaboration, especially externally. The USFS is finding it difficult to adjust to its changing strategic environment through shifting its world view, mission, and operations, despite having individual members and groups within of it that contribute and have the appropriate skills. Some consider the behavior of this key agency indicates that promoting bioregional ecosystem sustainability is not its priority.

The USFS is exhibiting some change however. For example, since the early 1970s severe fires in southern California it has gotten together with the California Department of Forestry and Fire Protection (CDF) and, " As a result, there is now a relatively well coordinated multi-agency fire protection system to control severe wild fires" (SNEP Vol. I, 1996, p.53.). Also, the Pacific Southwest Region office is now formulating an approach to greater Public involvement. But, this post-SNEP activity, like the new California Fire Plan of the (CDF), is process not policy, planning and product oriented (USDA, 1998 a; CDF, 1998).

The above characterization appears to apply to most key public stakeholders in the bioregion, county and state as well as federal, according to SNEP and the later analysis of ecosystem management, bioregional governance and institutional innovation in the Sierra Nevada of Larry Ruth. Further, he finds:

> "Sustainability and ecological health are viewed by many public and private institutions as compatible with their own institutional priorities, but to some degree, sustainability is a goal added on top of other more established organizational function. An intrinsic problem with this approach is that these institutions have rarely been able to perceive the implications of their actions for the larger ecosystem, or to effectively review the cumulative effects of such actions across a region or sub-region." (Ruth, 1998, p.3.)

In addition, if agencies want to share responsibilities and management, legal mandates usually dissuade such activity.

Nevertheless, I found several examples of public agencies beginning to move beyond these constraints. One example is an alliance of rural counties, the

Rural Counties Regional Council, has initiated pilot projects, with the Sierra Alliance and the Sierra Business Council, based on SNEP findings and recommendations. The State Resources Agency is a key supporter of these developments, especially its Fire and Resource Assessment Program unit.

The subject of establishing some type of Sierra Nevada bioregion-wide planning body was familiar to most of my key informants but it was not generally thought to be the subject of serious analysis at this time. Some however thought that the US Forest Service would arrive at such a proposal after working through its new "Sierra Nevada Framework for Conservation and Collaboration" (USDA, 1998 a). The main concern seems that such a body would be another top-down regional authority (see Key Issue #1 above). Others pointed out that California has had some success with regional bodies, such as the California Coastal Commission.

Policy Research Suggestions

There are a number of important research topics here. Generally for this issue there seems to be gap between limited university based policy research and a few projects of NGO and state and federal key stakeholders that are quite focused and typically do not deal with significant generic and systemic policy issues. Two examples of topics are:

8.) what are strategic public policies that would improve institutional capacities to capture and use benefits from Sierran resources for sustaining the bioregional ecosystems? This subject may be considered generically or in the context of one or several key stakeholder institutions. It could also be addressed more specifically within a particular sub-region.

9.) The development of exchange mechanisms among key stakeholders is another important problem.

Key Issue # 5: Future of Local Place-Based Communities

The local community developments outlined above suggest significant innovation may be emerging for sustaining these communities as well as being a strategic tool for the conserving the bioregion's integrity. What specifically is happening, what are its ramifications and how should it be encouraged and supported is a key issue.

This issue may also be an appropriate specific context for analyzing the future of place-based community in our post-industrial society. To what extent are Sierran NRDC and CRMS activities romantic urges to sustain what is becoming a socio-economic artifact? Or are we observing a significant manifestation of a

preferred set of values and life style that can revitalize and evolve into one sustainable settlement model for these times; one that engages the new I&C technology and economy skillfully to these ends? From what I have so far learned about these innovative local groups in northern California, Oregon and Washington, they do not represent the social drop-out, equity refugee or my-ranchette type migrants. They appear to be formulating a new informed and realistic political-economic base, one that also appears skillfully "wired" for expanding their perspectives and activities.

Policy Research Suggestion

10.) As is the case with most of the key issues identified in this brief, the lack of information circumscribes much of what I suggest for analysis. In this case, first there is a need to know considerably more about what is occurring: what, who, and where, and strategic impacts. Also, whether and how they are able to maintain their activities.

Key Issue #6: Local Personal and Governmental Incomes

The core element of this key issue is the low level of public and private reinvestment in the bioregion's resources and ecosystem. Similar to other mountain regions of the world, the value of Sierran resources has disproportionally accrued to selected beneficiaries outside the bioregion who have not adequately reinvested in the sources of their income, which in turn is a reason for the significant degradation of the sources. Today, generation of substantial consumer surpluses from development of water and hydroelectricity in particular produces a value, typically outside the bioregion, considerably exceeding the financial costs assessed to users, taxpayers or others.

While this historic use of the bioregion's water continues to be a problem, the more generic negative situation may be increasing due to a considerable shift to amenity uses of the bioregion's natural environment. The term "amenity use," along with "amenity value" and "amenity economy," while representing growing phenomena, that often includes the earlier recognized activity "recreation," is poorly understood and defined. Yet the growth of associated activities appears to be having an increasing negative impact, in part because research on and management of amenity use is inadequately funded.

This shift to amenity use, including recreation, is partially responsible for reducing more traditional forest activity, as this use is considered more environmentally benign. So that parallel to expanding under its own steam, amenity use is also being promoted by public and private stakeholders as an alternative. Traditional forestry use also continues to be the structural basis of significant local employment and public revenue in some counties, especially in

Lassen, Plumas and Sierra, while this shift more generally in the bioregion is reducing income from timber receipts. Typically, conversion of wildlands to residential property and commercial recreation is now having much greater local income and expenditure implications in the Sierras. The increasing role of tourism and recreation based employment has been described earlier. William Stewart points out that although a large and growing stream of property tax revenue is associated with this source, it also results in new demands for bigger and more extensive road networks, sewerage and water infrastructure, and further, that the ecosystem inputs for this development may be greater than those associated with the conversion of land to housing (Stewart, SNEP, Vol III, 1996, p. 1053, and personal communication, 1998).

How is this emerging condition systemically related to the increasing role of "tourism" and "recreation" in generating bioregional employment, and public income and expenditures outlined earlier? It is not at all clear. A key reason for this is that these two terms are rather ambiguous, and therefore so is much of the information about the bioregion's ecosystem and resources uses they represent. This ambiguity is increased as the newer uses are as yet also poorly understood and defined. For example, what part of "recreation" activity is that of the tourist and what part of the local and bioregional resident, and do they have characteristically different impacts? And further, does the amenity migrant's use significantly differ? Existing terms and the constructs they are rooted in seem mainly inadequate for the strategic analysis, policy formulation and action now needed for generating local personal and government incomes; ones that support sustaining the bioregion' integrity. This situation seems to obtain for other issues identified in this brief as well.

As the SNEP overview assessment identifies, reinvestment in the bioregion's resources and ecosystem depends to a considerable degree on creation and modification in the institutional system (see Key Issue #4 above). By extension, to be skillfully undertaken it needs to result also in job growth in resource and ecosystem maintenance activities, especially related to harnessing the positive and ameliorating the negative impacts of the newer activities discussed above. This strategic linkage seems to be well understood and promoted by the new

place-based community organizations outlined above in Key Issue # 5. Also, a sub-regional positive example of a search for methods to finance environmental improvements, and to a less degree local income generation, from cost recovery from beneficiaries is taking place in the Lake Tahoe basin (Ruth, 1998, p. 17.). In these instances there is both an awareness of the ambiguity problems outlined in the above paragraph, and some innovation is occurring to overcome them.

Policy Research Suggestions

11.) One reason for my cursive outline of the above issue is that there is very little information about it. Developing the same and formulating associated public policy implications is therefore recommended. This task should include an assessment of to what degree is there a shift from the comparatively transparent and simple extraction of timber and mineral to a more opaque and complex one of amenity use? This would also include identification and analysis of the mix of both activity types.

12) There are a number of more bounded research topics obvious here, such as what has been the experience with specific benefits transfer mechanisms, and how may they be applied to the cost of watershed rehabilitation.

Key Issue #7: Water Use Policy and Process

The diversion of water for irrigation, residential, industrial and power use constitutes one of the significant alternations of the Sierra Nevada ecosystem, and the bioregion as a main source of the water used elsewhere in California. The negative resource and ecosystem impacts of the manner in which it is being extracted is identified as one of the overarching threats to the bioregion in the introductory section of this brief. This issue however seems to have already been identified and discussed sufficiently for this brief in a PPIC Policy Brief, "Environmental and Water Allocation Policy in California: Opportunities for the Public Policy Institute of California ," June, 1995. Here I would add that the structural relationships with the key issues of amenity migration and local employment and public revenues needs particular attention and development.

Policy Research Suggestion

13.) In addition to the recommendations of the 1995 PPIC policy brief on water, structural relationships with the key issues of amenity migration and local employment and public revenues needs specific analysis in the context of the Sierra Nevada. In doing so, particular attention should be given to the role of watershed management and its potential for local personal and governmental income generation. The Sierra Nevada Alliance, SBC and RCRC (see Key Stakeholders) are beginning hands-on pilot projects in this area. This research may also be considered as part of the research suggestions made to address Key Issues # 3 and #6.

Key Issue #8: Spiritual Significance

The role of spiritual significance in the conservation and protection of the Sierra Nevada Mountains is unclear. While I propose this is a key issue because of frequent historical and contemporary reference to the spiritual importance of these mountains, at the same time it is also important because of a lack of

understanding of this factor. Considerable attention needs to be given to understanding this significance for maintaining and rehabilitating the natural resources and ecosystem of the bioregion. Several key informants were of the opinion that in particular this will be a key factor in arriving at a societal vision(s) or more specific objectives for the future of the Sierra Nevada or its sub-regions.

The Sierra Mountains are of religious importance to traditional and neo-followers of Native Americans of the bioregion and beyond. More generally, it appears that the spiritual significance of mountains, and the Sierra Nevada in particular, is pan-religious, and for many may be more in keeping with what the sociologist Robert Bellah has called the American civil religion.

How to define this issue for policy relevant analysis is the first hurdle. While a study of relevant literature will bring some insight, I recommend focusing on an approach suggested by Gary Snyder (personal communication, Sept. 1998). What are the spiritual activities or practices people are undertaking and what are their impacts on the bioregion. He suggested three general categories of people involved: traditional and neo-followers of Native American practices; Buddhists and Daoists; and "semi-spiritual" back packers, climbers, and rafters. Some would add the angler to this list, and there are the more passive practitioners who settle to view mountains, their trees and water. In all five of the amenity migration case studies referred to earlier, "interviews also indicate that those amenity migrants concerned with protecting or otherwise sustaining the amenity resources may also be characterized as being motivated by spiritual and learning objectives in their decision to move" (Price, Moss, Williams, 1997, p. 268.).

Policy Research Suggestion

14.) Sponsorship is needed for the study of this issue, perhaps initially funding a research scoping task. It may also be considered in the context of the suggested research to address Key Issue #1.

IV. CONCLUSION

There appear to be considerable need for policy issues research to assist in maintaining the Sierra Nevada ecosystem and natural resources and the bioregion's continuing capacity to accommodate human settlement and sojourners. Unfortunately, there are few involved in this specific enterprise. The above research suggestions are far from exhaustive, but rather indicative of both substantive topics and experimental as well as more traveled methodological paths. Some of these suggestions would also provide a strategic entry to the very complex and quite significant issue of where and how will

California accommodate its expected population growth. Moreover, there appears to be a need for a champion to fill an important leadership gap and be a key catalyzing agent.

During the course of undertaking this research, a number of key stakeholders indicated an interest in opportunities for collaborative or other kinds of associative research. In relation to this potential, a particularly positive development was exhibited -- a growing number of local organizations not only wish to be more directly involved in both decision making and management of their community and bioregion, but they now have knowledge and access to information as increasingly it becomes less the preserve of expert and scribe. How will we put this opportunity to its best use?

V. KEY INFORMANT INTERVIEWEES (March - September, 1998)

1. Laurel Ames: Executive Director, Sierra Nevada Alliance, South Lake Tahoe, CA.

2. Edwin Bernbaum: Sr. Research Fellow, The Mountain Institute, Berkeley, CA.

3. Louis Blumberg: Assistant Director, The Wilderness Society, San Francisco, CA.

4. Barbara Boyle: Sierra Club, Head, California State Office, Sacramento, CA.

5. Timothy Duane: Assistant Professor, Dept. of City & Regional Planning and Dept. of Landscape Architecture & Environmental Planning, UC-Berkeley; SNEP Special Consultant , Berkeley, CA.

6. Don Erman: Professor and Director, Center for Water & Wildland Conservation, UC-Davis; SNEP Team Leader; Member, Board of Directors, Packard Foundation, Davis, CA.

7. James Gaither: Assistant Secretary for Conservation Matters, California Resource Agency; Advisor, California Biodiversity Council, Sacramento, CA.

8. Gregory Greenwood: Research Manager/Ecologist, Fire and Resource Assessment Program, California Department of Forestry & Fire Protection, Sacramento, CA.

9. Tracy Grubbs: Associate Director, Sierra Nevada Business Council, Truckee, CA.

10. John Hopkins: President, Institute for Ecological Health, Davis, CA.

11. Valerie Justice: Special Projects Coordinator, Regional Council of Rural Counties, Sacramento, CA.

12. Jonathan Kusel: Director, Forest Community Research; Lead Partnership Group; SNEP Special Consultant, Quincy, CA.

13. Dennis Machida: Executive Director, California Tahoe Conservancy; SNEP Special Consultant, South Lake Tahoe, CA.

14. Edward Marston: Editor, *High Country News*, Paonia, CO.

15. Anne Vernez Moudon: Professor of Architecture, Landscape Architecture

and Urban Design & Planning; Director, Cascadia Community & Environment Institute, College of Architecture & Urban Planning, University of Washington, Seattle, WA.

16. Larry Ruth: Post-Doctoral Research Fellow, School of Law, UC-Berkeley; SNEP Special Consultant, Berkeley, CA.

17. Annalee Saxenian: Associate Professor, Dept. of City & Regional Planning, University of California, Berkeley, CA.

18. John Sheehan: Economic Development Director, Plumas Corporation, Quincy, CA.

19. Jack Shipley: Applegate Partnership, Grants Pass, OR.

20. Gary Snyder: Yuba Watershed Institute; Professor, UC-Davis; poet and writer, Nevada City, CA.

21. William Stewart: Director, Fire and Resource Assessment Program, California Department of Forestry & Fire Protection; SNEP Special Consultant, Sacramento, CA.

22. Robert Twiss: Director, Center for Environmental Design Research and Professor Emeritus, Dept. of Landscape Architecture & Environmental Planning, UC-Berkeley, CA.

23. Jay Watson: Regional Director, The Wilderness Society, California/Nevada Region, San Francisco, CA.

24. Jon Welner: Consultant, Conserving California Landscape Initiative (Packard Foundation Project), Sacramento, CA

25. Carol Whiteside: President, The Great Valley Center, Modesto, CA.

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Notes to readers

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