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APPENDIX 3

Digital Geographic Data for the Sierra Nevada Region

SNEP compiled a large amount of existing geographic data and information pertaining to the Sierra Nevada ecosystem. This material ranged from digital maps and images that spanned the entire region to analog maps and data tables for local areas, and also included original data, maps, and model outputs generated by SNEP scientists and consultants. A technical support staff was hired to integrate this information into a coherent, well-documented database and to assist the Science Team with data compilation, data quality assessment, analysis, and product generation. The staff was located in Sacramento, where it deployed a moderate-sized local network of workstation computers linked to the Internet. This appendix provides a tabular summary of the digital data compiled by SNEP and an overview of data cataloguing and archiving activities.

DATABASE DESCRIPTION

The two general objectives of SNEP's database activities were the following:

1. Compile and provide existing data and information to support assessment and modeling activities of the SNEP Science Team and consultants.
2. Contribute to the development of a Sierra Nevada Information System accessible at local, state, and federal levels.

In meeting the first objective, the SNEP GIS staff acquired and integrated a large amount of geographic data on cultural, ecological, and physical environmental themes (table A3.1). To deal with the various restrictions on data distribution, SNEP classified every data set obtained or produced during the study into one of six access categories:

1. Unrestricted (public)
2. Unrestricted, but permission should be obtained from source agency
3. Accessible to Science Team and consultants, no special permission required
4. Accessible to Science Team and consultants only after signing of a waiver agreeing not to redistribute the data to anyone else
5. SNEP GIS staff only
6. File owner only

Only the first three categories of data are included in the SNEP archive. Products developed by SNEP are generally treated as unrestricted. Interim and draft versions were not generally distributed and are not part of the archival database.

A large fraction of the data was provided by the U.S. Forest Service from its Forestland and Resource Database (FRDB), in particular, the GIS ARC / INFO database developed at Pacific Meridian Resources in Emeryville, California. This database includes information on administrative boundaries, land planning units, biological resources, and physical conditions. The data are integrated vertically for each national forest. That is, maps of many different themes for each national forest have been co-registered in the GIS so that they can be overlaid and jointly analyzed. SNEP horizontally integrated selected themes across all of the national forests in order to conduct regionwide analyses. However, because the data for individual forests undergo frequent revision, the FRDB data were catalogued and archived by individual national forest (table A3.1).

Another important data source was the State of California's Teale Data Center, which maintains statewide coverages of political boundaries, land ownership, roads, and urban areas. These data must be purchased from Teale Data Center and have been catalogued but not included in the SNEP database. Similarly, recent satellite imagery used by SNEP to map vegetation and for regional hydrologic modeling is copyrighted and must be obtained from private vendors.

Several important regional maps and databases that were produced by SNEP are available in the data archive. These include hydroelectric plants, roadless regions derived from the Forest Service and Teale Data Center, road coverages, SNEP study region and subregion boundaries, late successional forests, plant communities and dominant species, and significant areas. These data sets are documented extensively in SNEP reports as well as through associated data dictionaries.

Table A3.1 lists only geospatial data in the SNEP archive and does not include other kinds of digital information produced by SNEP such as reports, graphics, and modeling software. Eventually it is our intent to incorporate much of this information into the SNEP archive.

PLANS FOR DATA DISTRIBUTION VIA THE INTERNET

To assist in the development of an accessible Sierra Nevada Information System, SNEP staff worked with staff in the Resource Agency's California Environmental Resource Evaluation System (CERES / University of California, Santa Barbara [UCSB]) program and the Alexandria Digital Library (ADL) project to define protocols for data documentation, cataloguing, and on-line storage. CERES is an information system developed by the California Resources Agency to facilitate access to a variety of electronic environmental data pertaining to California. Project Alexandria is a research project at UCSB whose primary goal is to design, implement, and deploy a digital library for spatially indexed information.

An important component of SNEP's data cataloguing effort has been preparation of metadata for project GIS coverages. Metadata are "data about data" that describe the content, quality, condition, and other characteristics of data. Spatial data pose special problems of documentation that have been addressed by the Federal Geographic Data Committee (FGDC), CERES, Alexandria, and many other organizations. These groups have been developing standard, structured descriptors of spatial data so that the data can be located and accessed across a network using computerized database management tools. SNEP has employed CERES and FGDC metadata standards to catalogue the database in order to make the data accessible through Project Alexandria's digital spatial library facility at UCSB. The ADL will provide a framework for putting these collections on-line, providing search and access to these collections to broad classes of users, and allowing both collections and users to be distributed throughout the Internet.

During 1995 the Alexandria Project completed the design and implementation of a successful "rapid prototype" system (RPS). The RPS is a "stand-alone" digital library that includes interface, catalogue, storage, and ingest components and is running in the Map and Imagery Library at UCSB. The Alexandria Project is now extending the RPS to a system supporting multiple users over the Internet. In line with its basic strategy, the second version of ADL will be connected to the World Wide Web.

SNEP GIS METADATA SUMMARY

SNEP metadata were catalogued by two methods for inclusion in the Alexandria Digital Library. The first method catalogued data sets originating with the U.S. Forest Service and the National Park Service. These data sets were catalogued using the CERES metadata schema. Details of that cataloguing effort can be found in a metadata summary by Quinn Hart of CERES. The second method catalogued data sets created by SNEP and is described by this summary. Priority was given to those data sets that are unique and not available from other sources. This metadata cataloguing work was the combined effort of SNEP, CERES, and Alexandria personnel.

Files

Three unique data sets were catalogued, the coverages and databases compiled for the SNEP late successional old-growth forest and significant natural areas projects and the tree seed zones of California. There were fifty-seven metadata entries, fifty-two ARC / INFO coverages, three data dictionaries, and two ARC / INFO databases. All of the coverages are geographically associated with national parks or national forests except the tree seed zones, which extend over the entire SNEP study area.

Metadata Entry Form and Elements

In cooperation with the Alexandria project, SNEP selected a subset of the FGDC metadata elements, based on applicability to the SNEP data sets and compliance with Alexandria's metadata standards.

The metadata entry form was created in Microsoft Access by Alexandria personnel. This was the Alexandria project's first attempt to distribute a metadata entry form. The form consists of a subset of FGDC elements chosen by SNEP with additional USMARC elements required by Alexandria.

Geographic Coordinates, Transfer Size, and Format

The geographic coordinates and transfer size for each layer were derived by use of an ARC / INFO Arc Macro Language (AML). The AML projects the individual SNEP coverages to latitude and longitude coordinates and provides the size of each file in ARC / INFO export format.

Resource Description

The name of the file as it is known to SNEP GIS staff is used.

Beginning Date and Ending Date

The data sets catalogued did not require that a range of dates and times be described. For both beginning and ending dates, the year the data were captured is used for the late successional old-growth forest and significant natural areas projects, and the date of the source map is used for the tree seed zones.

Local Call Number

A local call number is a metadata element mainly applicable to bibliographic information, but it is used here to refer to the file address (often referred to as the file "path") on the computer used by SNEP GIS. This element refers to a particular metadata system, in this case, the American National Standard for Bibliographic Information Interchange.

Originator

The Sierra Nevada Ecosystem Project is listed as the originator on all coverages except the tree seed zones. For the tree seed zones the source from the original map is used.

Publication Information

The date of publication of the SNEP data is 1996, and the publisher is Centers for Water and Wildland Resources, University of California, Davis, California 95616.

Contact Information

The University of California, Santa Barbara, Biogeography Laboratory is listed for all of the contact information. Contact information is listed four times under the headings Metadata Contact Information, Holdings, Distribution Information, and Processing Steps.

Maintenance and Update Frequency

Maintenance and update frequency are entered as unknown at this time.

Map Projection Name and Direct Spatial Reference Method

All of the SNEP data are in Albers Conical Equal Area, and all of the data sets catalogued are in vector format.

Metadata Elements Not Utilized

There are several metadata elements that are not utilized. This was due to the type of data catalogued and the information available. SNEP catalogued only data sets in vector format so those metadata elements strictly for raster data were not needed. Unutilized metadata elements include: row count, column count, indirect spatial reference method, horizontal positional accuracy value, latitude resolution, longitude resolution, geographic coordinate units, and supplemental information.

Narrative Fields

Each data set catalogued has entries for the fields Attribute Accuracy Report, Abstract, Entity, and Attribute Overview. However, the Alexandria metadata form allowed only a very limited number of characters (255) per field, so entries are extremely concise. Reference is given to the data dictionary for more detailed information.

Theme Keywords

Alexandria uses the Library of Congress subject headings. Theme keywords used for the late successional/old-growth forest data set are “late successional forests” and “old-growth forests.” For place keywords, “Sierra Nevada,” “national forest,” and the county and state names are used. For the Significant Natural Areas data set, theme keywords used include “ecological significant areas,” “geological significant areas,” and “cultural significant areas.” Place keywords for Significant Natural Areas include “Sierra Nevada,” “national forest,” and state names.

Source Citation

All SNEP data sets catalogued are based on national forest visitor maps, U.S. Geological Survey (USGS) 7.5 minute quadrangles, orthophotoquads, and USGS national park maps. Source citation information was gathered from these hard-copy sources. For the tree seed zones coverage, source citation information from the hard-copy tree seed zones map was used.

Browse Graphic Files (BGF)

In a CERES/SNEP cooperative effort a combined AML and script was written to create the browse graphic files (BGF). This program will create a BGF in graphics interchange format (GIF), the size required by Alexandria for all coverages in a specified directory. SNEP created BGFs for all of the coverages catalogued.

TABLE 3.1

GIS directory.

Type	Theme	USA	California	Nevada	Sierra Nevada	BLM	State Parks	Lassen Volcanic NP	SEKI NP	Yosemite NP	Modoc NF	Lassen NF	Pumas NF	Tahoe NF	Lake Tahoe Basin	Eldorado NF	Stanislaus NF	Sierra NF	Sequoia NF	Toiyabe NF	Inyo NF	Source	Scale	Data Type
Cultural	Administrative boundary, NF proclaimed										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Cultural	Administrative boundary, national forest										x	x	x	x	x	x	x	x	x	x	x	USFS	1:24K	V
Cultural	Administrative boundary/ownership		x	x																		ArcUSA	1:2M	V
Cultural	Administrative boundary/ownership				x																	Teale	1:100K	V
Cultural	Administrative/special-use sites										x			x		x	x		x		x	USFS	1:24K	V
Cultural	Calowl Plan A										x	x	x	x		x	x	x	x			USFS,	1:24K	V
Cultural	Census Geography 1990–92				x																	USBOC, Teale	1:100K	V
Cultural	Cities		x	x																		ArcUSA	1:2M	V
Cultural	Cities				x																	Teale	1:100K	V
Cultural	County boundary		x	x																		ArcUSA	1:2M	V
Cultural	County boundary				x																	Teale	1:100K	V
Cultural	County boundary														x							TEGIS	1:24K	V
Cultural	County boundary										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Cultural	Developed recreation sites										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Cultural	Farmland 88		x																			DOC-FMMP	1:100K	V
Cultural	Farmland 92				x																	DOC-FMMP	1:100K	V
Cultural	Geographic names, places		x	x																		ArcUSA	1:2M	P
Cultural	Giant sequoia management																		x			USFS	1:24K	V
Cultural	Hydroelectric power plants				x																	SNEP	1:600K	P
Cultural	L&RMP land suitability class										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Cultural	LMP management area											x		x							x	USFS	1:24K	P
Cultural	LULC 1970				x																	USGS, UCSB		V
Cultural	Managed areas				x																	Teale, UCSB	1:100K	V
Cultural	Near natural/backcountry										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Cultural	Parcel, LTB, DG														x							TEGIS	1:24K	V
Cultural	Parcel, LTB, El Dorado County														x							TEGIS	1:24K	V
Cultural	Parcel, LTB, PL														x							TEGIS	1:24K	V
Cultural	Parcel, LTB, WA														x							TEGIS	1:24K	
Cultural	PLSS, LTB														x							USGS, TEGIS	1:24K	V

Acronyms

BLM	Bureau of Land Management	**LMP**	Land Management Planning	**SBI**	Sierra Biodiversity Institute
CDF&FP	California Department of Forestry and Fire Protection	**LTB**	Lake Tahoe Basin	**SCS**	Soil Conservation Service
DFG	California Department of Fish and Game	**LULC**	Land Use Land Cover	**SEKI**	Sequoia and Kings Canyon National Parks
DG	Douglas County	**LWQCB**	Lahontan Water Quality Control Board	**SNEP**	Sierra Nevada Ecosystem Project
DMA	Defense Mapping Agency	**m**	Meter	**Teale**	Stephen P. Teale Data Center
DOC	Department of Conservation	**M**	Million	**TEGIS**	Tahoe Environmental Geographic Information System
ESRI	Environmental Systems Research Institute	**NF**	National Forest	**UCSB**	University of California, Santa Barbara
FIA	Forest Inventory Analysis	**NP**	National Park	**USBOC**	United States Bureau of Census
FMMP	Farmland Mapping and Monitoring Program	**NWS**	National Weather Service	**USBR**	United States Bureau of Reclamation
GAP	Gap Analysis Project	**P**	Point	**USFS**	United States Forest Service
K	Thousand	**PL**	Placer County	**USGS**	United States Geological Survey
L&RMP	Land and Resource Management Planning	**PLSS**	Public Land Survey System	**V**	Vector
Lasnp	Lassen Volcanic National Park	**R**	Raster	**WA**	Washoe County

TABLE 3.1 (continued)

Type	Theme	USA	California	Nevada	Sierra Nevada	BLM	State Parks	Lassen Volcanic NP	SEKI NP	Yosemite NP	Modoc NF	Lassen NF	Pumas NF	Tahoe NF	Lake Tahoe Basin	Eldorado NF	Stanislaus NF	Sierra NF	Sequoia NF	Toiyabe NF	Inyo NF	Source	Scale	Data Type
Cultural	Rangeland emphasis													x								USFS	1:24K	V
Cultural	Ranger districts and compartment										x	x	x	x		x	x	x	x			USFS	1:24K	V
Cultural	Recreation emphasis (adopted ROS)										x				x							USFS	1:24K	V
Cultural	Regions, CA Department of Fish and Game		x																			DFG	1:1M	V
Cultural	Regions, Jepson		x																			UCSB		V
Cultural	Research natural areas (rnas)										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Cultural	Resource units, BLM				x																	BLM		V
Cultural	Roadless regions (draft)				x																	SNEP	1:24K, 1:100K	R
Cultural	Roads		x	x																		ArcUSA	1:2M	V
Cultural	Roads		x																			USBR MPGIS	1:100K	V
Cultural	Roads				x																	Teale	1:100K	V
Cultural	Roads										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Cultural	Roads, LTB														x							USGS, TEGIS	1:24K	V
Cultural	SNEP ecoregion (core)				x																	SNEP	varies	V
Cultural	SNEP study area				x																	SNEP	varies	V
Cultural	SNEP subregions				x																	SNEP, UCSB	1:24K	V
Cultural	Special area not withdrawn mediated																		x			USFS	1:24K	V
Cultural	Special area not withdrawn plan																		x			USFS	1:24K	V
Cultural	Special areas											x	x	x			x	x	x		x	USFS	1:24K	V
Cultural	Special interest areas										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Cultural	USGS 7.5 minute quadrangles				x																	ArcUSA	1:24K	V
Cultural	USGS 7.5 minute quadrangles										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Cultural	Visual quality zone										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Cultural	Wild and scenic rivers											x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Cultural	Wilderness, Lassen Volcanic NP							x														NPS, SNEP		V
Cultural	Wilderness, NF										x	x	x	x	x	x	x	x	x	x	x	USFS	1:24K	V
Cultural	Wilderness, Sequoia & Kings Canyon NPs								x													NPS		V
Cultural	Wilderness, Yosemite NP									x												NPS		V
Ecological	CALVEG		x																			USFS, CDF&FP	1:250K	V

continued

Acronyms

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DFG	California Department of Fish and Game	**LULC**	Land Use Land Cover	**SEKI**	Sequoia and Kings Canyon National Parks
DG	Douglas County	**LWQCB**	Lahontan Water Quality Control Board	**SNEP**	Sierra Nevada Ecosystem Project
DMA	Defense Mapping Agency	**m**	Meter	**Teale**	Stephen P. Teale Data Center
DOC	Department of Conservation	**M**	Million	**TEGIS**	Tahoe Environmental Geographic Information System
ESRI	Environmental Systems Research Institute	**NF**	National Forest	**UCSB**	University of California, Santa Barbara
FIA	Forest Inventory Analysis	**NP**	National Park	**USBOC**	United States Bureau of Census
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Ecological	Deer emphasis areas													x		x		x	x		x	USFS	1:24K	V
Ecological	Ecological unit inventory														x	x						USFS	1:24K	V
Ecological	Emergency Activity Reporting System (EARS: 1989–93)				x																	CDF&FP	NA	DB
Ecological	FIA grid inventory plots										x	x									x	USFS	1:24K	V
Ecological	Fire history, USFS										x	x	x	x	x	x	x	x	x		x	USFS	variable	V
Ecological	Fire management analysis zones (FMAZ)				x																	CDF&FP	1:100K	V
Ecological	Fire, 1921–93, Sequoia & Kings Canyon NPs								x													NPS	1:24K	R/V
Ecological	Fire, 1931–93, Yosemite NP									x												NPS		R
Ecological	Fuel breaks												x			x				x		USFS, SNEP	1:126	V
Ecological	Furbearer habitat										x	x					x	x				USFS	1:24K	V
Ecological	Giant sequoia grove point locations				x																	various	varies	P
Ecological	Giant sequoia, Mountain Home																		x			CDF&FP	1:24K	V
Ecological	Giant sequoia, national park groves								x													SEKI	1:24K	V
Ecological	Giant sequoia, north of Kings River									x					x		x	x				various	1:24K	V
Ecological	Giant sequoia, Sequoia NF																		x			Sequoia NF	1:24K	V
Ecological	Giant sequoia, SNEP compilation				x																	various, SNEP	variable	V
Ecological	Hardwood		x																			CDF&FP	1:24K	V
Ecological	Historic and current chinook spawning area				x																	SNEP	1:114	V
Ecological	Historic fishless area				x																	SNEP	1:500K	V
Ecological	Historical fire report database (EARS HIST: 1981–88)				x																	CDF&FP	NA	DB
Ecological	Integrated inventory plots												x		x	x	x					USFS	1:24K	P
Ecological	Land capability, Bailey														x							SCS, Bailey, TEGIS	1:24K	V
Ecological	Low site timberland										x	x	x		x	x						USFS	1:24K	V
Ecological	LSOG plot locations											x				x	x		x			UCSB, SNEP	1:24K	P
Ecological	Meadow management zone													x		x	x		x			USFS	1:24K	V
Ecological	Modified yield timber type											x	x	x	x	x			x		x	USFS	1:24K	V

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Ecological	Monitoring sites														x							LWQCB, USFS, USGS, SCS	1:24K	P
Ecological	National Interagency Fire Management Integrated Database				x																	USFS	NA	DB
Ecological	Old growth																			x		USFS	1:24K	V
Ecological	Old growth/stand structure inventory plots													x				x	x			USFS	1:24K	P
Ecological	Plantation inventory plots										x	x	x	x		x	x	x	x		x	USFS	1:24K	V
Ecological	Rainfall		x																			USGS	1:100K	V
Ecological	Range allotments, NF (draft)				x							x	x	x	x	x	x	x	x		x	UCSB	varies	V
Ecological	Riparian conditions				x																	SNEP	NA	DB
Ecological	SBI old growth				x																	SBI		V/R
Ecological	SNEP Aquatic Diversity Management Areas				x																	Calwater, SNEP	varies	V
Ecological	SNEP Index of Biological Integrity watersheds				x																	Calwater, SNEP		V
Ecological	SNEP late successional						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	SNEP	varies	V
Ecological	SNEP significant areas—cultural				x				x	x		x		x		x		x	x	x	x	SNEP	1:1267	V
Ecological	SNEP significant areas—ecological				x	x			x	x		x		x	x		x	x	x	x	x	SNEP	1:1267	V
Ecological	SNEP significant areas—geological				x	x			x	x		x		x	x	x	x	x	x	x	x	SNEP	1:12672	V
Ecological	Soils								x													NPS	20m	R
Ecological	Soils, LTB														x							SCS, TEGIS	1:24K	V
Ecological	Soils, order 2 and 3 composite															x						USFS	1:24K	V
Ecological	Soils, order 3												x	x	x	x			x			USFS	1:24K	V
Ecological	Soils, STATSGO		x																			SCS	1:250K	V
Ecological	Spotted owl habitat—SOHAS											x	x	x		x	x	x	x			USFS	1:24K	V
Ecological	Spotted owl habitat PACS and BASE										x	x	x	x	x	x	x	x	x			USFS	1:24K	V
Ecological	Stream channel conditions																		x			Sequoia NF		V
Ecological	Streamside/riparian management zone										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Ecological	Timber																			x		USFS	1:24K	V
Ecological	Timber type														x							USFS, TEGIS	1:24K	V

continued

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Ecological	Tree seed zones				x																	USFS, SNEP	1:1M	V
Ecological	Unsuitable forestland										x		x			x	x	x	x		x	USFS	1:24K	V
Ecological	Vegetation, national parks								x	x												NPS		V
Ecological	Vegetation, Camp Creek															x						USFS	1:24K	V
Ecological	Vegetation, GAP				x																	UCSB	1:100K	V
Ecological	Vegetation, Kuchler		x																			ESRI, BLM	1:1M	V
Ecological	Vegetation, Leiberg, 1902												x	x								SNEP	1:845K	V
Ecological	Vegetation, NF (eveg)										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Ecological	Vegetation, plot data, national park								x													NPS		P
Ecological	Vegetation, riparian														x							USFS, TEGIS	1:24K	V
Ecological	Vegetation, State Board of Forestry, 1888													x		x						SNEP	NA	V
Physical	Basin boundary, Lake Tahoe														x							TEGIS	1:24K	V
Physical	Dams and diversions, nonjurisdictional				x																	Teale	NA	P
Physical	Dams, jurisdictional				x																	DWR, DFG	1:250K	P
Physical	Digital elevation model				x																	DMA, ESRI, SBI	100m	R
Physical	Digital elevation model							x	x	x	x	x	x	x	x	x	x	x	x	x	x	USGS, USFS	30m	R
Physical	Geology														x							various, TEGIS	variable	V
Physical	Geology, California		x																			DMG, 1977	1:750K	V
Physical	Hydrobasin, Calwater		x																			CDF&FP	1:24K	V
Physical	Lake Tahoe shoreline														x							TEGIS	1:24K	V
Physical	Lakes	x																				ArcUSA	1:2M	V
Physical	Lakes										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Physical	Lakes		x																			USGS, CDF&FP	1:100K	V
Physical	Lakes, other than Lake Tahoe														x							USGS, TEGIS	1:24K	V

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DFG	California Department of Fish and Game	**LULC**	Land Use Land Cover	**SEKI**	Sequoia and Kings Canyon National Parks
DG	Douglas County	**LWQCB**	Lahontan Water Quality Control Board	**SNEP**	Sierra Nevada Ecosystem Project
DMA	Defense Mapping Agency	**m**	Meter	**Teale**	Stephen P. Teale Data Center
DOC	Department of Conservation	**M**	Million	**TEGIS**	Tahoe Environmental Geographic Information System
ESRI	Environmental Systems Research Institute	**NF**	National Forest	**UCSB**	University of California, Santa Barbara
FIA	Forest Inventory Analysis	**NP**	National Park	**USBOC**	United States Bureau of Census
FMMP	Farmland Mapping and Monitoring Program	**NWS**	National Weather Service	**USBR**	United States Bureau of Reclamation
GAP	Gap Analysis Project	**P**	Point	**USFS**	United States Forest Service
K	Thousand	**PL**	Placer County	**USGS**	United States Geological Survey
L&RMP	Land and Resource Management Planning	**PLSS**	Public Land Survey System	**V**	Vector
Lasnp	Lassen Volcanic National Park	**R**	Raster	**WA**	Washoe County

TABLE 3.1 (continued)

Type	Theme	USA	California	Nevada	Sierra Nevada	BLM	State Parks	Lassen Volcanic NP	SEKI NP	Yosemite NP	Modoc NF	Lassen NF	Pumas NF	Tahoe NF	Lake Tahoe Basin	Eldorado NF	Stanislaus NF	Sierra NF	Sequoia NF	Toiyabe NF	Inyo NF	Source	Scale	Data Type
Physical	Rivers				x																	ArcUSA	1:2M	V
Physical	Rivers				x																	Teale	1:100K	V
Physical	Slope, LTB														x							USGS, TEGIS	1:24K	R
Physical	Streams										x	x	x	x	x	x	x	x	x		x	USFS	1:24K	V
Physical	Streams, LTB														x							USGS, TEGIS	1:24K	V
Physical	Watersheds, LTB														x							USGS, TEGIS	1:24K	V
Physical	Weather zones				x																	NWS, CDF&FP	1:100K	V

Acronyms

BLM	Bureau of Land Management	**LMP**	Land Management Planning	**SBI**	Sierra Biodiversity Institute
CDF&FP	California Department of Forestry and Fire Protection	**LTB**	Lake Tahoe Basin	**SCS**	Soil Conservation Service
DFG	California Department of Fish and Game	**LULC**	Land Use Land Cover	**SEKI**	Sequoia and Kings Canyon National Parks
DG	Douglas County	**LWQCB**	Lahontan Water Quality Control Board	**SNEP**	Sierra Nevada Ecosystem Project
DMA	Defense Mapping Agency	**m**	Meter	**Teale**	Stephen P. Teale Data Center
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K	Thousand	**PL**	Placer County	**USGS**	United States Geological Survey
L&RMP	Land and Resource Management Planning	**PLSS**	Public Land Survey System	**V**	Vector
Lasnp	Lassen Volcanic National Park	**R**	Raster	**WA**	Washoe County

APPENDIX 4

The SNEP Process in Detail

This appendix outlines, in greater detail than presented in the body of volume I, the key steps SNEP took to conduct its study. The goal is to present a candid overview, rendering the process as it actually unfolded, rather than presenting a *fait accompli*. This is not intended as critical review—that will come later—but to aid the reader in understanding the human, technical, and societal context in which SNEP worked. Our hope is that by understanding this context, those who use our products will recognize the power as well as the limitations of our conclusions and in so doing more effectively translate this new information into action.

SNEP ASSIGNMENT

One of the difficulties SNEP faced initially was in interpreting the several charges it received. The different sources of SNEP assignments resulted in debate over authority, priority of issues, scope, and type of analysis. The request from Congress that gave rise to the Sierra Nevada Ecosystem Project came in two forms. The 1993 Department of Interior and Related Agencies Appropriation Act, as authorized by H.R. 5503 (1992 Congress), allocated $150,000 for an old-growth forest assessment of the Sierra Nevada. The House Committee on Agriculture also approved H.R. 6013 (Sierra Nevada Forest Ecosystems Study Act of 1992), which called for a comprehensive ecosystem assessment of the entire Sierra Nevada. The intent of H.R. 6013 was read into the record, but it fell victim to adjournment so was never formally approved. Because both bills eventually strongly guided SNEP, as explained later, their content is summarized here.

H.R. 5503

The Conference Report for Interior and Related Agencies 1993 Appropriations Act authorized funds for a "scientific review of the remaining old-growth in the national forests of the Sierra Nevada in California, and for a study of the entire Sierra Nevada ecosystem by an independent panel of scientists, with expertise in diverse areas related to this issue."

In a letter to the chief of the Forest Service explaining the intent of the appropriation language, the chair of the Committee on Natural Resources, Agriculture, Merchant Marine, and Fisheries, along with the chair of the Appropriations Subcommittee on Interior and Related Agencies and other interested legislators, reiterated the call for a scientific review of the remaining late successional old growth in the national forests of the Sierra Nevada and a study of the entire Sierra Nevada ecosystem. The letter further stated that the review's immediate objective should be to produce maps identifying the old-growth forest ecosystems and key watersheds on national forest lands in the Sierra Nevada range and the plant and animal species associated with those ecosystems.

According to the letter, the study should also evaluate different alternatives for protecting the old-growth Sierra Nevada forests and key watersheds, in terms of risks to the ecosystem and associated species and effects on timber harvest levels and other management activities, and should determine whether reserves are needed to protect old-growth and watershed values. Recommendations for management of forest and rangelands within and outside such reserves were requested as well.

H.R. 6013

The Sierra Nevada Ecosystem Study Act of 1992 called for the establishment of a scientific committee to accomplish six tasks:

1. Delineate the various ecosystems of the Sierra Nevada forests.
2. Inventory the resources of these ecosystems, including watersheds and late successional forests, and the species associated with them.
3. Evaluate the health conditions and trends of these ecosystems.
4. Identify the processes, activities, and other factors that affect the health conditions and trends of these ecosystems, including drought, fire and fire suppression, timber harvest and forest practices, disease infestations, livestock grazing, urban and residential development, water projects, forest regeneration, soil erosion, and air quality.
5. Recommend alternative management strategies to protect Sierra Nevada ecosystems, including watersheds and late successional forests and their associated species, and to assess whether reserves are necessary to maintain the

health of the Sierra forest ecosystems. Additionally, if the Science Team finds that reserves are necessary, to designate which lands should be included; recommendation of each alternative management strategy is to include both a discussion of the risks it would pose to the ecosystem and an economic analysis that evaluates impacts on jobs, county revenues, and timber supplies to local, state, and national markets.

6. Examine the Mediated Settlement Agreement for Sequoia National Forest relative to the management of giant sequoia groves and whether additional lands are needed to ensure the health and survival of the giant sequoia ecosystem.

Finally, H.R. 6013 called for a team of scientists to conduct the study with the following areas of expertise represented: forest ecology (old growth), forest ecology (managed forests), wildlife biology, forest economics, silviculture, hydrology, fish biology, forest fire management, forest entomology, range ecology, and risk analysis.

Additional Congressional Direction

Four legislators wrote the chief of the U.S. Forest Service to offer clarification of both H.R. 5503 and H.R. 6013. In their letter, which SNEP later used for clarification, they reemphasized that the scientific study of the Sierra Nevada should address the six objectives described in H.R. 6013 and that reports should be submitted for peer review before they are submitted to Congress.

Steering Committee Guidance

The Steering Committee, which oversaw SNEP (see "Administration"), further interpreted H.R. 5503 and H.R. 6013 in a charter to SNEP. In this document, the Steering Committee called for a two-part study:

1. An evaluation of available data, literature, assessments, maps, and related information to provide an inventory of old-growth and other associated ecosystems, including provisional strategies for management of these ecosystems.
2. An ecosystem study of the entire Sierra Nevada, including assessments, alternatives, and environmental, social, and economic consequences of provisional strategies.

The Steering Committee further clarified the assignment in stating that assessments are to include the following:

- A social overview of historic, current, and projected human influences and anthropogenic effects on the Sierra Nevada ecosystem.
- An economic overview of the current market and nonmarket economic effects of historic, current, and projected management scenarios.
- Resource inventories with an estimate of pre-Euro-American conditions that can be used as a benchmark to describe ecosystem changes; the inventories should evaluate the major geologic, climatic, physical, and biological conditions that influence ecosystem development within the Sierra Nevada.
- A special-feature assessment that identifies the remaining old-growth stands and the key features or definitions used to describe this resource.
- Examination of the Mediated Settlement Agreement, Section B, Sequoia Groves (Sequoia National Forest) and recommendations for scientifically based mapping and management of giant sequoia groves.
- Evaluation of the health status and sustainability of the Sierra Nevada ecosystems.
- Identification of the processes, activities, and other factors that affect the health conditions and trends of Sierra Nevada ecosystems (drought, fire and fire suppression, timber harvest and forest practices, disease infestations, livestock grazing, urban and residential development, water projects, forest regeneration, soil erosion, and air quality); a quantitative assessment of risk in each area must be included to the degree in which credible data exist.
- Assessment of the past, current, and likely future effects of water resource management strategies on aquatic ecosystems in the Sierra Nevada.
- Descriptions and analysis of the analytical models used in all assessments, including sensitivity analysis of the projected values.
- Research gaps and data needs.

In addition, alternatives were to include the following:

- A range of management scenarios for maintaining the health and sustainability of the Sierra Nevada ecosystems while providing resources to meet human needs.
- A wide range of themes or objectives; for example, alternatives could emphasize specific themes of (a) establishment of coarse- or fine-grain filter strategies (or combinations thereof) to enhance or maintain natural ecological values, (b) intensified zoning to emphasize featured uses or activities, and (c) natural values, recreational values, or commodity values.
- Environmental, social, and economic consequences, evaluated with regard to each alternative and using a wide range of criteria, including temporal and spatial effects.

The Steering Committee called for peer review of publications, products, assessments, and reports completed by the Science Team.

ADMINISTRATION

The various charges for SNEP gave direction for staff organization. Nonetheless, SNEP's administration, and the roles played by different groups, evolved over the course of the study.

Steering Committee

The deputy chief for the Forest Service was given authority to establish a science-based Steering Committee, whose job was to initiate and provide administrative guidance for the project. The Steering Committee elected its own chair from within the committee and included representatives from Forest Service Research, Washington Office; National Park Service; University of California; California Academy of Sciences; and National Academy of Sciences (table A4.1). The role given to the Steering Committee was to select the Science Team leader and the Science Team, to assume primary responsibility for public communications, and to provide overall guidance and advice to the Science Team throughout the study.

The role of the Steering Committee changed over time. It fulfilled the obligation of choosing team leaders (held by three different people) and ratifying selections for Science Team members. The Steering Committee initially played only a minor role, however, in interpreting the various charges for SNEP's assignment, in guiding the approach to the study, and in advising on public participation. After the first year of the project, the Steering Committee became more active and worked more closely with the Science Team. The Steering Committee handled the lawsuit that arose in the second year regarding public participation and Federal Advisory Committee Act (see "Public Participation"). Certain members of the Steering Committee became active reviewers of process and scope, emphasizing the need for explicit statement of assumptions, a practical approach to institutional realities, and the relationship of SNEP to other agencies, Congress, and the Administration. During the review of SNEP reports, the Steering Committee coordinated anonymous peer reviews.

Science Team

According to charge, the technical work of SNEP was to be conducted by an interdisciplinary team of high-caliber, nationally respected scientists with expertise in a wide range of biological, physical, and social sciences pertinent to the Sierra Nevada. Science Team composition grew in several phases during the first year. From an initial small team during the tenure of the first Science Team leader, the core Science Team eventually comprised eighteen Science Team members (so approved by the Steering Committee) and nineteen special consultants (see the lists in appendix 2). Special consultants served roles equal to those of designated Science Team members. This core Science Team comprised the leaders of SNEP projects, authors and coauthors of SNEP technical reports, and main participants in broad as well as specific dialogues about the SNEP strategic approach, direction, and progress. Science Team meetings were held monthly (most for two days) through the course of the project and attended by the core Science Team.

TABLE A4.1

SNEP administrative and science teams.

Steering Committee

Chair
Jim Space, Director, U.S. Forest Service, Pacific Southwest Research Station, Albany, CA

Former Chair: Barbara C. Weber, then Director, U.S. Forest Service, Pacific Southwest Research Station, Albany, CA

Members
George Bartholomew, University of California, Los Angeles, CA
Dennis Breedlove, California Academy of Sciences, San Francisco, CA
Bruce M. Kilgore, Pacific West Field Area, National Park Service, San Francisco, CA
Jeffrey Romm, University of California, Berkeley, CA
Jerry A. Sesco, U.S. Forest Service, Forest Service Research, Washington, DC
Former Member: Don C. Erman, University of California, Davis, CA

Science Team

Team Leader
Don C. Erman, University of California, Davis, CA

Former Team Leaders
Deborah L. Elliott-Fisk, University of California, Oakland, CA
John Gordon, Yale University, New Haven, CT

Coordinating Committee
Don C. Erman, Team Leader, University of California, Davis, CA
Constance I. Millar, Chair, U.S. Forest Service, Pacific Southwest Research Station, Albany, CA
Deborah L. Elliott-Fisk, University of California, Oakland, CA
David Graber, National Biological Service, Three Rivers, CA
Douglas Leisz, Placerville, CA
Rowan A. Rowntree, U.S. Forest Service, Northeastern Forest Experiment Station, Albany, CA
Coordinating Associate: Michael Oliver, University of California, Davis, CA

Public Participation Committee
Jonathan Kusel, Chair, Forest Communities Research and University of California, Westwood, CA
Susan Carpenter, Carpenter and Associates, Riverside, CA
Sam C. Doak, Doak and Associates, Portland, OR
Erin Fleming, University of California, Davis, CA
Victoria E. Sturtevant, Southern Oregon State College, Ashland, OR

Science Team Members, Special Consultants, Associates, and SNEP Staff
See lists in appendix 2

In addition to the thirty-seven scientists who took primary responsibility for the broad SNEP project, a large and diverse group of associates played a critical if narrower role in the project (see list in appendix 2). These associates contributed technical information, reports, and reviews on one or several projects or disciplines. The associate scientists mostly did not participate in the broadest SNEP effort, nor did they regularly attend Science Team meetings but worked through a member of the core Science Team.

SNEP was directed by a Science Team leader, who shouldered executive responsibility for primary decisions about direction, scope, technical framework, philosophical approach, scheduling, and review of SNEP process and products. The Coordinating Committee (table A4.1), comprising six Science Team members including the team leader, provided strategic direction and executive recommendations and decisions on many aspects of the project. The Coordinating Committee met weekly (at times, daily), reviewed broad team approaches, approved direction and progress of Science Team projects, reviewed and recommended annual budgets for Science Team members, arbitrated conflict, interacted with the Steering Committee, and edited and coordinated production of the *Progress Report* and SNEP's final reports. The Coordinating Committee worked closely with the SNEP Public Participation Committee (table A4.1) and the public key contacts group in their efforts to involve the public with the SNEP process (see "Public Participation").

Project Working Groups

Science Team members, together with associates, staff, and select colleagues, formed several working groups during the course of the project. These ranged from technical groups addressing assessments (see "Technical Framework"), such as the Disturbance Group, the Watershed Group, the Institutions Group, to technical support, such as the GIS Group (see "Phase 3: Geographic Information System and On-line Availability," and appendix 3), to SNEP administration, such as the Public Participation Group (see "Public Participation") and the SNEP Editorial Group.

SCOPE OF SNEP

The philosophical approach taken by SNEP determined the way in which its projects were conducted and the nature of its conclusions.

Independence

In all direction regarding the project, independence of the Science Team and the scientific process was clearly stressed. The Science Team was administered within an academic context (Centers for Water and Wildland Resources, UC Davis), and many team members belonged to academic institutions. Several scientists were affiliated with public agencies (U.S. Forest Service, National Biological Service, U.S. Geological Survey, National Park Service, State of California Resources Agency), but within SNEP these members represented their respective research communities, not organizations.

Several other new or ongoing projects on the Sierra Nevada overlapped the tenure of SNEP, including the USFS CalOwl Assessment and Draft EIS, the state of California CERES program, the California Gap Analysis Project (GAP), the Sierra Nevada Research Planning Program (SNRP), and the California Rivers Assessment Program. SNEP directly coordinated with CERES (see Phase 3: "Geographic Information System and On-line Availability"), GAP, and the Sierra Nevada Research Planning Program but intentionally worked independently of the CalOwl Project, which was an agency assessment and plan under National Environmental Policy Act (NEPA) direction.

The nature of SNEP's funding further encouraged independence. SNEP projects were directly funded by Congress and, through congressional appropriation, the U.S. Forest Service. These funds were used as operating budgets for technical assessments, to support the SNEP GIS staff and facilities, to provide salary for support staff, consulting scientists, and some primary SNEP scientists, and to cover project overhead in facilities, printing, and accounting.

Other sources indirectly supported SNEP. Many SNEP scientists' salaries were covered by their respective organizations. Associate scientists contributed consultation and statistical and GIS advice and review, and uncounted hours were donated to SNEP projects by resource managers and specialists of agencies and departments in the Sierra Nevada. These latter included the U.S. Forest Service, National Park Service, Bureau of Land Management, state of California, counties, and California Indian tribes.

Process and Collaboration

SNEP's assignment put the Science Team on new ground; no previous assessments provided adequate models. As such, much of the team process and scientific approach summarized in this appendix and implicit in technical reports was newly developed as part of SNEP. Thus, SNEP's contributions are not just data, maps, and analyses, but new approaches to ecosystem analysis and bioregional assessment. One of the unexpected consequences from the approach SNEP took was an implicit collaboration and cooperation among federal, state, local, and private participants. Although SNEP maintained scientific standards and independence as indicated earlier, the critical involvement of people from many sectors meant that assessments and scenarios were not isolated scientific endeavors. The cooperation among team members and associates from different sectors within SNEP presages the collaborative teamsmanship that will enable successful management of Sierran bioregions.

Scientific Approach

SNEP attempted to maintain a scientific approach to team process, including candid presentation of the process. The SNEP

team included scientists with differences of opinion, representing diverse schools of thought, ages, backgrounds, and experiences. Rather than minimize these differences in an imperative for team consensus, SNEP intentionally allowed them to flourish during team analysis and the review process. SNEP's intent was to highlight in reports and presentations the areas of team controversy and differing interpretation, describing the justifications, rationale, and assumptions behind interpretations. In so doing, SNEP hoped to demystify the scientific process and to clarify the nature of debate to users of SNEP's products. Although it would make easier reading to present unambiguous conclusions, in many cases, it would be false to imply consensus. By disclosing the process, we hope that the information we present will be understood in the context of the scientific process (including debate, uncertainty, fragmentary evidence) in which it was developed.

Peer Review

Peer review is part of the scientific tradition. SNEP's reports went through multiple cycles of review by different reviewer groups, the sum of which accounted for greater scrutiny than most scientists encounter in normal scientific journal or book publishing. The SNEP Coordinating Committee directed most of the review processes, except the anonymous reviews of the final reports, which were coordinated by the Steering Committee. All SNEP projects resulting in reports initially were submitted in proposal format, elaborating proposed rationale, justification, and methods. Before submission to the Coordinating Committee, these were reviewed by Science Team colleagues and then reviewed by the Coordinating Committee. Preliminary results of technical projects were presented to an external group of science reviewers at a Science Team meeting in May 1995, at which time critical comments were solicited.

Final reports were subject to review as follows: internal reviews by a minimum of five Science Team members, external review by three anonymous reviewers, and review by a variable number of public key contacts (see "Public Participation"). Review forms were used to track each manuscript. An editorial board of two SNEP Science Team members coordinated the review process by tracking review comments, assuring that review comments were incorporated in revisions, and granting final approval of revised manuscripts. Draft reports for which substantive comments were raised were brought to the attention of the Coordinating Committee, and appropriate actions (e.g., new authors added, workshops convened) were taken to bring the report to SNEP standards.

In addition to peer review of technical approach and content, SNEP conducted reviews with the public (see "Public Participation").

Assessment, Not Plan

SNEP's responsibility was to provide a scientific evaluation of trends and consequences, not decision making or planning. Throughout the project, the public often confused SNEP with a NEPA or California Environmental Quality Act analysis (such as CalOwl or FEMAT), which it was not. The primary difference is that, although both approaches undertake scientific analysis of conditions and trends, SNEP's recommendations for the future are nonbinding examples, not plans. SNEP was educational in nature: presenting new information, interpretations, and suggestions. With its strategies, SNEP presented a "grab bag" of tools, models, and suggestions for how to address some of the most important ecosystem problems confronting the bioregion. In most cases, SNEP's recommendations would not directly translate into on-the-ground plans but were intentionally conceived at a design level, although SNEP did consider aspects of management and institutional implementation. Any work done to translate SNEP's suggestions into real policy or management actions would entail further analysis of local implications, a task that was beyond the ability and responsibility of SNEP scientists.

The Science Team focused on technical analysis, assessment, interpretation, integration, and creative modeling. SNEP objectives were to unveil myths about resource conditions, raise red flags about problem areas, provide centralized and retrievable data and maps, interpret multidisciplinary information synthetically, and display in clear language potential designs to solve major problems in the Sierra. SNEP assessments attempted to be comprehensive and exhaustive; strategies developed were intentionally illustrative and representative. SNEP scientists strove to present material in a way that could be effectively passed to decision makers. Despite best intentions, the temptation to make comprehensive and exclusive recommendations was strong and unavoidable, and some bias undoubtedly remains in reports.

Data Compilation and Synthesis

Although a scientific assessment project, SNEP was directed by assignment not to undertake new or primary research. The Science Team therefore compiled preexisting data but reached deep for information beyond standard published scientific articles. Although SNEP scientists maintained a data-quality standard, they used information from agency files, consultations with experts and specialists, applicable evidence from studies in adjacent bioregions, projections from theory and simulations, historical files, and even anecdotes and historical photos. New simulation models were built in some cases (as in, for example, simulations of forest conditions), and new methods for evaluating conditions (e.g., variable riparian buffers, late successional forest categories). In the latter case, new data plots were installed and analyzed to validate the categories and ranks employed by SNEP.

SNEP scientists were requested by congressional charge to make evaluations about status and condition. Because of the generally poor data quality, the lack of preexisting information, the requirement not to do new research, and the short time frame to complete the work, making evaluative statements required each scientist to extend him- or herself. SNEP scientists were fulfilling their obligation by making professional judgment statements and inferences. For many, this was the

most difficult and professionally challenging aspect of the project.

TECHNICAL FRAMEWORK

Several aspects of SNEP's assignment presented particular challenges to the team in developing a strategic technical approach. These included Sierrawide scale, interdisciplinary scope, lack of a "driving issue" and emphasis on integration, ecological versus social aspects in SNEP, poor data and scientific knowledge, time frame, assessment and policy alternatives, and role of public participation in the process. These are each considered separately (the latter in a separate section, "Public Participation").

Sierra-wide Scale

The geographic scope of the assignment remained a challenge through the course of the project. Even defining the outer boundaries for the study region remained a debate for over a year. The logical bounds of a Sierra region were different for almost every issue and discipline. Although this might not seem a significant problem, the imperative to integrate among analyses encouraged the Science Team to seek a "consensus" boundary. In the end, the team accepted a compromise boundary, recognizing that analysis of individual issues could modify boundaries without impeding integration.

For many issues, assessments and management were most approachable at scales below the Sierrawide level, for example, at the regional level. Nonoverlapping and hierarchic patterns of Sierran diversity created difficulty in approaching regionalization synthetically. In the end, the Science Team accepted diversity within the Sierra by not forcing "consensus" regional boundaries and recognizing that conclusions pertain to different hierarchic scales. In SNEP reports, authors point out issues relevant at different levels.

Interdisciplinary Scope

SNEP's assignments called for an interdisciplinary scientific evaluation. Various disciplines were named; SNEP added to these. Despite the attempt to cover all important issues, gaps remained. It became impossible to add scientists for every important discipline; some issues had to be evaluated by scientists whose primary work was not in the area of their direct expertise.

Large interdisciplinary teams function differently from small or individual efforts, leading to unexpected challenges. Large team size and diversity of composition—eventually about eighty active scientists—led to divergence of opinion on almost everything. Effective decision making, strategic planning, maintaining schedules, budgeting, and reporting became time consuming and unwieldy. Developing technical project groups and committees, and giving the Coordinating Committee executive power, helped to order the diversity and make progress.

Integration

Most previous bioregional assessments and landscape evaluations had at their core a single or a few crises or driving issues. The trend has been to start with these central issues (e.g., endangered owl, salmon, marbled murrelet) and expand to become more integrated ecological analysis. SNEP, by contrast, began as an integrated ecological study, with no central emphasis given in the charge. Although some key issues were highlighted (old growth, watersheds, wildlife), they were repeatedly set in the context of an integrated ecological assessment. Determination of priority and importance was left in the hands of the Science Team. In this, the team was aided by previous surveys of public and scientific opinion about priority issues in the Sierra Nevada (Sierra Summit, Sierra Now, Sierra Nevada Research Planning Program). These issues were merged with priorities derived from scientific experience and judgment.

Ultimately the challenge centered on how to do a truly integrated ecosystem study. The "whole" (Sierran ecosystem) could not be studied usefully only as a whole, but individual pieces dissected for analysis would lead to dis-integration. Further, scientific tradition conditions scientists to focus on narrow topics, small areas, controlled situations, and repeatable conditions and to work in small teams with scientists of their own discipline. Working at the level of system interconnections, considering relationships among topics, and seeing the whole as well as the parts remain as challenges for science as well as SNEP.

Ecological and Social Aspects

SNEP's charges stressed that social as well as ecological components were part of ecosystems, ecosystem sustainability, and SNEP analysis. Both the importance of this orientation and the uncertain implications of how to deal with it are not new with SNEP but nonetheless were recast in SNEP's attempts to define its mission and to understand what assessment standards to use and what broad targets to consider as appropriate futures for the Sierra. The imperative to assure ecological sustainability while providing human goods and desires (from the SNEP assignment) provided both a tension point and some guidance on how to assess trade-offs.

Data Quality and Scientific Knowledge

Despite an eagerness to achieve objectives that Congress requested, poor data quality and availability and limited scientific understanding simply did not allow the level of analysis Congress and the public might want. This reality influenced the way SNEP approached its charge, the nature of conclusions presented, the ability to achieve integrated assessments, and the way conclusions could be used.

Time Frame

Given the scope and complexity of SNEP, two and one-half years proved too short a time to complete the task. The inter-

disciplinary nature of the project, size and diversity of the team, enormous start-up time, need to develop a new GIS, lack of compiled information, inability of most scientists to devote more than part-time to the project, large geographic distances involved, and need for both analysis and integration all challenged the timing for completion of SNEP. Some projects, by the rudimentary nature of information, required new data gathering or information collection. Development of simulation models that integrated parts of the system were highly time consuming. Participation with the public absorbed scientists' time to a much greater degree than had been anticipated.

Assessment and Policy Analysis

The Science Team was challenged in determining how to integrate or dissociate assessments from development of management alternatives, how to define assessments, and what constituted appropriate policy alternatives. The allocation of time to these topics, the role of different individuals directing the efforts, and the challenge of integrating assessments with policy alternatives developed only slowly over time.

Technical Framework for Assessment and Policy Options

The Science Team divided the technical aspects of the project into three primary components: ecosystem assessments, analysis of management and policy strategies, and GIS database development (table A4.2).

Phase 1: Ecosystem Assessment. Phase 1 formed the primary emphasis of SNEP analyses and the bulk of Science Team efforts and final reports. Assessments were intended to address biological, physical, and social aspects of Sierran ecosystems and to link with policy strategies but not depend on them. Assessments would meet agreed-on standards of explicit assumptions, risk assessment, statistical validity, and peer review.

SNEP conducted the assessments using a phase of conceptual dissection and analysis followed irregularly by several phases of synthesis. Although the "Sierra Nevada ecosystem" conceivably is divisible into a nearly infinite number of component parts and processes, the Science Team identified what it felt to be the most important parts for analysis, based on both the ecosystem standpoint and social priority. These included issues of biological and physical diversity, agents of change (disturbance forces), social components and human communities, and institutions (table A4.3). These elements, and the subsystems that the Science Team developed by combining several elements (e.g., watersheds, riparian communities, aquatic vertebrates and invertebrates), were subjected to in-depth technical analyses by project scientists and groups of scientists. These "assessment reports," published individually with author attribution in volumes II and III, are the primary analytical efforts of SNEP assessments.

Assessment of each ecosystem component was organized around five guiding questions:

1. What are current ecological, social, and economic conditions?
2. What were historic ecological, social, and economic conditions, trends, and variabilities?
3. What are trends and risks under current policies and management?
4. What policy choices will achieve ecological sustainability consistent with social well-being?

TABLE A4.2

Primary components of SNEP technical framework.

Ecosystem Assessments	Analyses of Management and Policy Strategies	GIS Database Development
Form primary focus of SNEP analyses and final report. Link with SNEP analyses of policy strategies, but do not depend on them. Meet agreed-on standards of risk assessment, data credibility, statistical validity. State assumptions, data sources, and methods explicitly. Address five assessment questions.	Form secondary focus of SNEP analyses and final report. Link problems identified in ecosystem assessments to possible solutions for improving health and sustainability. Depend on assessments for starting point (problems identified). Are intentionally illustrative, not comprehensive; provide thought-ideas, not detailed plans. Could not be implemented without further local analysis. Mostly address components of ecosystems (only a few attempt to be integrated at a regional level). Use diverse approaches for strategies, depending on issue, from quantitative simulations to verbal models. Meet agreed-on standards (public goals, potentially implementable, etc.).	Develop GIS database and maps to support SNEP assessments and policy stratagies. Provide access to file server and database post-SNEP for wide application by the public, other scientists, analysts, and managers.

TABLE A4.3

SNEP technical framework: ecosystem components in SNEP assessments.

Ecological Diversity	Agents of Change	Physical Diversity	Social Diversity	Human Resource Uses and Social Systems
Plant communities: general; riparian; meadow; oak woodlands; giant sequoia	Fire	Water	Population growth	Silviculture
Vegetation: forest structure and succession	Insects and pathogens	Soils	Human communities	Grazing
Species diversity: terrestrial vertebrates; aquatic vertebrates; aquatic invertebrates; insects, vascular plants; nonvascular plants	Floods and avalanches	Air	California tribes	Agriculture
Genetic diversity	Exotic plants and animals	Geology and minerals		Fire management
Significant areas		Climate		Recreation
				Special forest products
				Economics
				Institutions
				Adaptive management

5. What are the implications of these choices for ecological, social, and economic conditions?

Standards for evaluations of conditions and trends were derived from SNEP's operational definitions of health and sustainability.

Although ecosystem components were studied individually, the Science Team made a continuing effort to organize thinking at a higher, more integrated level. Where possible, assessments were linked (riparian with aquatic; vegetation with floristic diversity with forest structure; etc.) so that partial integration was achieved even during the analysis phase. Team presentations and whole-team reviews of draft papers provoked discussion among scientists and provided fertile ground for debate on fundamental topics and conclusions. This interdisciplinary debate proved healthy for the project as it led eventually to greater clarity of analysis and integration on many topics.

Once the detailed technical assessments were completed, efforts turned toward integration. Because scientists work more readily on individual projects rather than in integrated analyses, adequate time had to be left for this part of the project. This task proved to be extremely difficult. Volume I, our summary report, eventually became the vehicle for bringing about integration. This report was intended to synthesize, not abstract, the key integrating and synthetic priorities from the lengthy volume II reports. The discussions, workshops, and joint writing, reviewing, and editing for this volume produced a higher level of conceptual synthesis than had been achieved in the project previously.

Phase 2: Analysis of Management and Policy Strategies. Phase 2 was in the background of the project for the first year or so because it depended on results from assessments. Policy analysis initially focused on quantitative simulation models of commercial forest condition. This aspect was expanded through development of advances in models and use of data. Emphasis on one approach, however, was met with debate in the Science Team when members found other issues to address for Sierra Nevada futures than those amenable to quantitative modeling of forest conditions.

Thus began a phase to broaden the scope of policy scenarios within SNEP. In the spirit of environmental think tanks (e.g., the Rocky Mountain Institute), the Science Team released itself from the constraints of mathematical modeling and considered diverse institutional approaches, thought-models, and fragments of components. In the end, SNEP presented a sample of ideas, each organized similarly, although methods, goals, and ecosystem components addressed differed among them. Finally, to address the concern that most scenarios were fragmentary and unintegrated, SNEP developed a few integrated scenarios for parts of the Sierra, which attempted to synthesize ecosystem components.

Ultimately, the team felt that *strategies* rather than *scenarios* more aptly describes the characteristics of the policy examples developed by SNEP, and *strategies* is the term used in the volume I chapters.

Phase 3: Geographic Information System and On-line Availability. The SNEP GIS Center was developed primarily to support SNEP inventories, mapping, assessments, simulations, and modeling efforts. A secondary goal was to make SNEP's data and data-management system available to federal, state, and local agencies, as well as various interest groups (e.g., university researchers, private industries, environmental organizations, and local communities) and the general public. The SNEP GIS Center collaborated and co-located with the state's CERES program to develop a system that would serve SNEP needs for independence during the course of the project yet could be integrated with ongoing programs in California after SNEP's completion. The SNEP GIS Center was also coordinated with the Alexandria system at the University of California, Santa Barbara, which serves as a storage location following SNEP's completion and before the system can be

made more widely available via public media. SNEP information and some databases are accessible on-line via the World Wide Web.

For detailed explanation of the SNEP GIS, see appendix 3 in this volume.

PUBLIC PARTICIPATION

The Approach

The Sierra Nevada Ecosystem Project (SNEP) approach to public participation was based on adaptive principles. The Science Team encouraged active involvement of a diverse array of Sierra stakeholders to promote the broadest exchange of ideas and to promote a mutual learning process between scientists and the public. Specifically, SNEP public involvement was designed to be inclusive and participatory. It was also iterative, as it successively sought and responded to input from participants through a dynamic exchange. The approach was based on the premise that broad public involvement would improve SNEP's understanding of the Sierra Nevada and factors contributing to economic and social well-being, as well as assist in the development and refinement of scenarios for the Sierra Nevada.

The team's approach required both active participation from a diverse public and a willingness on the part of scientists to listen to the public and openly discuss different views. By interspersing periods of creative interaction with the public and focused consolidation and refinement among the scientists, the Science Team was able to adapt to new ideas and information provided by the public as well as inform the public of its progress. This productive interplay allowed SNEP to develop an assessment that combined the rigor of a scientific approach with the grounded knowledge and practicality afforded by public input.

Participation

To ensure an inclusive process, the SNEP team focused on three distinct types of public groups: key contacts, collaborative place-based groups, and the general public. The public involvement strategy included activities for each of these groups because they brought unique skills and knowledge to the SNEP assessment process.

The charter for SNEP recommended that the team rely on a group of *key contacts* to help accomplish project objectives. The initial key contact group consisted of individuals who had participated in previous planning and evaluations of the Sierra Nevada (e.g., Sierra Summit Steering Committee, Sierra Nevada Research Planning Team). Additional individuals were added to the group as the team identified regions or areas of interest that were not represented. Members of the key contact group generally had considerable knowledge of and experience with Sierra Nevada issues. The key contacts group totaled approximately ninety individuals representing various interest groups and scientific or other perspectives within the communities of interest of the Sierra Nevada.

Early in the public involvement process, a subset of key contacts were self-selected as a work group to advise the SNEP team on public involvement strategies. The *key contact work group* consisted of about a dozen people who assisted the team with planning public meetings during the final year of the project. Groups with a diversity of interests were represented in the work group, including recreation groups, public agencies, the timber industry, and the environmental community.

Place-based collaborative groups, which focus efforts in communities "placed" in the Sierra, were selected as focal points for SNEP's local public participation activities. These groups were selected because they represented a diversity of perspectives and a high level of general understanding of natural resource issues. Additionally, the team felt these groups could effectively contribute local and regional knowledge and act as catalysts for local public involvement. Collaborative place-based groups can be broadly defined as bioregional, community, or watershed-based groups with diverse interest representation that meet to discuss local resource management and well-being issues.

SNEP sought collaborative groups in three regions based on variations in resource-dependence, economies, development pressures, and other variables: the northern Sierra, the west-central Sierra, and the east-central Sierra. Only two groups were chosen, however: the Quincy Library Group in the northern Sierra and the Coalition for Unified Recreation in the Eastern Sierra (CURES) in the east-central Sierra. A high level of conflict and the absence of a collaborative group with broad enough interest representation prevented SNEP from working with a place-based group in the west-central Sierra.

The *general public* includes all other individuals not specifically included in the key contact or place-based groups. Although limited resources constrained SNEP's work with the public, working relationships with both the key contacts and the place-based groups helped to draw and focus general public interest and participation. Three meetings were held to which the general public was invited.

Implementation

The SNEP public participation strategy consisted of a multistage approach involving newsletters, an open letter to the public, meetings and workshops, and focused public reviews of draft assessments (a list of all individual public involvement meetings and more general public interactions is provided at the end of this section).

Newsletter. Four issues of a newsletter, *SNEP Update*, were used to provide general information on project activities and preliminary findings. Each issue included discussion of public involvement activities, including calls for public input and announcements of public meetings. Newsletters were mailed to key contacts and others on SNEP's mailing list, which totaled close to 3,000 names, and was made available at all public

meetings, workshops, and other meetings attended by team members.

Open Letter. An open letter to the public was prepared requesting information and calling for public contributions to scenario development. The letter was printed in the March 1995 issue of *SNEP Update*. It was also widely distributed via mailing lists provided by key contacts and the California Department of Forestry and Fire Protection. From this outreach effort, a total of forty-one submissions from the public were distributed to the Science Team.

Meetings and Workshops. A series of public meetings and workshops were conducted with collaborative groups (and communities of place), key contacts (largely communities of interests), and the general public.

Two public meetings were held within the geographical areas of each of the two collaborative groups. These meetings were co-hosted by the collaborative groups, which made arrangements and ensured that the broader public was invited. After the first meeting in the east-central Sierra, a special planning meeting was held with a subset of members of the CURES group to plan the second one. In the northern Sierra a member of the key contact group facilitated discussions and arrangements between the SNEP team and the Quincy Library Group. A single public meeting was held in the city of Jackson in the west-central Sierra during the summer of 1995 without the aid of a local collaborative group.

These local meetings were attended by a subgroup of the Science Team representing a diverse range of disciplines, including areas of particular interest to the collaborative groups. Each meeting had a different complement of scientists and was initiated with an introduction to SNEP's mission and general progress to date. Brief presentations were made by members of the Science Team on approaches and progress within their individual assessments. The last half of these two- or three-hour meetings was dedicated to informal questions and answers and open discussion among scientists and public attendees. The second meetings in both the eastern and the northern Sierra also included interactive demonstrations of some of SNEP's computer-based geographic information system (GIS) data. Notes were taken at each meeting to ensure that questions and suggestions from the public were captured, and these were later shared with the full team.

The first public meeting was held in June of 1994 with the release of the SNEP Progress Report. There was limited interaction between the Science Team and the public beyond a formal question-and-answer session. The first SNEP team meeting with the key contacts took place in November of 1994. At this meeting the team learned the importance of public access to scientists: breaks in many instances proved more valuable than the presentations themselves, as participants took the opportunity to discuss issues with scientists directly. Two additional large public meetings were held along with a separate workshop with the key contacts. The key contacts work group helped plan these meetings, which allocated considerable time for interaction between scientists and the public. The key contacts work group was instrumental in providing ideas on how to maximize interactions between SNEP scientists and the public. The public meeting held in February of 1995 focused on introducing the approaches used by scientists in the assessment and discussions of preliminary findings. The full-day meeting began with formal presentations by some of the scientists, including questions from the public. Nearly three hours of the meeting were dedicated to an open workshop format in which attendees were able to engage in discussions with scientists at tables organized by resources and disciplines. Included in this arrangement was an area dedicated to interactive demonstrations of some of SNEP's GIS data. Note takers were stationed at each table to capture the questions and suggestions offered by the public.

In June of 1995 a special workshop was held with the key contacts to solicit ideas regarding the development of policy scenarios. During this workshop, the key contacts were briefed on a list of possible scenarios based on ideas from the public, scientific models, and the team's resource assessments. Attendees were then divided into small groups composed of both scientists and key contacts. Led by SNEP facilitators, the groups discussed concerns and offered suggestions regarding scenario development. Notes were taken on poster sheets. Representatives from each group summarized their discussions to the full group. The dialogues captured were used by the Science Team to expand and refine the development of a suite of scenarios.

The final public meeting, in September 1995, was scheduled to provide sufficient time to incorporate public comment gained during the meeting into the final development of scenarios. This meeting offered an opportunity for the public to understand and evaluate the range of strategies developed to date and for the SNEP scientists to listen to the public's concerns, insights, and suggestions. Scheduling additional time to incorporate public comment allowed the SNEP team greater opportunity to fashion strategies that incorporated local expertise and reflected public concerns. The round-robin type of interaction in which the public conversed with scientists face-to-face—a style first suggested by the key contacts work group for the February public meeting—was repeated in this meeting. Following a few formal presentations by SNEP scientists, participants were given the opportunity to discuss scenarios and findings directly with scientists at tables organized by strategy focus and general resource area. As with previous meetings, notes were recorded at each table to capture the questions and suggestions offered by the public, and these were circulated to the team shortly thereafter.

Reviews. Key contacts and place-based groups also participated in a focused review of SNEP assessment reports in late summer of 1995. Draft assessments were subjected to blind peer reviews and were simultaneously sent to key contacts and place-based groups, on request, for their review and comment. Key contacts and place-based groups asked to co-

ordinate public review of these drafts and were permitted to circulate the draft subproject reports to whomever they chose. In order to limit the number of separate comments on each report, the key contacts and place-based groups were responsible for summarizing responses and returning them to the team within the same time period given to peer reviewers. In a process similar to a formal peer review, team scientists used comments received from the key contacts and place-based groups to inform subsequent revision of subproject reports. Interestingly, though there were extensive requests for individual reports by key contacts and place-based groups, there were only a limited number of reviews returned to the team.

Other Interactions. The formal public involvement strategy just detailed was supplemented by a variety of other interactions between individual scientists on the SNEP team and the public. Interactions were often intended to either inform the public of SNEP or gather specialized knowledge, but they often accomplished both. These included meetings with agencies, private industry, county supervisors, and interest groups, a series of workshops with local experts to assess community capacity and well-being, and other workshops to identify and map late successional forest types.

SUMMARY

The Sierra Nevada Ecosystem Project is drawing to a close, though it is not complete at the time of this writing; nonetheless, some preliminary conclusions can be drawn about the efficacy of the adaptive process employed. First, most scientists, including those who were initially skeptical of interaction with the public, found the public involvement process both instructive and valuable. Many scientists were influenced in a variety of ways by public interaction, and near project end virtually all scientists were positive about exchanges with the public. The ease with which the public involvement team was able to draw scientists to public meetings toward the end of the project compared with the beginning is evidence of this. Further evidence is the nature of exchanges at public sessions: scientist interaction with the public shifted from being didactic and somewhat defensive in early sessions to explanatory and encouraging of mutual exploration of complex issues in the later sessions.

Secondly, though it is impossible to pinpoint specific "public" ideas that influenced scientists' work, it is clear that public involvement influenced the work of the team. Numerous times in SNEP team meetings, a scientist would reference a public comment to reinforce a point or make clear that the issue under discussion must be addressed to respond to public concern. The focus on institutions in SNEP, which emerged late in the project, was driven by a small number of scientists on the team as well as by continued comments and questions in public sessions. Designing a fuels-reduction strategy was reinforced by public comment and interaction with the Quincy Library Group, which had done considerable thinking on its own on this subject. Identification of areas of late successional old growth and determination of community capacity could not have been done without the help of numerous agency and local experts, respectively. The scientific assessments may not have been changed dramatically through public involvement, but interaction with the public often influenced how data were presented and conclusions drawn and, perhaps most profoundly, influenced the development of scenarios.

Thirdly, the adaptive process itself had a significant effect on the involved public, in both their perceptions of the science project itself and their relationships with one another. Individuals who initially felt the project was a waste of time later expressed a genuine concern that the best possible science be used to address the complex social and resource issues in the Sierra Nevada. There was general acknowledgment that much needed to be learned and that scientists were essential in facilitating this learning process. Virtually all participants appreciated being a part of the process and praised the openness of the scientists in listening to their viewpoints. Perhaps most importantly, people who had long been sitting on opposite sides of issues agreed that resolution of complex resource management issues would be achieved only with them working together and not against one another. There appeared to be broad agreement among these participants to continue the dialogue begun in this adaptive process.

Summary of Public Interactions

General public and key contact meetings or workshops:

- June 15, 1994, Steering Committee meeting
- November 21, 1994, Steering Committee / Science Team / key contact meeting
- December 7, 1994, public planning meeting with CURES work group—Sam Doak, Don Erman, Jonathan Kusel, John Menke, Connie Millar, Bill Stewart
- December 8, 1994, meeting with Key Contact Planning Group—Jonathan Kusel and Public Involvement work group, Susan Carpenter, Sam Doak, Vicki Sturtevant
- December 12, 1994, Quincy Library Group (Quincy)—Joan Brenchley-Jackson, Sam Doak, Norm Johnson, Jonathan Kusel, Bill Stewart
- January 19, 1995, CURES planning meeting (Mammoth Lakes)—Sam Doak, Jonathan Kusel
- February 4, 1995, public workshop for MSA Giant Sequoia work group—Debbie Elliott-Fisk and MSA work group
- February 9, 1995, meeting with Key Contact Planning Group—Jonathan Kusel and Public Involvement Work Group
- February 21, 1995, public workshop (Davis)—Science Team and associates

- February 23, 1995, conference call with Key Contact Planning Group—Jonathan Kusel and Public Involvement Work Group
- February 1995, CURES east-side public workshop—Sam Doak, Tim Duane, Rick Kattelmann, Jonathan Kusel, John Menke, Connie Millar, Vicki Sturtevant
- March 1995, call for public input into scenario development—Harrison Dunning
- March 17, 1995, trends of fish, amphibians, and aquatic habitats, UC Davis—Peter Moyle
- April 11, 1995, Quincy Library Group public workshop — Joan Brenchley-Jackson, Sam Doak, Tim Duane, Jo Ann Fites-Kaufmann, Jerry Franklin, Norm Johnson, Rick Kattelmann, Jonathan Kusel, John Menke, Bill Stewart, Vicki Sturtevant
- June 22, 1995, key contacts workshop to discuss scenarios—Science Team
- July 13, 1995, west-central Sierra meeting (Jackson)—Larry Costick, Mike Diggles, Dave Graber, Greg Greenwood, Jonathan Kusel, John Menke
- July 25, 1995, meeting with Key Contact Planning Group—Susan Carpenter, Sam Doak, Jonathan Kusel and Public Involvement Work Group
- September 20, 1995, general public meeting (Sacramento)—Science Team and associates

Presentations and Workshops

- September 1993, Environmental Sciences Policy and Management, UC (Berkeley)—Debbie Elliott-Fisk and Don Erman
- November 1993, Resource Conservation Districts (Mark Hicks and Julie Spezia)—Debbie Elliott-Fisk
- December 2, 1993, Cooperative Snow Survey Conference (Tahoe City)—Rick Kattelmann
- December 1993, Sierra Alliance—Debbie Elliott-Fisk
- December 1993, Resources Agency satellite interactive teleconference—Debbie Elliott-Fisk
- February 1994, TUCARE—Debbie Elliott-Fisk
- February 1994, meeting, Human Dimensions—Science Team
- February 8, 1994, eastern Sierra public (Lee Vining)—Connie Millar
- March 1994, USFS PSW Science Forum (Albany)—Connie Millar
- March 29, 1994, Inyo National Forest (Bishop)—Connie Millar
- March 31, 1994, Lake Tahoe Basin Management Unit—Connie Millar
- April 7, 1994, White Mountain Research Station (Bishop), —Rick Kattelmann
- April 22, 1994, Toiyabe National Forest (Bridgeport)—Connie Millar
- April 26, 1994, Transportation/Roads Workshop—John Menke
- June 1994, Eldorado National Forest management team—Doug Leisz
- July 16, 1994, Sierra Nevada Alliance annual meeting (Mammoth Lakes)—Connie Millar
- September 1994, county planners—Tim Duane
- September 21, 1994, California Biodiversity Council (Yosemite)—Don Erman
- October 1994, El Dorado–Amador Forest Forum—Doug Leisz
- October 10, 1994, Sierra Nevada Industrial Forest Land Owners: California Forestry Association—Don Erman, Harrison Dunning, Norm Johnson, Jonathan Kusel, Doug Leisz, Connie Millar, Rowan Rowntree, Bill Stewart
- October 21, 1994, Sierra Communities Council—Don Erman
- October 28, 1994, key contact members representing environmental interests—Don Erman, Jonathan Kusel, Dennis Machida
- November 1994, California Cattlemen's Association—John Menke, Bill Stewart
- November 1994, Cooperative Snow Survey Conference (Asilomar)—Erin Fleming
- November 1994, USFS–Sequoia National Forest tour for Regional Forester Lynn Sprague (MSA tour)—Debbie Elliott-Fisk
- Fall 1994, University of California Extension Ecosystem Conference—Don Erman, Norm Johnson, Connie Millar
- February 3, 1995, Western Section of the Wildlife Society, annual meeting—Don Erman
- February 3, 1995, MSA signatories, MULC, and associates—Debbie Elliott-Fisk and MSA work group
- February 23, 1995, government conference on the environment—Mike Oliver
- March 3, 1995, California Licensed Professional Foresters Association—Don Erman
- March 8, 1995, Resources Agency and department administrators—Tim Duane, Don Erman, Jonathan Kusel, Connie Millar, Bill Stewart

- April 26, 1995, University of California, Division of Natural Resources, Continuing Conference on the Environment (Granlibakken, CA)—Mike Oliver
- May 25, 1995, Regional Council of Rural Counties (Sacramento)—Don Erman
- June 1995, U.S. Forest Service regional managers (Sacramento)—Mike Oliver
- July 15, 1995, Society of American Foresters: Riparian Grazing—John Menke
- July 17, 1995, California Wool Growers / National Lamb Feeders Association—John Menke
- UC Division of Agriculture and Natural Resources Council of Deans and Directors—Debbie Elliott-Fisk, Don Erman
- Executive Council on Biodiversity—Debbie Elliott-Fisk
- Sierra Summit Steering Committee—Debbie Elliott-Fisk
- State Senate Committee on Natural Resources—Debbie Elliott-Fisk
- California Forestry Association, annual meeting—Debbie Elliott-Fisk
- Quincy Library Group, consulting on model of late successional forests—Jo Ann Fites-Kaufmann, Jerry Franklin

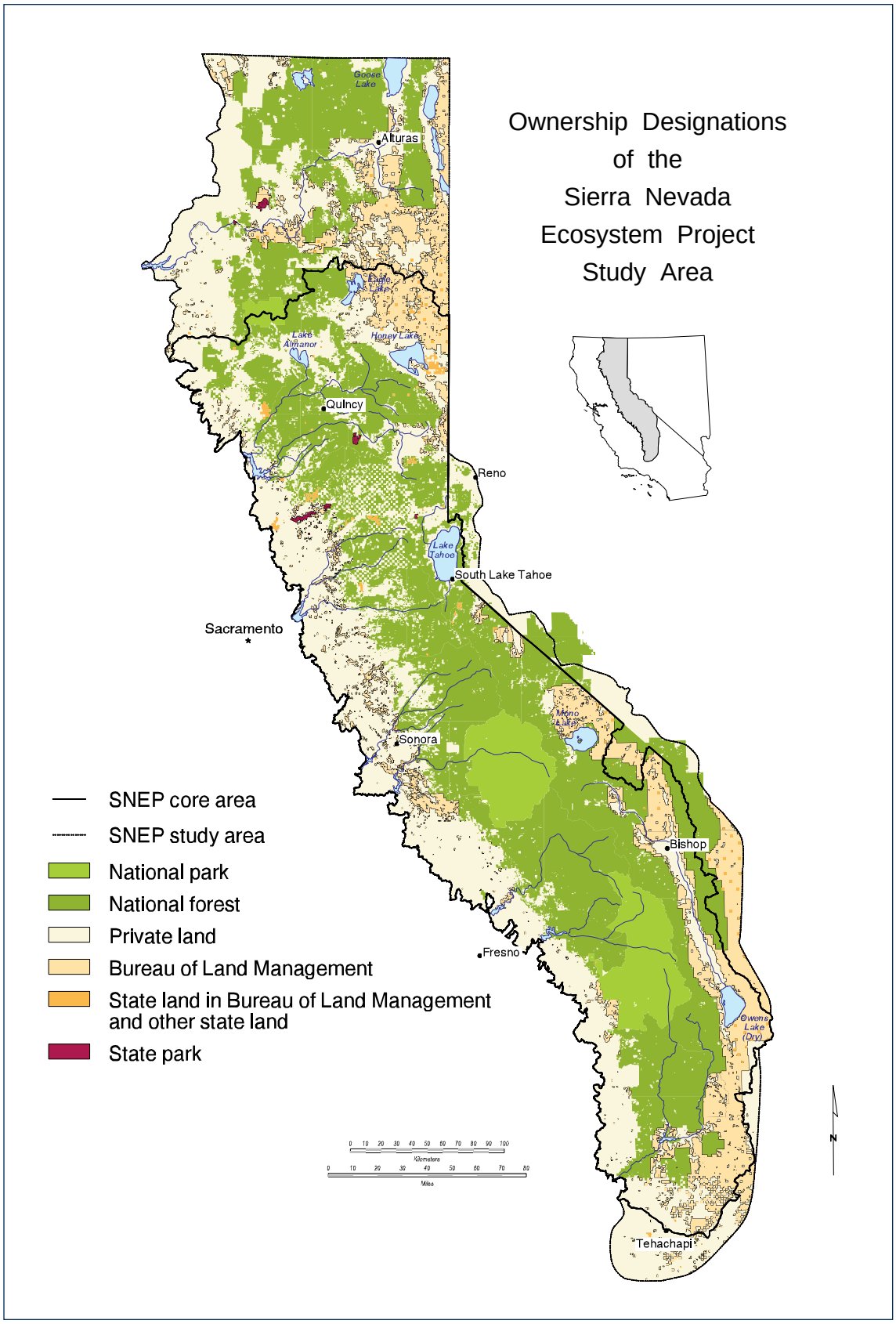
Social assessment workshops were held at the county level (Sam Doak and Jonathan Kusel):

- March 27, 1995, Kern County (Bakersfield)
- April 4 , 1995, Sierra County (Sierraville)
- April 5, 1995, Plumas County (Quincy)
- April 13, 1995, El Dorado County (Placerville)
- May 3, 1995, Mono County (Mammoth Lakes)
- May 4, 1995, Inyo County (Bishop)
- May 4, 1995, Placer County (Auburn)
- May 5, 1995, Greater Lake Tahoe Basin (South Lake Tahoe)
- May 8, 1995, Amador County (Jackson)
- May 9, 1995, Calaveras County (San Andreas)
- May 9, 1995, Tuolumne County (Sonora)
- May 10, 1995, Madera County (Oakhurst)
- May 10, 1995, Mariposa County (Mariposa)
- May 11, 1995, Fresno County (Fresno)
- May 11, 1995, Tulare County (Tulare)
- May 16, 1995, Lassen County (Susanville)
- May 18, 1995, Butte County (Paradise)
- May 22, 1995, Yuba County (Brownsville)
- May 22, 1995, Nevada County (Nevada City)
- May 24, 1995, Tuolumne County, second meeting (Sonora)
- May 1995, Nevada County, second meeting (Nevada City)
- May 1995, Butte County (Oroville)
- June 1995, Sierra County, second meeting (Sierraville)

Case study workshops were held to assess the accuracy of the experts at the county level, working with community experts (Sam Doak and Jonathan Kusel): April 3, 1995, Portola; April 4, 1995, Sierraville; April 5, 1995, Quincy; April 7, 1995, Graeagle; April 12, 1995, Chester; and April 20, 1995, Greenville.

FACA

SNEP is excluded from the regulatory actions of the Federal Advisory Committee Act of 1988 because it was initiated by congressional action and is conducted as a report to Congress. This assertion was challenged in a lawsuit, *California Forestry Association v. U.S. Forest Service* which charged that SNEP was in violation of FACA. District Court Judge Charles Richey concluded in his decision of December 22, 1995, that SNEP did not violate FACA. In arriving at its decision, the court discerned that the congressional intent for SNEP made clear that the project would report to Congress and that both the Forest Service and SNEP subsequently conducted the project in a manner consistent with this interpretation. The fact that SNEP was initiated to provide information and analysis, not a plan for proposed management action, was considered by the court a distinction without a difference, because the Forest Service plans would likely derive, at least in part, from SNEP's report. Judge Richey ruled not only that FACA did not apply to SNEP but also that the Forest Service may use SNEP's final report without fear of violating FACA.



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