MONO COUNTY

MASTER ENVIRONMENTAL ASSESSMENT

2001

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CHAPTER 1
USING MONO COUNTY'S MEA

MONO COUNTY

Mono County is located on the eastern side of the Sierra Nevada. The area's spectacular scenery of high valleys and rugged mountain ranges has made it a popular recreation destination. Approximately 94 percent of the land in the county is publicly owned; as a result, outdoor recreational activities form the economic foundation of the county. The county's population of approximately 10,000 persons lives in small communities spread throughout the county. Approximately half of the total population lives in the town of Mammoth Lakes, the county's only incorporated community.

THE MONO COUNTY MASTER ENVIRONMENTAL ASSESSMENT

The Mono County Master Environmental Assessment (MEA) was originally prepared as part of the County General Plan update process in 1993. The MEA contains all of the background information for the General Plan and serves as a database for the development of General Plan policies. The MEA fulfills General Plan Guideline requirements for information on existing conditions; it also fulfills CEQA requirements for the environmental setting section of an Environmental Impact Report (EIR).

The comprehensive database collected in the preparation of an MEA streamlines the process of preparing future environmental documents. The Mono County MEA contains information on the existing conditions in the county and analyzes the effects those conditions would have on future development. Future projects can benefit from this analysis, as it will lessen the work necessary to prepare environmental documents. MEAs also allow local agencies to update the database as new information becomes available.

LEGAL AUTHORITY FOR MASTER ENVIRONMENTAL ASSESSMENT

CEQA Guidelines (§ 15169) state that public agencies may prepare MEAs for all, or a portion of, the territory subject to their control in order to provide a comprehensive database that can be referenced in future EIRs or Negative Declarations. CEQA guidelines do not contain requirements for the format, content or procedures used in preparing MEAs; MEAs are suggested solely as an approach to identify and organize environmental and other applicable background information.

SUMMARY OF 2001 MEA UPDATE

The 2001 edition of the Mono County MEA includes an extensive update of all the information presented in the MEA. Tables, figures and maps have been revised to reflect up-to-date information. In some cases, tables or figures have been deleted where they are no longer applicable. Furthermore, some updated information has not yet been analyzed (e.g., Chapter 6-Housing).

The document has also been reformatted for easier use. References to Internet sites that provide additional information on topics in the document have been added throughout the text and in the references section.

MEA MAPS

Tables, figures and maps are included in the MEA text where applicable. In addition, information about planning and socioeconomics, physical sciences, biological sciences, and public health and safety is presented on a map set included in Appendix A. Generally, the map set presents information for the following 27 areas of the county:

A. Antelope Valley
B. Devil's Gate/Swauger Creek
C. East Walker River
D. Bridgeport
E. Bodie
F. Mono Lake
G. Cowtrack Mountain
H. Adobe Valley/Benton
I. June Lake
J. Long Valley
K. Hammil Valley
L. Wheeler/Paradise
M. Chalfant Valley
N. Fish Lake Valley
O. Sonora Pass
P. Walker Mountain
Q. Adobe Hills
R. Ansel Adams Wilderness
S. Glass Mountain
T. Mount DuBois
U. Mammoth Lakes
V. John Muir Wilderness
W. White Mountain

In some cases, information on the map sets does not appear on all sheets. That can occur when the information is not available, such as rockfall and landslide hazards for lands on the Humboldt-Toiyabe National Forest where the necessary geotechnical studies have not been done. In other cases, the area may not have the attribute, so the map is blank. This occurs for Flood Hazards on Map E (Bodie). Blank map sheets have not been included in the MEA.

Information for some topics is presented on more-detailed maps (e.g., Special-status Species are shown on 47 maps), while other topics are delineated only on countywide maps (e.g., DFG deer use areas).

SITE-SPECIFIC MONO COUNTY DOCUMENTS

Since the adoption of the General Plan Update in 1993, numerous projects approved provide site-specific land use direction for various areas in Mono County. Many of these documents also contain site-specific studies that provide greater detail on a variety of environmental topics. In addition, a number of studies provide information on a countywide level.

The following documents are incorporated by reference in this Master Environmental Assessment and should be referenced when reviewing the MEA. A footnote has been added to each chapter heading in the MEA as a cross reference to the following list:

Swauger Creek Planning Area

Project:	**Tentative Parcel Map 32** Eight-lot subdivision on 320 acres.
Area:	Swauger Creek/Devil's Gate
Site Specific Studies:	**Wildlife Assessment Study for the Williams Parcel Map, Mono County, CA, 1995.** Tim Taylor

Bridgeport Planning Area

Document:	**Sweetwater Ranch EIR** Mono County Planning Department (prepared by L.K. Johnston and Associates), 1992
Project:	Seven-unit, large-lot subdivision on 163 acres.
Area:	Bridgeport Valley
Site Specific Studies:	**Biological Resources (Wildlife and Vegetation).** William B. Dodge **Sweetwater Ranch Deer Migration Study.** Tim Taylor **Fault Investigation.** Kleinfelder Associates **An Archaeological Survey and Assessment of the Sweetwater Ranch Subdivision, Mono County, CA.** Jeffery F. Burton and Mary M. Farrell **Soil Survey.** USDA, Soil Conservation Service

Bodie Hills Planning Area

Document:	**Draft Environmental Setting and Threshold Recommendations for the Bodie Hills Area Plan** Pacific Environmental Consultants, 1993
Project:	Area Plan
Area:	Bodie Hills
Site Specific Studies:	Provides information on a variety of topics including: Geology, Cultural Resources Wildlife Resources, Air Quality Vegetation, Water Resources Visual Resources
Document:	**Bodie Hills RV Park Specific Plan/EIR** Mono County Planning Department, 2000
Project:	Specific Plan
Area:	Bodie Hills
Site Specific Studies:	**Wildlife Survey.** Tim Taylor **Botanical Survey of the Proposed Bodie Hills RV Park, Mono County, California** Mark Bagley **Traffic Impact Study: Bodie Hills RV Project** Crenshaw Engineering **Hydrology and Flood Plain Study for Bodie Hills RV Park** Denio and Associates Engineering

An Archaeological Survey of the Proposed Bodie Hills RV Park, Mono County, California. Contributions to Trans-sierran Archaeology No. 41
Mary Farrell and Jeffery Burton
Supplemental Botanical Survey for the Proposed Bodie Hills RV Park
James Paulus
Wildlife Assessment Survey at the Bodie Hills RV Park
Tim Taylor

Mono Basin Planning Area

Document: **Tioga Inn Specific Plan/EIR**
Mono County Planning Department, (prepared by Eric J. Toll), 1993
Project: Resort--motel, restaurant, gas station, mini-mart, 10 dwelling units
Area: Lee Vining
Site Specific Studies: **Tioga Inn Vegetation and Wildlife Assessment Study.**
Tim Taylor
Groundwater Resources and Fault Study.
Kleinfelder Associates
Rare Plant and Vegetation Survey of the Tioga Inn Project Area.
Mark Bagley

Document: **Initial Study and Proposed Negative Declaration**
Marzano Sand and Gravel
Mono County Planning Department, 1994
Project: Use Permit and Reclamation Plan Modifications
Area: Rush Creek
Site Specific Studies: **Wildlife Survey.**
Tim Taylor

Document: **Mono Rock Mine Expansion EIR**
L.K. Johnston and Associates, 1999
Project: Use Permit and Reclamation Plan Modifications
Area: Rush Creek
Site Specific Studies: **Wildlife and Vegetation information.**
Resource Concepts, Inc.
Sensitive Plant Species Surveys for the Proposed Expansion of Mono Rock Aggregate Mine, Lee Vining
James Paulus
Deer Habitat Suitability Study for the Mono Rock Reclamation Plan Area, Mono County, California
Tim Taylor
Cultural Resource Study
Jeff Burton

Upper Owens Planning Area

Document: **Arcularius Ranch Specific Plan/EIR**
Mono County Planning Department and Haselton Associates, 1993
Project: Expansion of existing recreational and cattle ranching operations on approximately 1,080 acres
Area: Upper Owens River
Site Specific Studies: **Arcularius Ranch--Wildlife and Vegetation Assessment Study.**
Tim Taylor

	Geotechnical Feasibility Study. Triad Geotechnical Consultants **Cultural Resources of the Arcularius Ranch, Long Valley, CA.** Jeffery F. Burton and Mary M. Farrell

<u>Long Valley Planning Area</u>

Document:	**Lakeridge Ranch Estates Specific Plan/EIR** Mono County Planning Department, 1995
Project:	114-lot single-family residential subdivision
Area:	Crowley Lake
Site Specific Studies:	**Archaeological Review Letter.** Jeff Burton **An Archaeological Survey of an 80-Acre Parcel South of Lake Crowley.** R.L. Kaldenburg and J.E. Reed **Preliminary Geotechnical Investigation for an 80-Acre Parcel in Crowley Lake.** Kleinfelder Associates **Preliminary Soil Surveys.** USDA, Soil Conservation Service **Lakeridge Ranch Estates Mule Deer and Wildlife Assessment Study.** Tim Taylor **Engineer's Report for Mountain Meadows Mutual Water Company.** Triad Engineering **Traffic Impacts for South Landing Road and Pearson Road.** Mono County Planning Department

Document:	**Sierra Business Park Specific Plan and EIR** Bauer Environmental Services, 2000
Project:	Industrial park development
Area:	Long Valley
Site Specific Studies:	**Geotechnical Analysis** Sierra Geotechnical **Biological Resource Analysis** Michael Brandman Associates **Traffic Impact Analysis** Traffic Safety Engineers **Air Quality Analysis**

<u>Wheeler Crest Planning Area</u>

Document:	**Rimrock Ranch Specific Plan/EIR** Mono County Planning Department, 2001
Project:	35-lot single-family residential subdivision
Area:	Wheeler Crest
Site Specific Studies:	**Archaeological Survey and Testing for the Proposed Rimrock Ranch Subdivision, Mono County, California** Jeff Burton **Rimrock Ranch Specific Plan Deer Study** Tim Taylor **Water Resource Assessment, Rimrock Ranch Specific Plan** Team Engineering; Kleinfelder Associates

ADDITIONAL RESOURCES FOR MONO COUNTY

Every effort is made to keep the information in the MEA up-to-date. The nature of some topics makes this difficult to achieve. Additional information sources, many of them available on the Internet, are listed in the reference section and in Chapter 1, Plans and Policies. The current Internet address at the time of printing is listed for these sources; the address may have changed since printing.

CHAPTER 2
PLANNING AND SOCIOECONOMICS

Numerous agencies have plans and policies that affect land use and development in the county on both private and public lands. This chapter provides a brief synopsis of those plans and policies. It also summarizes several collaborative approaches to planning and resource management in the Eastern Sierra.

LOCAL AGENCY PLANS AND POLICIES

MONO COUNTY GENERAL PLAN

California Government Code § 65300 requires each county to "adopt a comprehensive long-term general plan for the physical development of the county."

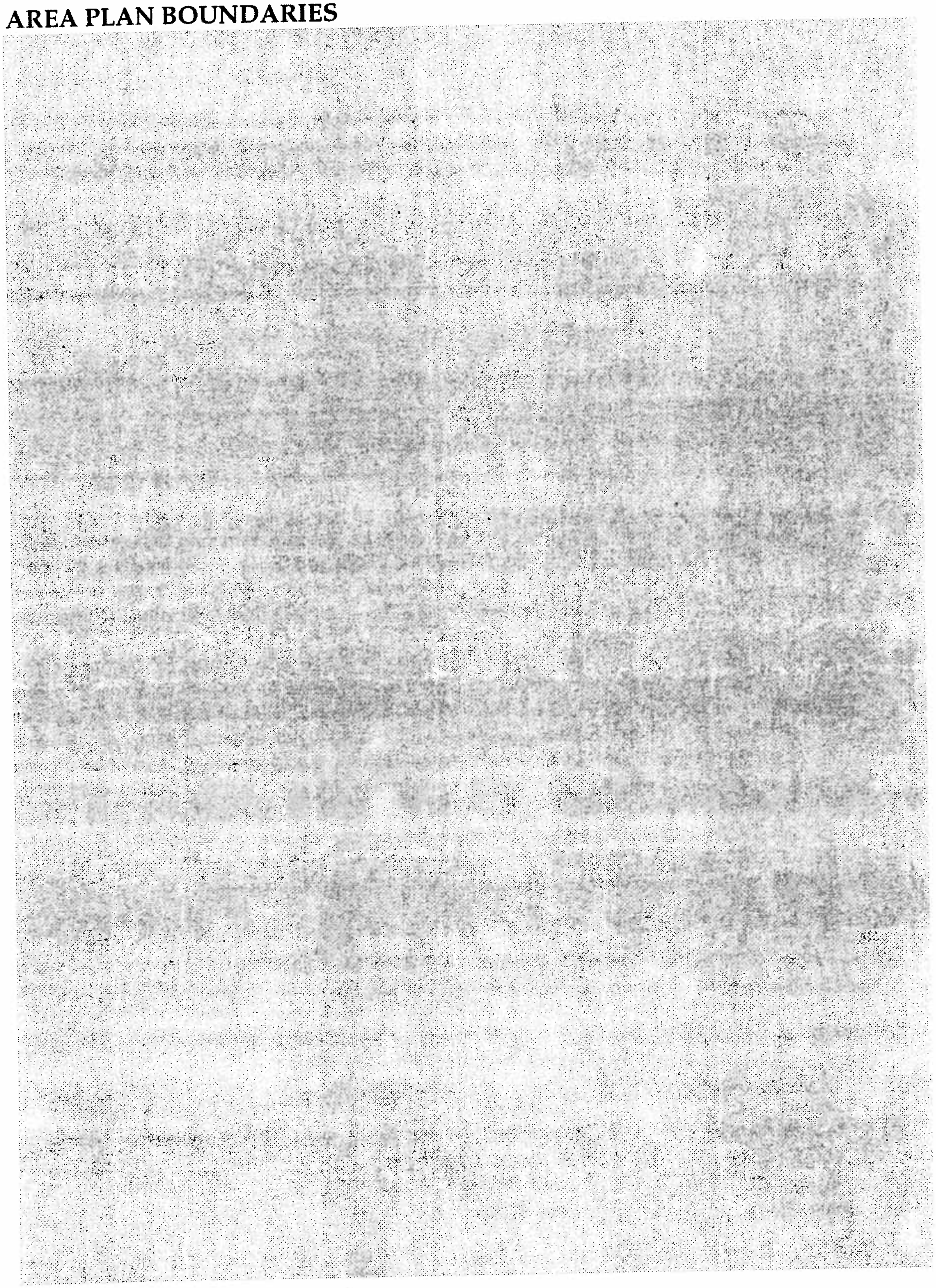
The Mono County General Plan acts as a foundation for all land use decisions; it expresses development goals for the county as a whole and for individual communities and embodies public policy on the distribution of future land uses. The General Plan addresses a broad and evolving range of issues associated with development, including physical, social and economic concerns, in seven mandatory elements: Land Use, Circulation, Housing, Noise, Safety, Conservation and Open Space.

The Mono County General Plan also contains a Hazardous Waste Management Element, prepared in accordance with the State Department of Health Services (DHS) Guidelines for the Preparation of Hazardous Waste Management Plans. The objective of the planning process is "to ensure that safe, effective and economical facilities for the management of hazardous wastes are available when they are needed, and that these facilities are of a type, and operated in a manner, that protects the public health" (California DHS, 1987a). The current Mono County General Plan is a revision of previously adopted general plan elements; it supersedes and replaces those elements. Although the plan covers the entire county, detailed planning focuses on private lands and lands owned by the Los Angeles Department of Water and Power.

AREA PLANS
Area Plans further refine county general plan policies to address the needs of a particular community or area. Area Plans identify issues that are important to the community and establish goals, policies and programs to address those issues. Land use policies for all community areas have been included in the Land Use Element of the County General Plan. The following communities or areas in Mono County have adopted Area Plans:

Antelope Valley	*Mono Basin*	*Wheeler Crest/Paradise*
Swauger Creek	*June Lake*	*Benton, Hammil, Chalfant*
Devil's Gate	*Mammoth Vicinity*	*Oasis*
Bridgeport Valley	*Upper Owens*	
Bodie Hills	*Long Valley*	

FIGURE 1
AREA PLAN BOUNDARIES



Area Plan policies were developed by the Regional Planning Advisory Committees (RPACs) for each community planning area. Figure 1 shows the boundaries of the community planning areas. In addition to the Area Plans, Specific Plans provide detailed direction for implementation of General Plan policies for specific areas throughout the county. Specific Plans have been adopted for a number of parcels in Mono County.

JUNE LAKE REDEVELOPMENT PLAN
A redevelopment feasibility study has been prepared for the June Lake community. The study is an outgrowth of policies contained in the June Lake Area Plan. The study finds that use of redevelopment powers for June Lake is feasible and the establishment of a redevelopment agency and preparation of a redevelopment plan could become a major implementing mechanism for achieving the goals of the June Lake Area Plan (Mono County, 1989).

MONO COUNTY LOCAL AGENCY FORMATION COMMISSION
(Sphere of Influence Reports, Government Reorganization Studies)
The Local Agency Formation Commission (LAFCO) is required to prepare a Sphere of Influence Report for each special district and city in the county. The Sphere of Influence study defines the ultimate service area and boundary of a local agency and recommends future governmental reorganizations. The purpose of these studies is to encourage the orderly formation of local agencies, to discourage sprawl and to preserve valuable open space and agricultural lands. Mono LAFCO has adopted Spheres of Influence for all but one of the approximately 26 local agencies within the county.

The preparation of governmental reorganization studies is a function of LAFCO that is often an outgrowth of Sphere of Influence recommendations. Mono LAFCO conducted a reorganization study for the Benton/Hammil/Chalfant area that ultimately resulted in the reorganization of fire protection agencies in that area.

REGIONAL TRANSPORTATION PLAN (RTP)
Section 65080 et seq. of the California Government Code requires the preparation of Regional Transportation Plans (RTPs) and the update of those plans on a biennial basis. The purpose of a Regional Transportation Plan is to:

- Provide a clear vision of the regional transportation goals, policies, objectives and strategies;
- Provide an assessment of the current modes of transportation and the potential of new travel options within the region;
- Predict the future needs for travel and goods movement;
- Identify and document specific actions necessary to address the region's mobility and accessibility needs;
- Identify guidance and document public policy decisions by local, regional, state and federal officials regarding transportation expenditures and financing;
- Identify needed transportation improvements, in sufficient detail, to serve as a foundation for the: 1) Development of the Federal Transportation Improvement Program (FTIP), the Regional Transportation Improvement Program (RTIP) and the Interregional Transportation Improvement Program (ITIP);
- Facilitate the National Environmental Protection Act (NEPA)/404 integration process decisions;
- Identify project purpose and needs;
- Develop an estimate of emissions impacts for demonstrating conformity with the air-quality standards identified in the State Implementation Plan (SIP);
- Promote consistency between the California Transportation Plan, the regional transportation plan and other transportation plans developed by cities, counties, districts,

private organizations, tribal governments, and state and federal agencies responding to statewide and interregional transportation issues and needs;

- Provide a forum for: 1) participation and cooperation, and 2) to facilitate partnerships that reconcile transportation issues that transcend regional boundaries; and
- Involve the public, federal, state and local agencies, as well as local elected officials, early in the transportation planning process so as to include them in discussions and decisions on the social, economic, air quality and environmental issues related to transportation.

State and federal planning laws require extensive coordination with applicable local, state and federal plans and programs during the development of the RTP. The Mono County Local Transportation Commission (LTC) adopts the RTP. Since 1980, the RTP has also been adopted as the Circulation Element of the County's General Plan.

AIRPORT LAND USE COMPATIBILITY PLANS (ALUPs)

The Airport Land Use Compatibility Plan (ALUP) is a framework for the orderly growth and development of an airport planning area over a 20-year timeframe. Similar to an Area Plan, the ALUP is more specific than the countywide General Plan. Compatibility plans have two purposes:

1. To provide for the orderly growth of each public airport and the area surrounding the airport within the jurisdiction of the Airport Land Use Commission; and
2. To safeguard the general welfare of the inhabitants within the vicinity of the airport and the public in general.

The Mono County Airport Land Use Commission has adopted Airport Land Use Plans for the Mammoth/Yosemite Airport, Bryant Field in Bridgeport and the Lee Vining Airport. The boundaries of those planning areas are shown in Figures 2A, B and C.

FIGURE 2A
AIRPORT LAND USE PLAN (ALUP) BOUNDARIES
BRYANT FIELD AIRPORT

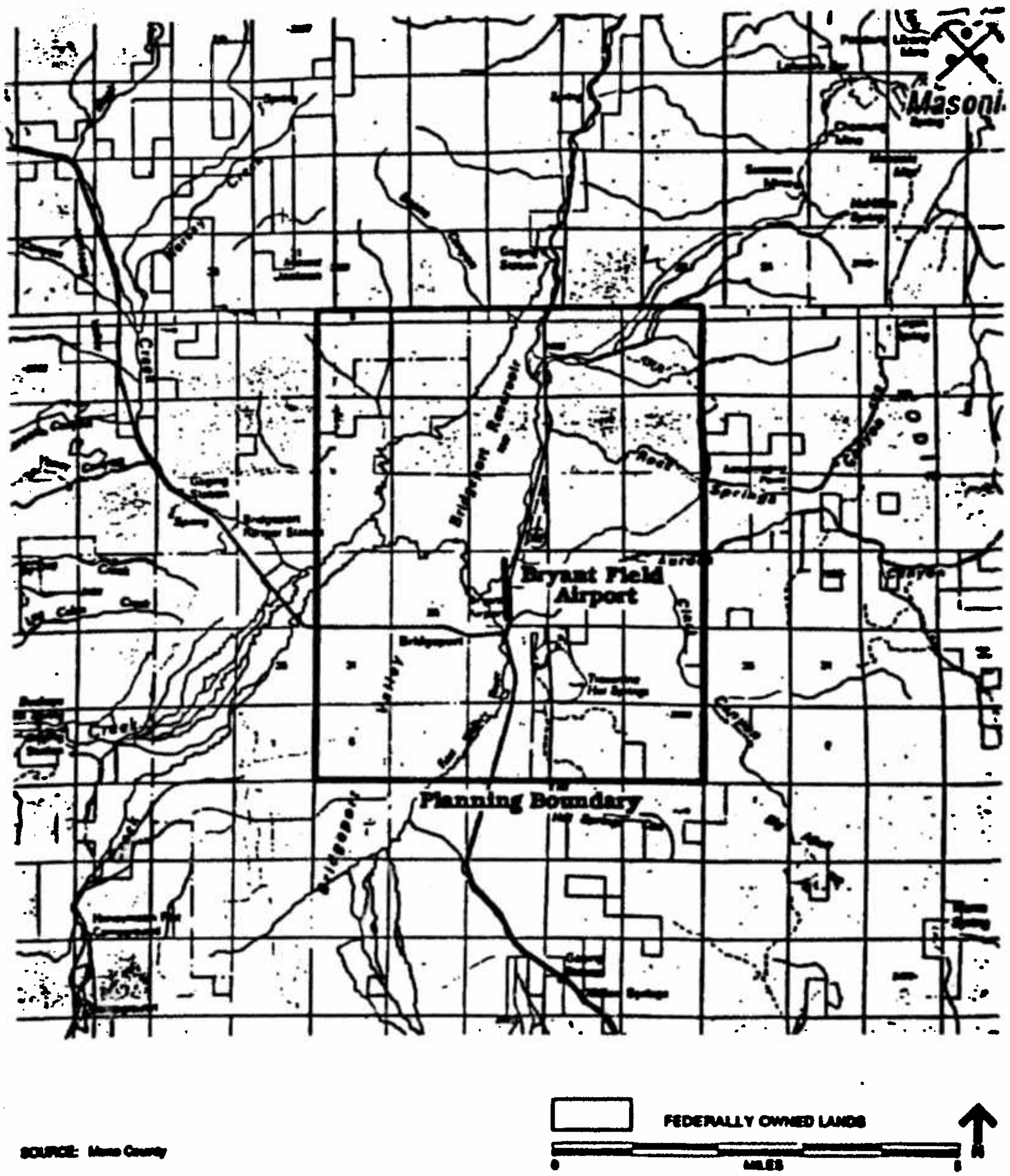


FIGURE 2B
AIRPORT LAND USE PLAN (ALUP) BOUNDARIES
LEE VINING AIRPORT

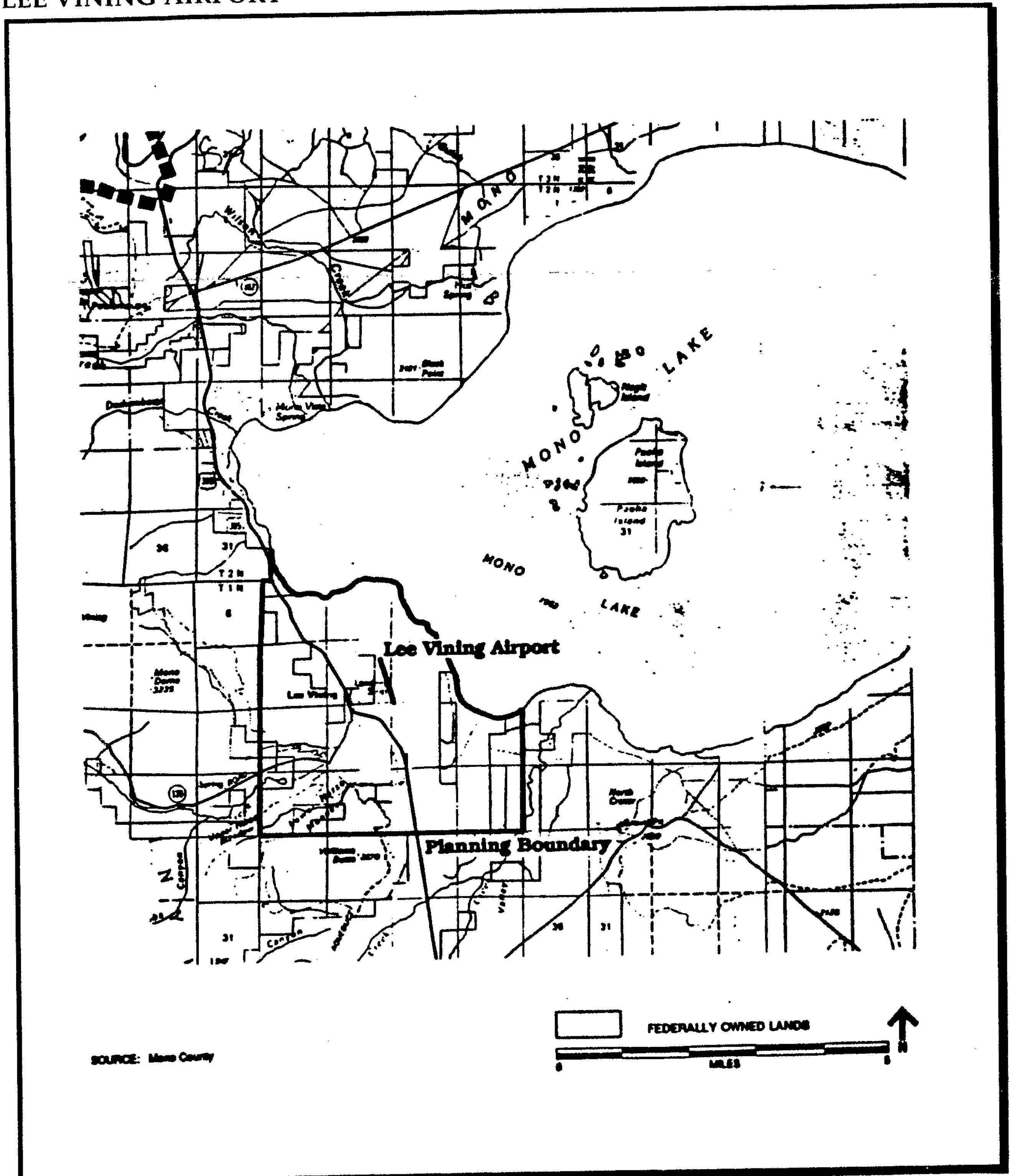
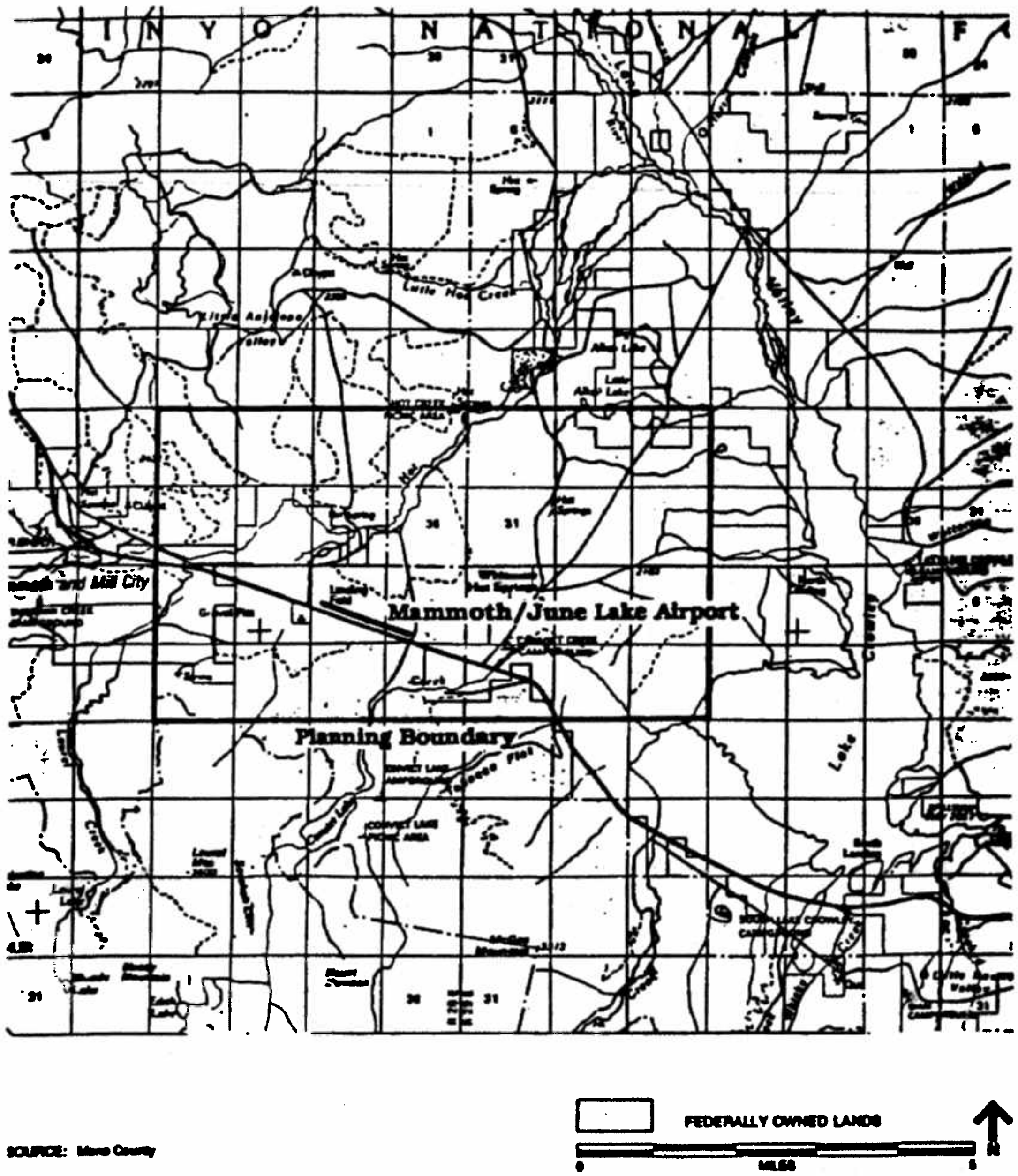


FIGURE 2C
AIRPORT LAND USE PLAN (ALUP) BOUNDARIES



MONO COUNTY SOLID WASTE MANAGEMENT PLAN

The Solid Waste Management and Resource Recovery Act of 1972 requires that each county prepare and implement a Solid Waste Management Plan (SWMP). The County's Land Use Element must reflect the policies of the SWMP, specifically future locations for solid waste disposal facilities. The County is in the process of updating its SWMP (Mono County, 2000).

TOWN OF MAMMOTH LAKES

The Town of Mammoth Lakes' General Plan includes the seven mandatory elements as well as an optional Parks and Recreation Element. The Town is in the process of updating its General Plan.

COLLABORATIVE PLANNING AND MANAGEMENT

[Coalition for Unified Recreation in the Eastern Sierra (CURES) and Mono County Collaborative Planning Team (MCCPT)]

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> Many Sierran ecosystem declines are due to institutional incapacities to capture and use resources from Sierran beneficiaries for investment that sustains the health and productivity of the ecosystems from that benefits derive.
>
> Institutional incapacities arise from four primary sources: (1) fragmented control of ecosystems among different jurisdictions, authorities and ownerships; (2) absence of exchange mechanisms among these entities to sustain rates of investment and cooperative actions that reflect ecosystem values; (3) detachment between those who control ecosystems and communities that depend upon and care for them; and (4) inflexibility in response to rapid changes in population, economy and public interests (SNEP, Vol. I, Ch. 3, p. 48).
>
> The Coalition for Unified Recreation in the Eastern Sierra (CURES) is an informal partnership of recreation providers, chambers of commerce, local businesses, the environmental community, and federal, state and local governments. As its mission, "CURES is dedicated to preserving the Eastern Sierra's natural, cultural and economic resources and enriching the experiences of visitors and residents." (SNEP, Vol. I, Ch. 3, p. 60).
>
> Through their collaborative efforts, CURES members are leveraging dollars, avoiding duplication of effort, and providing high-quality recreation to visitors and residents of the area. In line with achieving their vision, their efforts are working toward a regionally sustainable economy that is linked to the sustainability of the natural environment of the Eastern Sierra (SNEP, Vol. I, Ch. 3, p. 60).

The Mono County Collaborative Planning Team (MCCPT), with members from federal, state and local governments and agencies, has developed a set of Guiding Principles that articulate a shared vision for the future of Mono County and that are intended to be used by member agencies and other entities to plan and manage resources and development in the county.

LOS ANGELES DEPARTMENT OF WATER AND POWER (LADWP or DWP)

[www.ladwp.com]

The LADWP owns approximately 63,000 acres in Mono County, most of that were acquired in the early 1900s in order to gain water rights and an inexpensive water supply for Los Angeles. This land continues to be managed by the LADWP in order to maintain water resource holdings. As a large landowner in Mono County, the Los Angeles Department of Water and Power (LADWP) is subject to all county, state and federal land use policies and regulations.

CALIFORNIA DEPARTMENT OF CONSERVATION, DIVISION OF MINES AND GEOLOGY [www.consrv.ca.gov/dmg]
The Surface Mining and Reclamation Act of 1975 (SMARA) establishes a statewide policy for the conservation and development of mineral lands in California, as well as requirements for permit and reclamation plan approval prior to conducting surface mining operations in the state. Mono County is the lead agency for implementation of SMARA, which pertains both to exploration and production activities. The Mono County Land Development Regulations include a Reclamation Ordinance and a Mining Operations Ordinance. The General Plan contains a Resource Extraction land use designation and Mineral Resource Policies in the Conservation/Open Space Element. State and local mining requirements are discussed further in the section of this document entitled Geology and Soils.

CALIFORNIA DEPARTMENT OF CONSERVATION, DIVISON OF OIL AND GAS [www.consrv.ca.gov/dog]
Any private or public entity proposing to drill, rework or abandon an oil, gas or geothermal well must obtain written approval from the Division of Oil and Gas. The Division issues a specific type of permit for each of these three activities. The purposes of regulation are to prevent damage to underground deposits, to prevent loss of geothermal reservoir energy, to prevent environmental damage to underground and surface waters and to the land surface, to prevent hazardous conditions, and to encourage the wise development of resources. A thermal developer in Mono County would direct inquiries to the headquarters office for District No. 1, located in Sacramento. On federal lands the developer would also require a permit from the Bureau of Land Management or the U.S. Forest Service. Other permits would be required from the Great Basin Air Pollution Control District, the Department of Health, the Department of Fish and Game, the Lahontan Regional Water Quality Control Board, and (on state lands) the State Lands Commission.

CALIFORNIA DEPARMENT OF CONSERVATION, OFFICE OF MINE RECLAMATION [www.consrv.ca.gov/omr]
The Office of Mine Reclamation oversees mine reclamation activities and reviews Reclamation Plans for mines in the county.

CALIFORNIA DEPARTMENT OF FIRE AND FORESTRY (CDF) [www.fire.ca.gov]
The CDF is responsible for wildland fire prevention and suppression on private lands in Mono County. The Department is responsible for overseeing implementation of the Firesafe Regulations (Chapter 22 of the Mono County Land Development Regulations).

CALIFORNIA DEPARTMENT OF FISH AND GAME [www.dfg.ca.gov]
The California Department of Fish and Game (DFG) has the authority to regulate any alteration of "the natural flow or ... the bed, channel or bank of any river, stream or lake designated by the department." Prior to development, developers must obtain a Streambed Alteration Permit from DFG. The Department analyzes these applications based on the impact of the requested alteration on fish and wildlife resources and may suggest mitigation measures, if necessary, to protect the resource.

The Department also administers the California Endangered Species Act, adopted by the California Legislature to conserve, protect, restore and enhance endangered or threatened ("special status") species. The Act prohibits the state or state agencies from approving projects that would jeopardize the continued existence of any endangered or threatened species or destroy critical habitat of such species, unless overriding factors are present, or if reasonable alternatives to the project were available that would prevent such jeopardy. Mitigation and enhancement measures may be incorporated into a project to avoid a finding of jeopardy. The DFG's website provides access to a variety of information relating to wildlife and habitat conservation including information on wetlands, deer habitat, streambed alteration, and the California Natural Diversity Database (CNDDB), that provides information on special-status species.

Lead agencies are required to consult with the DFG and to obtain written findings when preparing an EIR in order to determine the impact of a project on a threatened species. If the DFG determines that jeopardy will result from a project, the DFG must advise the lead agency of reasonable and prudent alternatives to the project. If the recommended alternatives are infeasible, the lead agency may still approve a project if it (1) requires mitigation and enhancement; (2) the benefits clearly outweigh the benefits of the recommended alternatives; (3) no irreversible or irretrievable commitment of resources has been made; and (4) a project will not result in likely extinction of the species.

The DFG administers some public lands in Mono County for wildlife habitat and implements its deer herd management plans throughout the county.

CALIFORNIA DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT [www.hcd.ca.gov]

The California Department of Housing and Community Development is responsible for:

- Administering state and federal housing finance, rehabilitation and economic development programs;
- Promoting the development of housing policies and programs, including the administration of Housing Element law and the development of information on housing need and availability;
- Analyzing, enforcing and participating in the development of building codes, manufactured housing standards, and mobile-home park and employee housing regulations.

CALIFORNIA DEPARTMENT OF PARKS AND RECREATION [www.cal-parks.ca.gov]

The California Department of Parks and Recreation maintains and administers two units of the California State Park System in Mono County. The Mono Lake Tufa State Reserve encompasses approximately 17,000 acres; Bodie State Historic Park contains approximately 495 acres. Each has nearly 200,000 visitors annually. These units provide cultural and natural features not available elsewhere in the State Park System. The Bodie State Historic Park Resource Management Plan, General Development Plan and EIR, adopted in 1979, serves as the guide for park use, maintenance and interpretation. The Department has yet to prepare a management plan for the Mono Lake Tufa State Reserve. The Department's website provides information about the state parks and links to Bodie SHP and the Mono Lake Tufa SR.

CALIFORNIA DEPARTMENT OF TRANSPORTATION [www.dot.ca.gov; Bishop District 9 office — www.dot.ca.gov/dist 9/]

Caltrans develops policies and programs related to the development of state and federal highways in the county, maintains those highways and comments on the potential impacts of projects on the highway system. Staff from Caltrans District 9 office works with the Mono County Local Transportation Commission to update the County's Regional Transportation Plan and to implement state and local transportation plans and policies.

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT (GBUAPCD) [California Air Resources Board — arbis.arb.ca.gov; GBUAPCD not online]

The California Air Resources Board (ARB) regulates mobile sources of air pollutants and coordinates and oversees the activities of the State's regional air quality agencies. The ARB and the regional air quality agencies operate a number of air quality monitoring stations throughout the state. Data collected at these stations are used by ARB to classify areas as "attainment" or "non-attainment" with respect to the federal standards. The ARB also establishes state ambient air quality standards and state emission standards for new vehicles, which in many cases are more stringent than the federal standards. In California, the more stringent of the federal and state standards applies; however, current air quality planning activities are focused on federal ambient air quality standards.

Mono County is under the jurisdiction of the Great Basin Unified Air Pollution Control District (GBUAPCD). As the regional air quality agency, the GBUAPCD is responsible for the development of "non-attainment plans" and has primary responsibility for regulating air pollutant emissions from stationary sources. By authority of its permitting power, the GBUAPCD can impose conditions on new or modified stationary sources. In addition, the GBUAPCD has established secondary source permitting requirements for such developments as ski areas, restaurants, hotels and parking structures that attract substantial motor vehicle traffic. The GBUAPCD has adopted a PM_{10} (10 micron particulate matter) non-attainment plan for the town of Mammoth Lakes and an ozone non-attainment plan for the entire county.

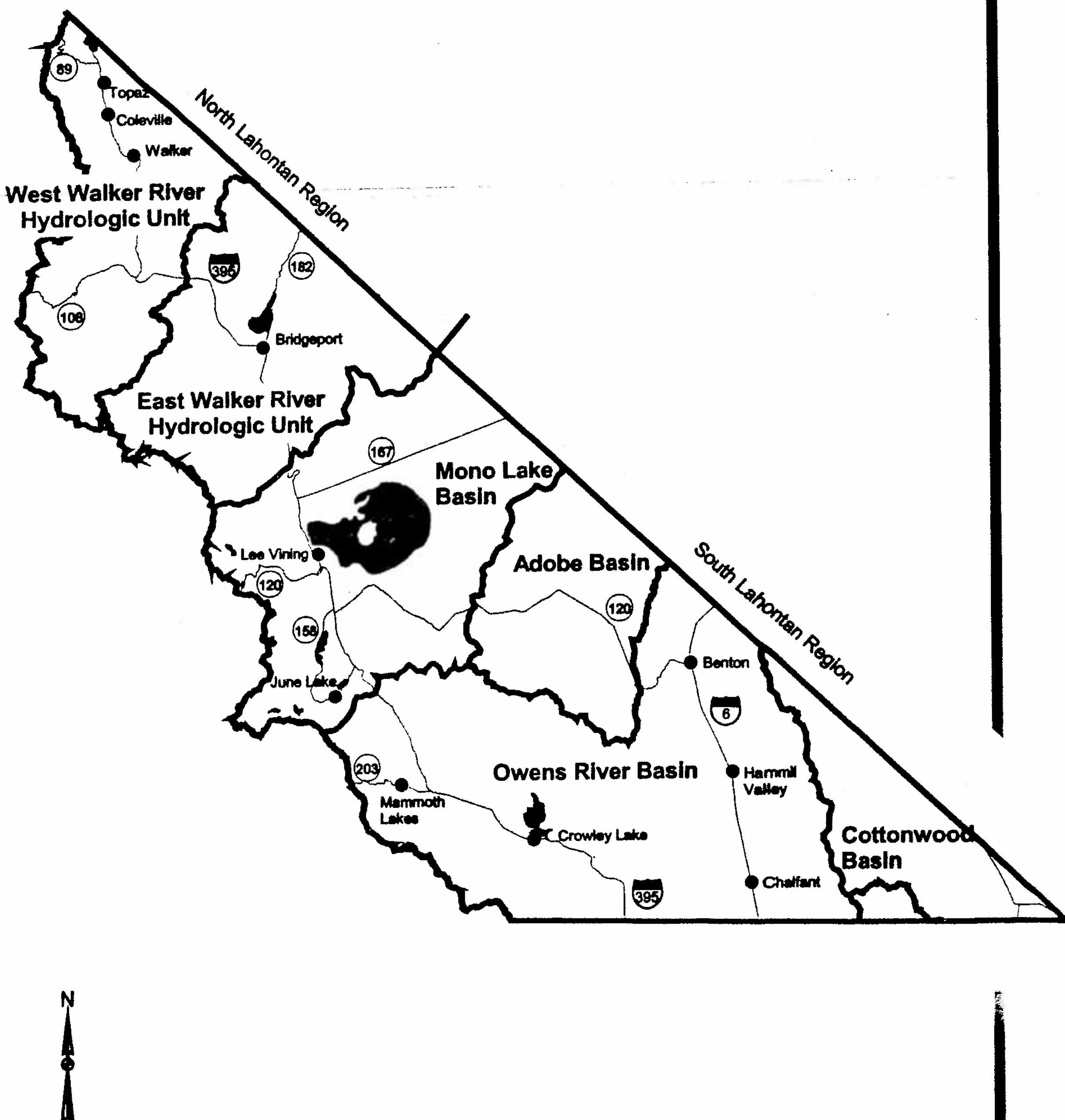
LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD (LRWQCB) [State Water Resources Control Board — www.swrcb.ca.gov; LRWQCB — www.mscomm.com/~rwqcb6/]
The Lahontan Regional Water Quality Control Board (RWQCB) has jurisdiction over water quality in Mono County. The North and South Lahontan Basin Plans address water quality issues in Mono County. The boundary between the North and South Lahontan basins is shown in Figure 3.

The plans specify actions to preserve and enhance water quality and protect beneficial uses for the maximum benefit of the people of the state of California. They specifically consider the unique physical, economic and social conditions of the basins in developing the best practicable water quality management scheme.

The Lahontan RWQCB also administers the National Pollution Discharge Elimination System Permit (NPDES) that applies if more than five acres of site disturbance will occur. For development in areas with wetlands, the LRWQCB administers the 401 permit process.

STATE LANDS COMMISSION [www.slc.ca.gov]
Property owned by the State of California in Mono County includes the "School Lands." When California became a state, sections 16 and 36 of each township were deeded to the State by the federal government to be used for the support of public schools. The State Lands Commission does not have land management plans for its desert holdings because it is not considered feasible to implement plans on isolated sections of land. The Planning Unit in the State Lands Commission responds to planning issues on a case-by-case basis during the EIS/EIR-review stage. Current policy is to seek consolidation of State School Lands by trading, usually with the U.S. Forest Service or the Bureau of Land Management (Shimer, 1986).

FIGURE 3
LAHONTAN DRAINAGE BASINS & HYDROLOGIC UNITS



Mono County GIS, 2001

BUREAU OF INDIAN AFFAIRS (BIA) [www.doi.gov/bureau-indian-affairs]
In 1990, there were approximately 340 Native Americans in Mono County (1990 Census). About 75% belong to federally recognized tribes or communities and live on or near reservations.

Federally recognized tribes in Mono County include the following (SNEP, Vol. II, Ch. 10):

Utu Utu Gwaitu Paiute
Benton Paiute Reservation
Population: 82
Land Base: 410 acres
Executive Order July 22, 1915 recognized the tribe. The tribe purchased 2.5 acres of land using HUD grant funds on August 24, 1984. Two hundred and fifty acres of land were transferred to the tribe from adjacent BLM lands through administrative order of the Secretary of the Interior in 1995.

Bridgeport Paiute Indian Colony
Bridgeport Rancheria
Population: 53 on the reservation, 26 adjacent
Land Base: 80 acres
Public Law 93-451 established rancheria October 18, 1974. Forty-one acres of adjacent BLM land were transferred through administrative order of the Secretary of the Interior in 1995.

The **Mono Lake Indian Community of Lee Vining** was seeking federal recognition as of 1995.

"Tribal governments, Indian communities and individual Indian people must be considered separately from the general population under a suite of federal and state laws dealing with environmental analysis, religious freedom, archaeological sites and protection of Native American human remains. Because federally recognized Indian tribes have a government-to-government relationship with the United States, they are not subject to state or county jurisdiction in most matters. Federal laws, such as NEPA, apply to land held in fee-simple title by Native Americans, but not necessarily to lands held in trust for a tribe by the federal government" (SNEP, Vol. II, Ch. 10).

The Bureau of Indian Affairs (BIA) is the federal agency with primary responsibility for working with Native American tribal governments. Other federal agencies may deal with native peoples as members of an ethnic group or simply as individuals; the BIA deals with native communities as governments.

The primary goal of the BIA, under a U.S. policy of self-determination, is to encourage and support tribal self-governing efforts and to provide needed programs and services on the reservations. One of the principal programs of the BIA is administering and managing land held in trust by the United States for Native Americans. Developing forest lands, leasing mineral rights, directing agricultural programs and protecting water and land rights are included in this responsibility. Tribal governments also hold some decision-making roles in land use.

BUREAU OF LAND MANAGEMENT (BLM) [www.blm.gov; www.ca.blm.gov (California office); www.ca.blm.gov/bishop (Bishop office)]
The Bureau of Land Management manages 554,215 acres within Mono County. BLM boundaries are shown in Figure 4. The Resource Management Plan (RMP) for the Bishop Resource Area

includes BLM lands in Mono County west of the White Mountains. The plan focuses on four issues—recreation, wildlife, minerals, and land ownership and authorizations—and addresses several additional concerns including cultural resources, fuelwood harvesting, livestock grazing and fire suppression. The overall purpose of the plan is to develop the best estimate of multiple use management for BLM lands.

NATURAL RESOURCES CONSERVATION SERVICE [www.nrcs.usda.gov]
The Natural Resources Conservation Service (formerly the Soil Conservation Service) is responsible for a variety of programs to assist people with conservation needs, including the following:

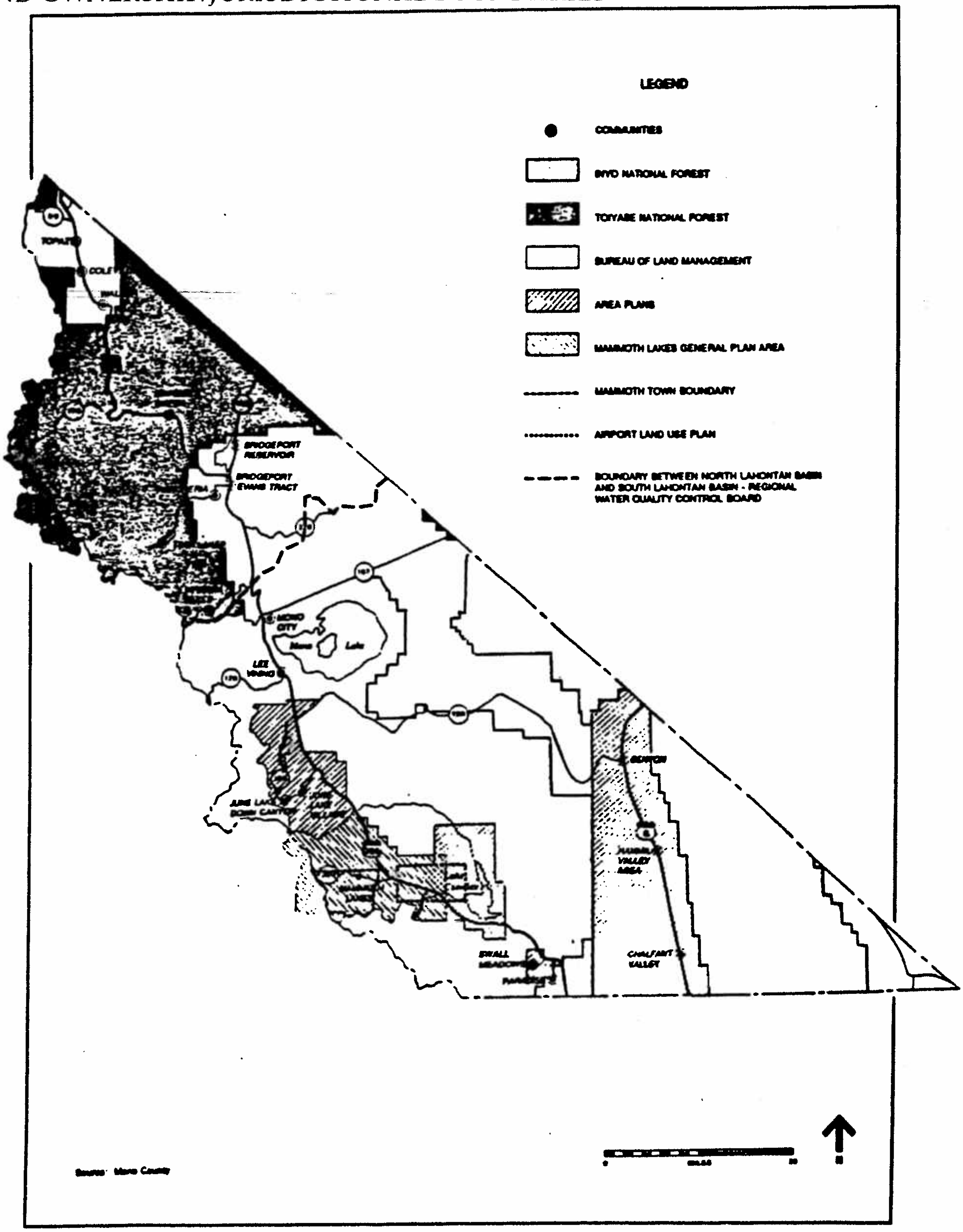
Soil Survey Program;
Watershed Surveys and Planning;
Watershed Protection and Flood Prevention Operations;
Grazing Lands Conservation Program;
Wetlands Reserve Program; and
Resource Conservation and Development.

U.S. ARMY CORPS OF ENGINEERS [www.usace.army.mil/]
A U.S. Army Corps of Engineers Section 404 (Clean Water Act) permit, often called a "404" permit, must be obtained by any person or public agency proposing to discharge dredged or fill material into waters of the United States, including wetlands. Fill material can include sand, gravel, dirt, clay and stone.

The River and Harbor Act of 1899 (Section 10) gives the Corps permit power over activities in navigable waters. Typical activities that require Section 10 permits include artificial canals, artificial islands, beach nourishment, boat ramps, breakwaters, bulkheads, dams, dikes and weirs. Navigable waters originally were defined as those suitable for commercial transport. Court decisions have widened the definition of navigable waters and have expanded the Corps' regulatory jurisdiction. "Navigable waters" now include rivers, adjacent wetlands, lakes and intermittent streams that, under specified conditions, are tributary to navigable waters.

A public or private landowner in Mono County who suspects that wetlands may occur on a site proposed for development should obtain a determination from the appropriate District Office of the Corps regarding the extent of "jurisdictional" wetlands on the property. The Corps evaluates projects by weighing the economic benefit of the proposal against any adverse impacts. The analysis involves a broad range of issues including public safety, water quality, land use impacts, historical value, and conservation and wildlife. Projects proposed in certain wetland areas, but are not water dependent, may be subject to an extensive alternatives analysis before being approved or rejected. The current nationwide policy of no net loss of wetlands is being rigorously implemented by the Corps and commenting agencies.

FIGURE 4
LAND OWNERSHIP/JURISDICTIONAL BOUNDARIES



U.S. FISH AND WILDLIFE SERVICE [www.fws.gov]
The Fish and Wildlife Coordination Act calls for consultation from U.S. Fish and Wildlife Service (USFWS) regarding impacts on migratory birds, wetlands, and other fish and wildlife resources from federally funded or permitted projects that may affect streams and water bodies, such as those permitted under Section 404 and Section 10. The Federal Endangered Species Act, like the California Act, protects plant, fish and wildlife species and their habitats, listed as threatened or endangered, and determines critical habitats for such species. Consultation is required on both private and public projects to determine whether the continued existence of the affected species will be jeopardized.

U.S. FOREST SERVICE-- HUMBOLDT-TOIYABE NATIONAL FOREST [www.fs.fed.us/htnf]
The Humboldt-Toiyabe National Forest contains 381,350 acres within Mono County. Its boundaries are shown on Figure 4. These lands are managed in accordance with the Toiyabe National Forest Land and Resource Management Plan (LRMP), adopted in 1986. The Toiyabe National Forest LRMP:

1. Establishes management direction for the Toiyabe National Forest;
2. Evaluates existing conditions in the forest and identifies issues, concerns and opportunities;
3. Specifies qualitative and quantitative standards and guidelines and approximate timing and location of actions necessary to achieve management direction;
4. Sets monitoring and evaluation requirements to measure progress toward goals; and
5. Creates multi-year implementation programs based on the plan that are translated into multi-year budget proposals.

The Humboldt-Toiyabe Forest is divided into 12 management areas. Each area is composed of contiguous lands with similar topography, geology and land and resource uses. The LRMP contains a description of each management area, the management directive and activities and specific standards and guidelines that apply to each area. All or part of the following management areas are within Mono County:

Alpine	Walker	Bridgeport Pinon-Juniper	Existing Wilderness

U.S. FOREST SERVICE -- INYO NATIONAL FOREST [www.r5.pswfs.gov/inyo]
The Inyo National Forest contains 814,592 acres within Mono County. Its boundaries are shown on Figure 4. These lands are managed in accordance with the Inyo National Forest Land and Resource Management Plan (LRMP), adopted in 1988. The Inyo LRMP is organized in a format similar to that used by the Toiyabe LRMP.

All or part of the following management areas on the Inyo National Forest are included within Mono County:

Mono Basin	Mammoth Escarpment	Upper Owens River	Glass Mountain
Lee Vining	Mammoth	Rock Creek /Pine Creek	Benton/Casa Diablo
Walker-Parker	Red's Meadow-Fish Creek	Pizona	
June Lake Loop	Convict /McGee	White Mountains	

CHAPTER 3
LAND USE*

SETTING

Mono County is located on the eastern slope of the Sierra Nevada, south of Lake Tahoe. The county is a long, narrow strip of land—108 miles at its greatest length and 38 miles in average width—bounded to the west by the Sierra crest and to the east by the Nevada state line. Although there are several mountain ranges in and adjacent to the county, the Sierra Nevada dominates the landscape—the predominant feeling throughout the county is one of space and panoramic views opening eastward from the Sierra.

Human use and development of the area has been influenced by its isolation and the difficulty of access. Access remains limited to one main transportation route, U.S. Highway 395, which runs through the county along the foot of the Sierra for approximately 120 miles. By car, Los Angeles is approximately 350 miles south on U.S. 395, Reno, Nevada, is 160 miles north on U.S. 395, and the San Francisco Bay Area is approximately 300-350 miles west on various routes connecting to U.S. 395. Two highways, State Route 167 and U.S. Highway 6, provide access to Nevada from the central and southern portions of the county. Access both to the east and the west may be closed in winter due to snow—U.S. 395 then becomes the only access to and through the county.

Mono County is rural and sparsely settled, with 9,956 residents in the 1990 Census. One half of the county's population (4,785 people in 1990) lives in the town of Mammoth Lakes, the only incorporated community in the county. The remainder of the population lives in a number of small communities scattered throughout the county. Approximately 94% of the land in the county is publicly owned; the Forest Service and the Bureau of Land Management manage much of it. The Los Angeles Department of Water and Power also owns large parcels of land in the southern portion of the county.

LAND OWNERSHIP PATTERNS

Land use within the unincorporated area of Mono County is highly constrained by land ownership. Approximately 94% of the land in the county is publicly owned; 88% is federally owned and the State, the Los Angeles Department of Water and Power, or Native American tribal groups own the remainder. Most private lands within the county are concentrated in community areas, with the remainder dispersed throughout the county in small parcels. Within existing community boundaries, some communities have limited land available for additional development; expansion of some communities beyond existing boundaries is limited by the public ownership of surrounding lands. Development of new communities throughout the county is limited by the lack of large concentrations of private lands outside existing communities; those parcels of private land that are large enough for development are in many cases agricultural lands and are not available for development.

Land use planning in the county is fragmented due to the pattern of land ownership. The federal land management agencies have planning authority on federal lands; the Town has planning authority for the incorporated area; and state agencies have planning authority on state lands.

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*Refer also to the section on "Plans and Policies" for cross-references to other documents that may provide additional site-specific land use information.

TABLE 1 LAND OWNERSHIP

	Acres	Square Miles	Percent
Inyo National Forest	814,592	1,273	41
Humboldt-Toiyabe National Forest	381,350	596	19
Bureau of Land Management	554,215	866	28
Los Angeles Department of Water and Power	62,678	98	3
State (State School Lands, DFG Lands, State Parks)[a]	42,412	66	2
County	507	.8	<1
Private--Town of Mammoth Lakes	2,200	3	<1
Private--Unincorporated	127,996	200	6
TOTAL Area	1,985,950	3,103	100[b]

NOTES: Acreage figures are current as of April 1992.
Total area in the county is 3,103 square miles (1,985,950 acres). Land area is 3,028 square miles (1,937,920 acres); water area is 75 square miles (48,030 acres)

a. State School Lands Acreage = 9,178; DFG Acreage = 15,739; State Parks Acreage = 17,495 (Bodie State Historic Park = 495, Mono Lake Tufa State Reserve = 17,000)

b. May not add to 100% due to rounding.

The County has only limited environmental authority on the federally owned lands managed by the Forest Service and the BLM; for minerals development, the County is the lead agency for compliance with the requirements of SMARA. The County has planning authority on DWP lands, and any development on those lands must comply with CEQA and the County's environmental review process. Development on DWP lands is a key issue since much of the land that DWP owns is environmentally sensitive; e.g., wetlands and critical wildlife habitat.

Since the County has direct planning authority over only a small percentage of the lands in the county, it must work with other land managers to manage the natural resources in the area in a coordinated and standardized manner, and to conserve natural resources while at the same time providing for community needs. Although the Land Use Element assigns land use designations to all of the land within its planning area, the focus of the planning effort is the privately owned unincorporated lands within the county. Land use designations have been developed to reflect federal land use designations and to complement the land use designations used by the Town of Mammoth Lakes.

EXISTING LAND USE

Land ownership, along with topography and other natural characteristics of the area, dictates land use patterns in Mono County. Since 94% of the land in the county is publicly owned, much of the land remains open space and is used for a variety of purposes.

A general pattern of development recurs throughout the county; residential and commercial uses are concentrated in small communities located in the valleys, the valley floors are used for grazing and croplands, mining occurs in the mountains, and recreational uses are dispersed throughout the county. Most of the development in the county is low density; the most intense development occurs in the town of Mammoth Lakes.

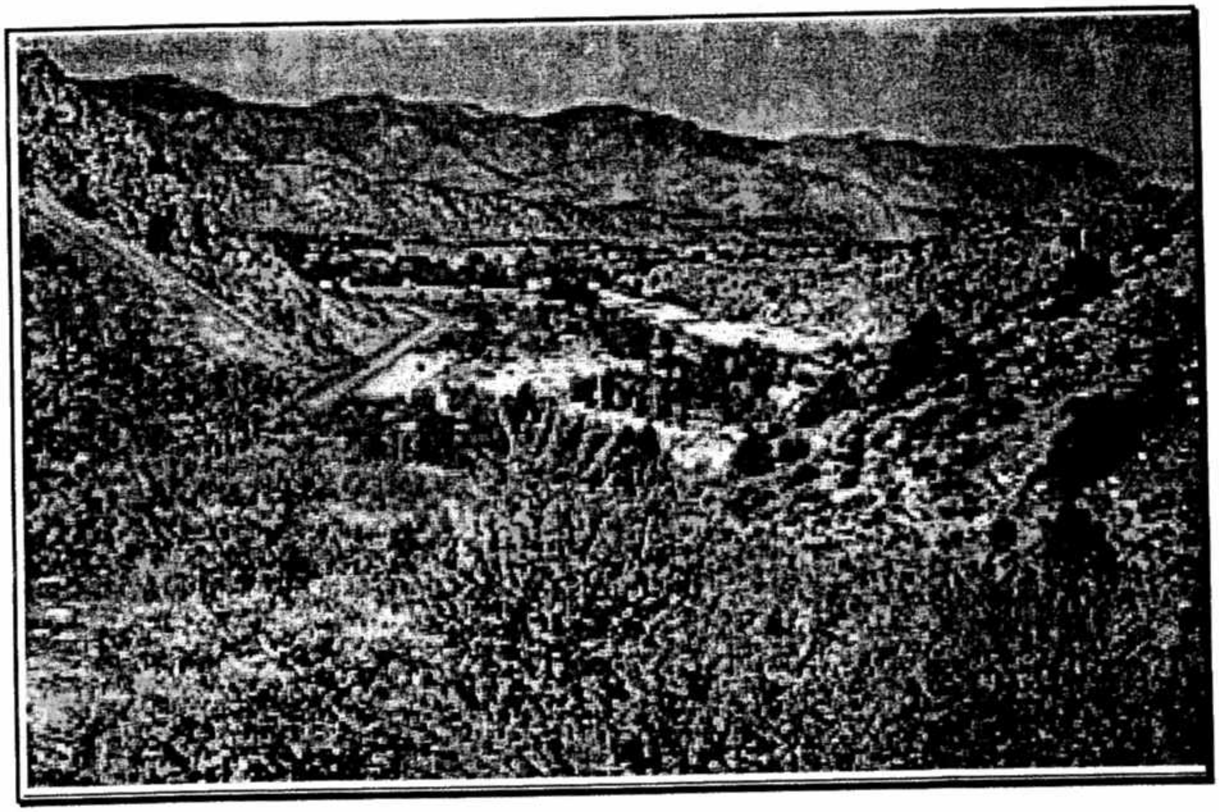
Outside of community areas, private lands are used for mining, grazing, resort and recreational developments. There is some residential development on private lands in the Devil's Gate-Swauger Creek area. Elsewhere in the county, residential developments have been proposed for large parcels of privately owned land such as Conway Ranch. Currently, no development has occurred at these sites.

Public lands throughout the county are used for a variety of recreational uses, including fishing, hunting, camping, alpine skiing, Nordic skiing, off-road vehicle use, snowmobiling, hiking, horseback riding, biking and sightseeing. The County operates several campgrounds and parks in addition to those operated by the Forest Service and the BLM. Figure 5 shows the location of these facilities (see Appendix A). Public lands in some areas are also used for livestock grazing, timber production, fuelwood cutting and mining.

COMMUNITY LAND USE

The following section outlines existing land use in each of the community areas and discusses environmental constraints that may affect the development potential of private lands in each of those areas. Some environmental constraints, such as the presence of cultural resources, have not yet been as well identified. They may become more evident as the development potential of specific sites is studied. Maps showing the environmental constraints discussed below are included in other sections of this document.

Antelope Valley



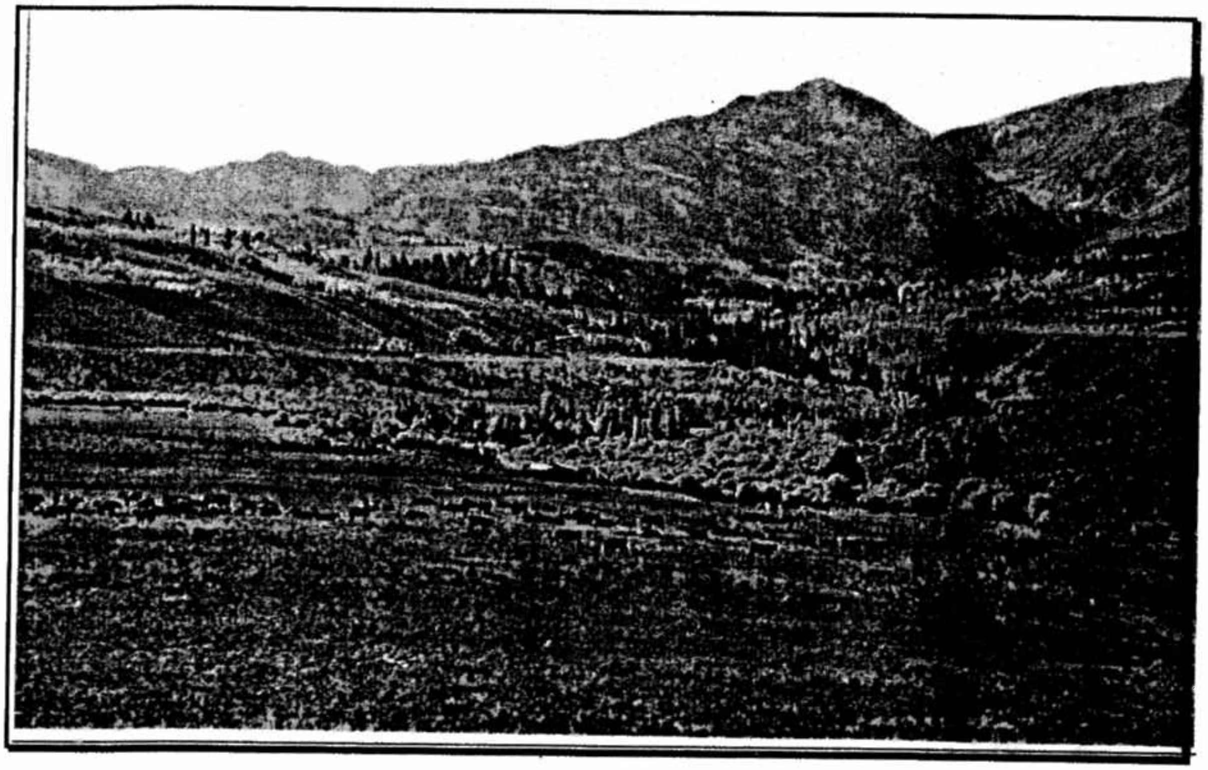
West Walker River in the Antelope Valley.

The Antelope Valley is located at the northern end of the county. The West Walker River flows through the valley floor to Topaz Lake, a man-made reservoir straddling the California-Nevada state line. The river is diverted for irrigation purposes throughout the valley; most of the valley floor is used for agriculture, livestock grazing and alfalfa growing. The valley includes the communities of Walker, Coleville and Topaz.

Land use within the communities is predominantly residential, with some limited commercial and lodging development and scattered public uses. The community of Walker includes residential uses, a county roadyard, a few lodges and restaurants, limited commercial development, a county landfill (on BLM land), a county park, community center and ball fields. Coleville includes residential uses, a high school, a privately operated cemetery, a branch library and housing for the U.S. Marine Corps facility at Pickel Meadow. Land use in Topaz is primarily residential. Sewer and water services throughout the valley are provided by individual wells and septic systems. The Antelope Fire Protection District provides fire protection.

Development in the valley may be affected by the presence of shallow groundwater throughout the valley, the existence of a groundwater basin and recharge zone in the area, the presence of fault-rupture hazard zones (Alquist-Priolo zones) along the west side of the valley, the existence of deer migration zones and habitat in the area, and the presence of flood zones throughout the valley.

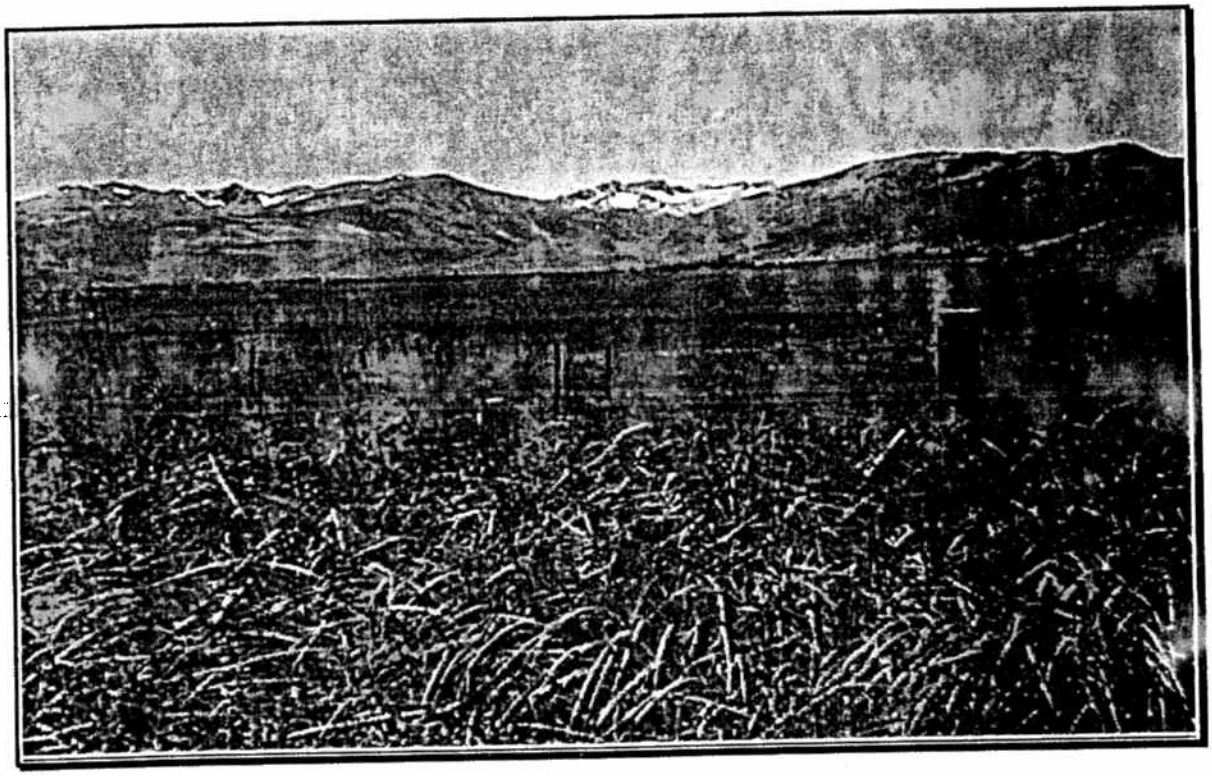
Swauger Creek, Devil's Gate



View from U.S. 395 near Sonora Junction.

The Swauger Creek/Devil's Gate planning area includes 5,200 acres of privately owned land located between Bridgeport and Walker Canyon. The area is generally characterized by steep mountainous terrain, foothills of more moderate grade, and wet meadow lowland areas throughout the Swauger watershed. Scenic vistas are abundant throughout the planning area, and the environment is the principal summer range for the Walker deer herd. The area is currently undergoing a change in use from traditional agricultural and public recreation to residential development. Single-family residential development is the primary land use in the area.

Bridgeport Valley



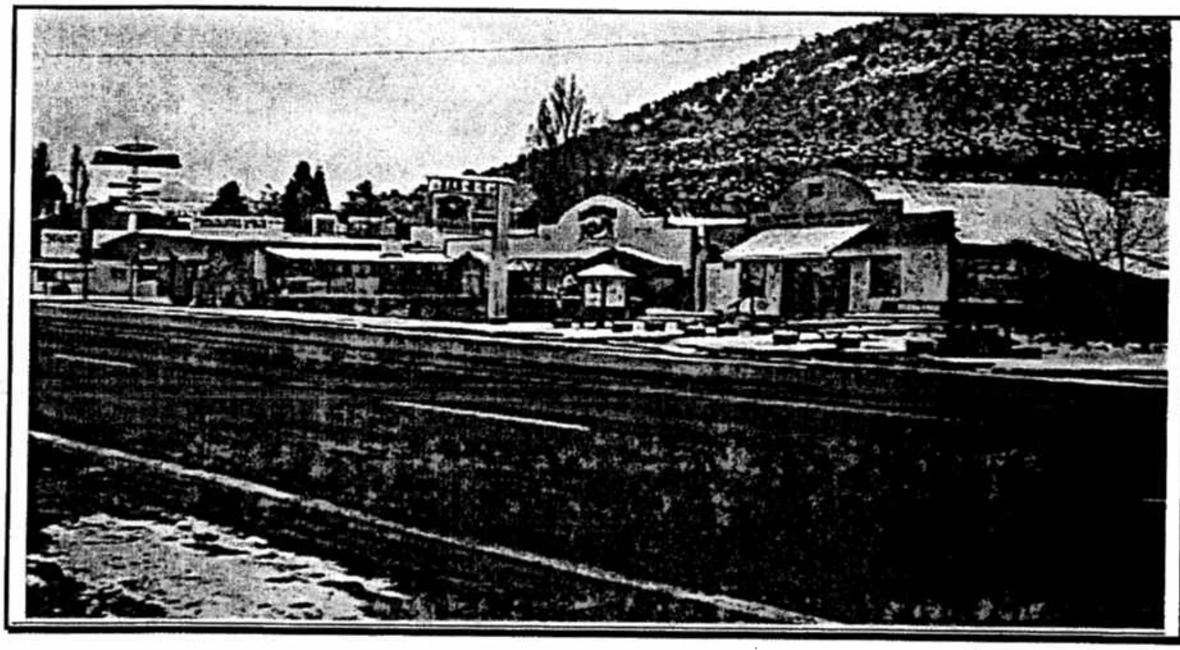
Agricultural lands in Bridgeport Valley.

The community of Bridgeport is located at the northern end of the Bridgeport Valley, adjacent to the Bridgeport Reservoir. Land use within Bridgeport includes residential and commercial uses, an elementary school, Mono General Hospital, the Bridgeport museum, a county park, community center and ball fields, the county government offices, the county jail, a county roadyard and maintenance facilities, a county landfill (on BLM land), an airport, a county-operated cemetery, the Bridgeport Quarry materials pit (on BLM land), and the USFS Bridgeport Ranger District offices. Water and sewer services are provided to most of the community by the Bridgeport Public Utility District (PUD). Development outside the PUD is served by individual wells and septic systems. The Bridgeport Fire Protection District provides fire protection.

The Bridgeport Valley is irrigated pastureland and is heavily used for grazing livestock; several ranches are located in the valley. The East Walker River is diverted for irrigation as it flows through the valley. Twin Lakes at the south end of the valley has been developed as a resort and second-home area. Development on private lands at Twin Lakes has been curtailed by recent changes in Lahontan's requirements for septic installations.

Development in the Bridgeport Valley may be affected by the presence of shallow groundwater throughout the valley, by wetlands, by the existence of a groundwater basin and recharge zone in the area, by the presence of fault-rupture hazard zones (Alquist-Priolo zones) throughout the the valley, and by the presence of flood zones at Twin Lakes, Bridgeport Reservoir, and throughout the valley.

Mono Basin



Downtown Lee Vining.

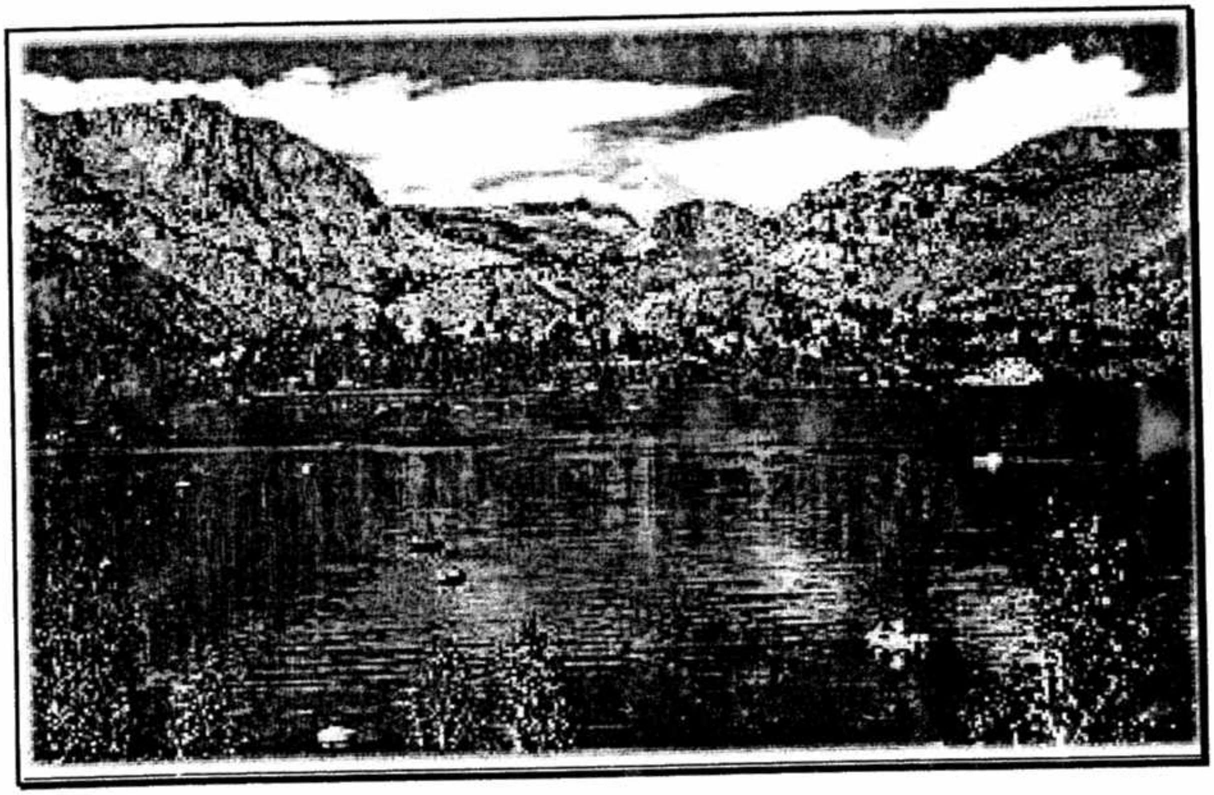
Mono Basin includes the communities of Lee Vining and Mono City. Mono City is a residential subdivision located north of Mono Lake, adjacent to the boundaries of the Mono Basin National Forest Scenic Area. Water for Mono City is provided by a community water system; sewer is provided by individual septic systems. The Mono City Fire Protection District provides fire protection. The Black Point Cinder Mine is located southeast of Mono City, on Forest Service land on the north shore of Mono Lake.

Lee Vining is located on U.S. Highway 395 at the southwest corner of Mono Lake. The community includes residential areas, an elementary school, a high school, a county park, a museum, a roadyards for Caltrans and the County, several lodging facilities and restaurants, limited commercial development, and the USFS Mono Basin Visitor Center. The USFS Mono Basin Ranger District Office is located just south of the community in Lee Vining Canyon. The Lee Vining Public Utility District provides water and sewer services; fire protection is provided by the Lee Vining Fire Protection District.

South of Mono Lake and Lee Vining, the Los Angeles Department of Water and Power (DWP) owns large parcels of land. Much of this land is leased for grazing. The county's Pumice Valley landfill is located on DWP land in this area. There are also three materials pits in this area; the Marzano and Hunewill pits are located on DWP land, the Horse Meadows pit is located on Forest Service land.

Development in the Mono Basin region may be affected by the presence of a number of special-status species and special habitats in the area, use of the area by mule deer for summer range and migration corridors, the existence of a fault-rupture hazard zone (Alquist-Priolo zone) running along the foot of the Sierra and through Lee Vining, and the presence of a flood zone along Lee Vining Creek. Development of private lands within the Mono Basin National Forest Scenic Area is governed by the Private Land Development Guidelines, which are a part of the Comprehensive Management Plan for the area.

June Lake

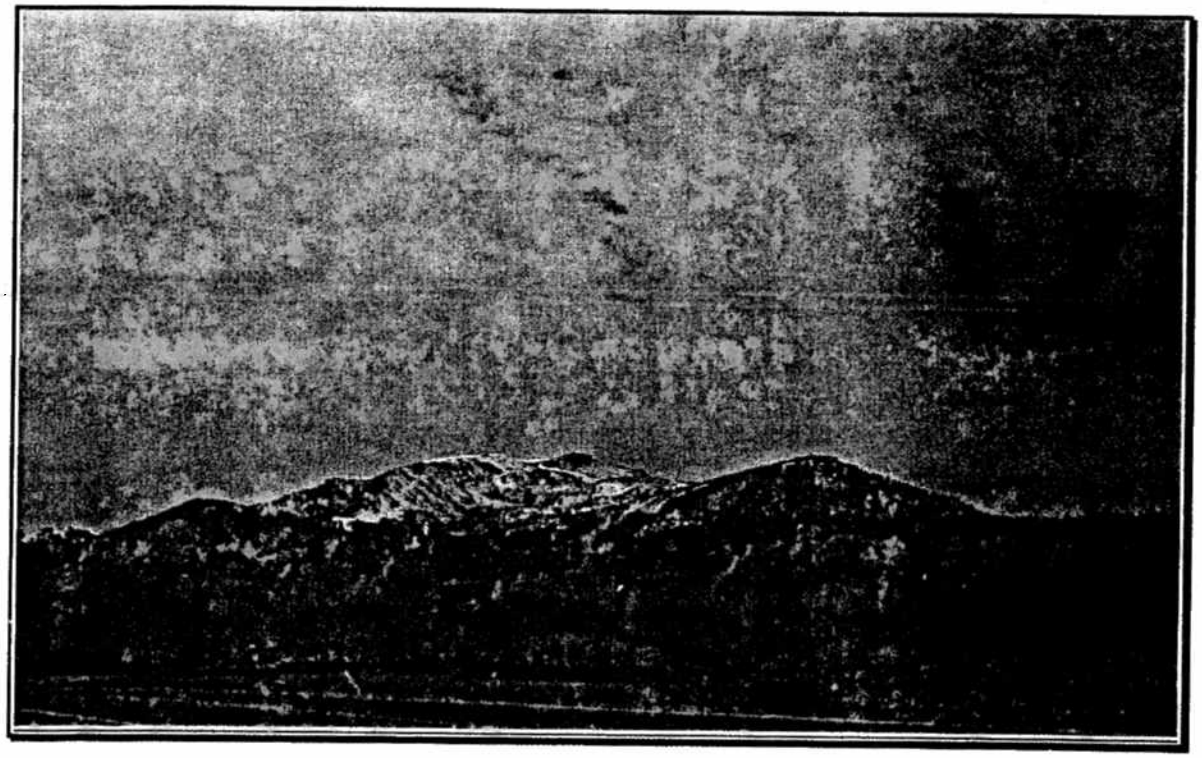


June Lake.

The community of June Lake includes a commercial core in the Village, residential areas in the Village and Down Canyon areas, a county park and community center, lodging facilities, June Mountain Ski Area, limited light industrial uses (small woodlots, equipment storage areas, and a gravel pit), and resort development. There is heavy recreational use throughout the area. The June Lake Public Utility District provides water and sewer services to the Village and Down Canyon areas; the June Lake Fire Protection District provides fire protection. State Route 158 is the only access to the community; it forms a loop, connecting with U.S. Highway 395 at the June Lake Junction and several miles farther north near Grant Lake.

Development in the June Lake area may be affected by the presence of a groundwater basin in the area, use of the area by mule deer and the presence of migration corridors in the area, the presence of wetlands, especially in the Down Canyon area, the presence of fault-rupture hazard zones (Alquist-Priolo zones) in the area, the presence of high-risk rockfall and landslide areas, the identification of avalanche-prone areas, and the existence of flood zones.

Mammoth Vicinity, Upper Owens



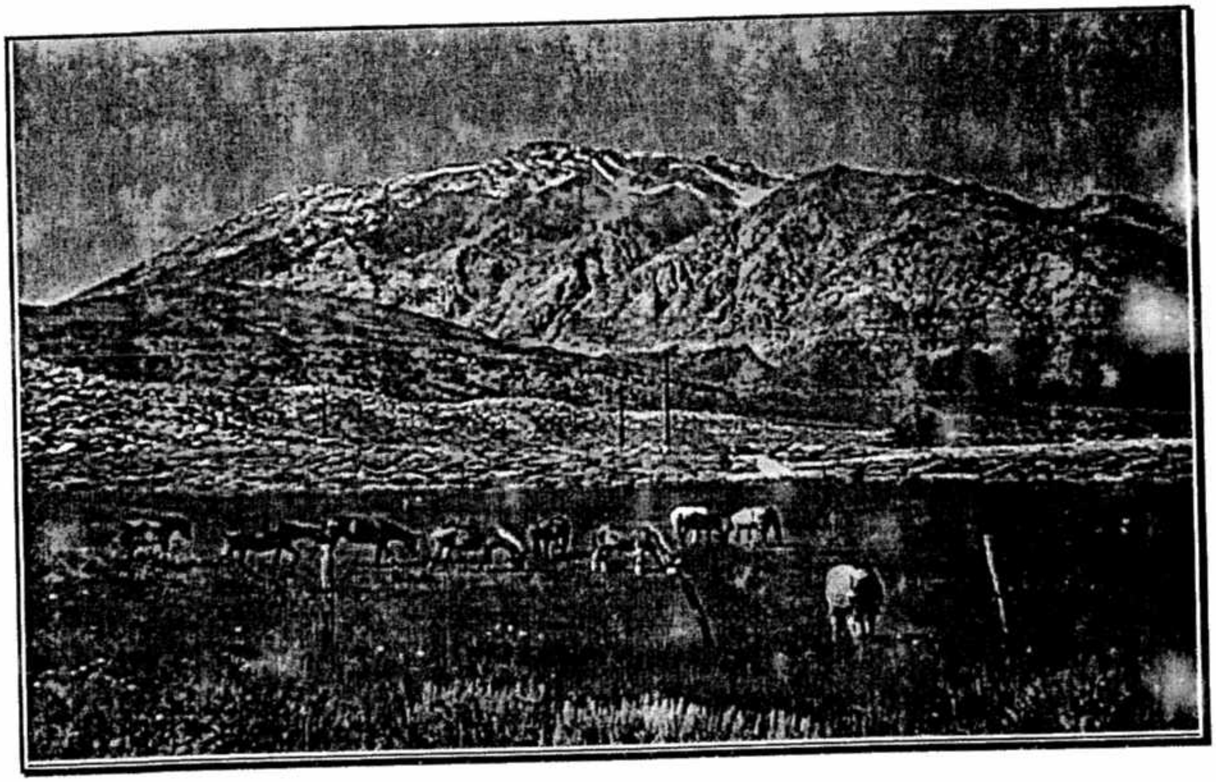
Mammoth Mountain.

The Mammoth vicinity area includes the town of Mammoth Lakes, the private lands along the Upper Owens River, and the area of Long Valley west of Crowley Lake. The Town has a mix of uses including residential, commercial, industrial and recreational; the Town of Mammoth Lakes General Plan and the Inyo National Forest Land and Resource Management Plan provide planning for those uses.

Outside the town, land use in the area includes the geothermal development at Casa Diablo, Hot Creek Fish Hatchery, Hot Creek Ranch, the Mammoth/Yosemite Airport, the Sierra Quarry materials pit, the USFS materials pit just north of the airport, a kaolin mine, the Sierra Nevada Aquatic Research Laboratory (SNARL), the Benton Crossing landfill (on DWP land), recreational facilities on DWP land at Whitmore Springs, the animal shelter at Whitmore Springs, recreational facilities on DWP land at Benton Crossing, and a cattle ranch and three fly fishing ranches along the Upper Owens River. Landowners along the Upper Owens River have developed land use policies for that area. DWP owns large parcels of land adjacent to Crowley Lake; much of this land is leased for grazing.

Development in the Mammoth vicinity may be affected by the presence of shallow groundwater in the area, the identification of a groundwater basin and recharge zone in the area west of Crowley Lake, the identification of a number of special-status species and special habitats in the area, heavy use of the area by wildlife, including mule deer, sage grouse and waterfowl, wetlands, the presence of fault-rupture hazard zones (Alquist-Priolo zones) and high-risk ground failure areas throughout the area, and the identification of a flood zone along Hot Creek.

Long Valley

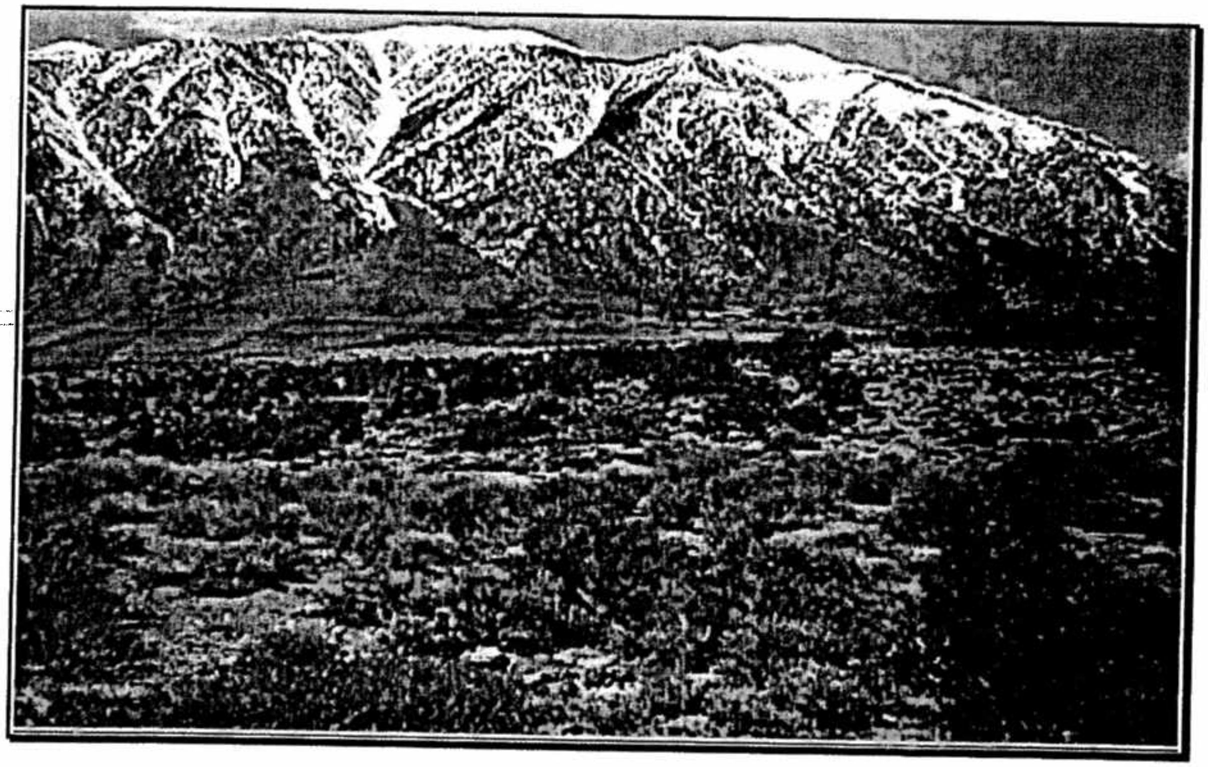


The Long Valley area.

The Long Valley area includes the communities of Long Valley, McGee Creek, Hilton Creek/Crowley Lake, Aspen Springs, Tom's Place and Sunny Slopes. These communities are primarily residential with some limited commercial development at Hilton Creek and at Tom's Place. The Hilton Creek Community Services District provides sewer service to the Hilton Creek area; elsewhere, individual septic systems are in use. Water is provided by a mutual water company, by individual wells, and in Sunny Slopes, by the Birchim Community Services District. The Long Valley Fire Protection District provides fire protection throughout the area.

Development in this area may be affected by the presence of shallow groundwater and a groundwater basin and recharge zone in the area south of Crowley Lake, wetlands, the identification of several special-status species and special habitats in the area, the identification of wildlife habitat in the area, and the identification of avalanche-prone areas.

Wheeler Crest

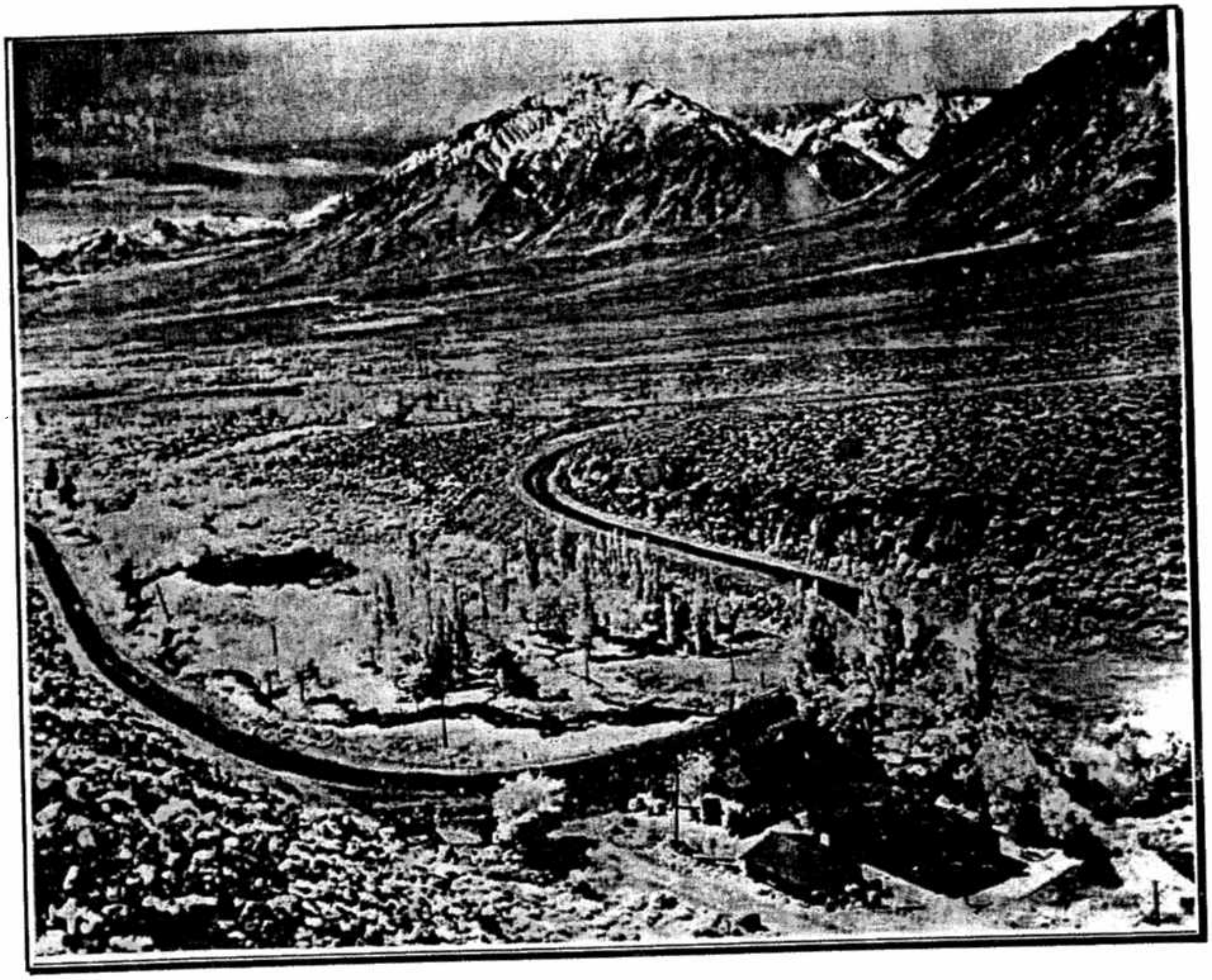


The Wheeler Crest area.

The Wheeler Crest area includes development at Swall Meadows and Pinon Ranch. All development in this area is residential; most of the area is served by individual wells and septic systems. The Wheeler Crest Community Services District operates a community well for the Hilltop Estates and Pinon Ranch subdivisions. The Wheeler Crest Fire Protection District provides fire protection throughout the area.

Environmental constraints to development in this area include the presence of a groundwater basin, use of the area as a deer migration corridor and critical winter range, and identification of fault-rupture hazard zones (Alquist-Priolo zone) and avalanche-prone areas.

Paradise

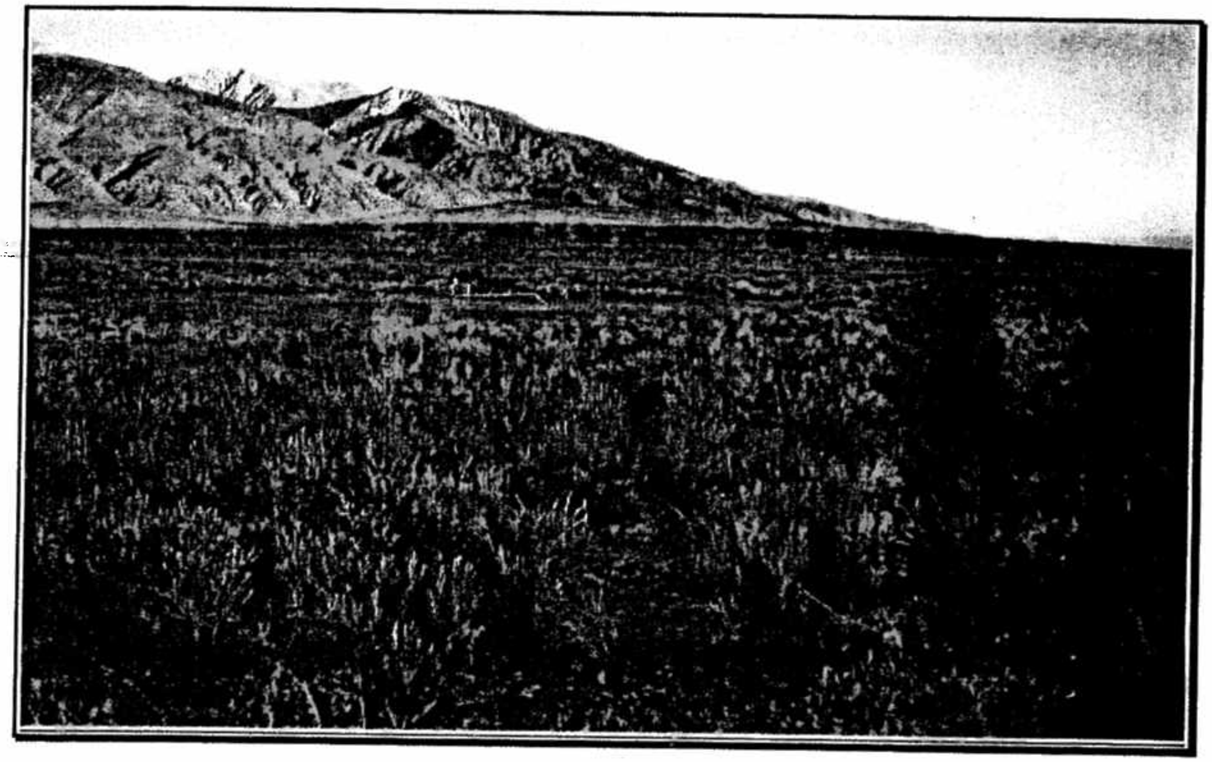


The Paradise area.

Paradise is a residential development at the southern end of the county. There is one commercial lodging facility in the area. All the development in the area is served by individual wells and septic systems. The Paradise Fire Protection District provides fire protection. The county maintains a trash container south of Paradise for use by residents of Wheeler Crest and Paradise; full containers are hauled to the Benton Crossing landfill once per week.

Development constraints in this area include the use of the area as a deer migration corridor and critical winter range.

Benton, Hammil, Chalfant



The Tri-Valley area.

The Tri-Valley area contains the communities of Benton, Hammil and Chalfant. The predominant land uses throughout the Tri-Valley area are residential and agricultural. In addition to residential development, Benton and Chalfant each contain a small store and community facilities, including a county park and ball fields and a county landfill on land leased from the BLM. Benton also has an elementary school. Large parcels of land throughout the Tri-Valley area, especially in Hammil Valley, are used for agriculture. In the past, alfalfa has been the primary crop. Other crops are now being grown, including seed potatoes, garlic and carrots.

All development in the area is served by individual wells and septic systems. The White Mountain Fire Protection District provides by the Chalfant Valley Fire Department, and in Hammil and Benton fire protection in the Chalfant area.

Development in the area may be affected by the presence of a groundwater basin under the entire area and identification of a recharge zone along the foot of the White Mountains east of Highway 6, the identification of a shallow groundwater zone at Benton Hot Springs, the presence of wetlands at Benton Hot Springs, the identification of several special-status species and special habitats in the area, the identification of mule deer habitat in the Benton area, the identification of debris flow hazards throughout the valley, and the existence of flood hazards throughout the valleys.

Oasis

The Oasis area.

Oasis is located in the extreme southeastern corner of the county and is isolated from the rest of the county by the White Mountains. Access is either from Nevada or via State Route 168 from Big Pine in Inyo County. The area is used for agricultural production, primarily alfalfa.

TIMBER LANDS

Although timber harvesting occurs in Mono County, timber is not an extensively developed resource. Mono County has been assessed by the California State Board of Equalization as a county where growing timber is not the highest and best use of the natural resource. Therefore, Mono County has no areas designated as timber production zones (TPZs—areas where lands is taxed on a use-valuation basis with its usage limited to growing and harvesting timber and compatible uses) (Tosta, 1988; California Statistical Abstract 2000, Table G-29). Productive forests do exist in Mono County, but they represent less than 10% of the total land area in the county (USFS, 1986). In 1998, 4.8 million board feet of timber was produced in Mono County, less than 1% of the 2.1 billion board feet produced statewide that year (California Statistical Abstract 2000, Table G-27).

Approximately 94% of the county's productive timber area lies within National Forest boundaries. In 1999, there were 183,000 acres of commercial forestland in Mono County. Of that total, 172,000 acres were public lands managed by the U.S. Forest Service, 7,000 acres were managed by a public agency other than the Forest Service, and 4,000 acres were privately owned (California Statistical Abstract 2000, Table G-29). The forest resource in the county is used extensively for fuelwood cutting, both by commercial operations and individuals.

AGRICULTURAL LANDS

The 1997 Census of Agriculture reported that there were 63 farms[1] in the county, a decrease of 13 from the total of 76 farms reported in the 1987 Census of Agriculture (information on agricultural production is from the California Statistical Abstract, 1990 and 2000 editions, and the California Department of Food and Agriculture [www.cdfa.ca.gov]). Average farm size in 1997 was 1,092 acres, an increase of 133 acres from the 1987 average farm size of 959 acres. Total farmland acreage decreased from 72,900 acres in 1987 to 68,813 acres in 1997; total cropland harvested decreased from 8,871 acres to 8,462 acres during the same period.

The value of Mono County agricultural production in 1997 was $18.3 million; in 1989, it was $13.3 million. In 1997, cattle and calves accounted for $7.03 million ($5.3 million in 1989), hay and alfalfa for $4.62 million (alfalfa alone —$4.1 million in 1989), carrots for $2.05 million (not listed separately in 1989), seed crops for $1.55 million (not listed separately in 1989), and sheep and lambs for $1.44 million ($1.2 million in 1989). In 1989, irrigated pasture, hay, wool and other crops accounted for 2.7 million.

Large portions of the privately owned land in the county are used for agriculture. The majority of cropland in the county is used for cultivation of alfalfa; however, there has been a steady increase in the production of other crops, including potatoes, beans, a virus-free strain of garlic, and recently, carrots. Garlic crops are located near Topaz Lake and in the Hammil/Chalfant area (Milovich, 1988). Carrots have replaced alfalfa in many parts of the Hammil and Benton valleys.

The Farmland Mapping and Monitoring Program under the jurisdiction of the Department of Conservation is developing maps classifying the value of farmlands. Prime farmland is defined as "land that has the best combination of physical and chemical characteristics for the production of crops." There are numerous specific criteria relating to water availability, water table, soil chemistry, flooding, erodibility, and physical soil characteristics that must be met for land to be considered Prime Farmland. The Soil Conservation Service (SCS—now part of the National Resource Conservation Service, NRCS) has mapped most of these characteristics for Mono County, but Mono County has not yet been included in the Farmland Mapping and Monitoring (Farmland Mapping and Monitoring Program, 2001. See www.consrv.ca.gov/dlrp/FMMP).

[1] The Census defines a "farm" as any place from which $1,000 or more of agricultural products were sold, or normally would have been sold, during the Census year.

RANGELANDS

Grazing for cattle and sheep on irrigated and non-irrigated pastureland is the major use of rangeland. Grazing occurs on private lands and leased public lands. Livestock numbers have been reduced in recent years as the continuing drought lessens available forage. Range carrying capacities dropped 35% to 40% below normal between 1986 and 1990.

ZONING

The Mono County Land Development Regulations (included as a separate chapter of the Land Use Element of the Mono County General Plan) and the Subdivision and Land Division Code (Title 17 of the Mono County Code) implement the General Plan and Area Plans. The Land Development Regulations have been integrated with the Land Use Element to ensure consistency between those regulations and General Plan policies.

BUILDOUT AND SUSTAINABLE DEVELOPMENT

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> There is no clear threshold density at that settlement results in significant impacts on health and sustainability of ecosystems. Ecological implications of land conversion for human settlement [include the following]:

- Reduced total habitat area through direct habitat conversion.
- Reduced habitat patch size and increased habitat fragmentation.
- Isolation of habitat patches by roads, structures and fences.
- Harassment of wildlife by domestic dogs and cats.
- Biological pollution from non-native vegetation alleles.
- Increased impervious surfaces and increased peak runoff.
- Increased heavy metal and oil runoff from impervious surfaces.
- Increased risk of ground water and/or surface water contamination through septic effluent disposal.
- Decreased ground water flow to surface water systems due to ground water pumping.
- Modified surface water flow due to irrigation, septic system effluent disposal and treated wastewater discharges.
  (SNEP, Vol. II, Ch. 11).

CHAPTER 4
COMMUNITY SERVICES AND FACILITIES*

Community services include general governmental services such as public works, planning, administration, health care and justice, as well as emergency services including police and fire protection, paramedic services, and search and rescue. Community facilities include public infrastructure such as utilities, schools, community buildings, roads and recreational facilities. Roads are discussed in the Transportation section of this document; recreational facilities are discussed in the Outdoor Recreation section.

COUNTY SERVICES AND FACILITIES

Mono County provides general governmental services to county residents; many of these services are provided to town residents and residents of the unincorporated area as well. These services include the following:

Administration	Justice and Courts	Public Works
Animal Control	Library Services	Sheriff
Finance	Parks and Recreation	Tax Collection
Health Services	Planning and Building	Welfare

County services are provided in Bridgeport, the county seat, and through branch offices in Mammoth Lakes. Many of the services provided by the County have been heavily impacted by the growth of Mammoth Lakes; the Superior Court, the District Attorney and the Probation Department have all experienced increasing caseloads as a result of growth in Mammoth. In addition, the Mental Health Department office is located in Mammoth, and approximately 80% of the Department's service is provided in Mammoth. County services in Bridgeport are provided primarily in the county courthouse and the two courthouse annex buildings. Services in Mammoth are provided at leased offices in Mammoth Lakes.

The County operates recreational and community facilities in most communities; those facilities are discussed in the Outdoor Recreation section of this document. Other facilities operated by the County include cemeteries, landfills and roadyards. The County operates cemeteries at Bridgeport, Mono Lake and Long Valley. Landfills are currently located in Walker, Bridgeport, Benton, Chalfant, Benton Crossing and Pumice Valley; the county is in the process of converting the landfills at Walker, Bridgeport, Benton and Chalfant to transfer stations. A transfer station is currently located at Paradise. Current and future solid and liquid waste facilities are discussed in detail in the County's Solid Waste Management Plan, that is currently being updated. Hazardous waste facilities are discussed in the Hazardous Waste section of this document and in the Hazardous Waste Management Element. The County operates roadyards at Benton, Crowley, Mammoth, Lee Vining, Bridgeport and Walker. Road maintenance operations are discussed in detail in the Transportation section of this document. Figures 5A through 5D show community facilities.

EDUCATIONAL FACILITIES

Mono County is served by two school districts: the Eastern Sierra Unified School District and the Mammoth Unified School District (see Figure 6). Students in the southern portion of the county

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*Refer also to the section on "Plans and Policies" for cross-references to other documents that may provide additional site-specific information on community services and facilities.

(Paradise and the Tri-Valley area) may also attend school in Bishop, elementary at the Round Valley School District or high school at the Bishop Union School District.

The Eastern Sierra Unified School District operates elementary schools in Coleville, Bridgeport, Lee Vining and Benton, and high schools in Coleville and Lee Vining. High school students in Bridgeport are bussed to Coleville; high school students in Benton attend school in Bishop; students from June Lake attend school in Lee Vining. Schools in Lee Vining are not currently overcrowded, although other schools in the district are; the school district consequently has been formally identified as "impacted." As an impacted district, it possesses the authority to impose fees on new construction for capital outlay and permanent classroom construction (Mono County Code § 15.09).

In the past few years, there has been some controversy over allowing students from June Lake to attend high school in Mammoth. Proponents of this plan argue that the small size of the Lee Vining facility does not enable it to provide the quality education that Mammoth can.

The Mammoth Unified School District operates elementary, middle and high schools located in Mammoth, and serves students from the Mammoth and Crowley Lake areas. Enrollment at the Mammoth schools fluctuates some with the large transient population in the Town. Enrollment is up, particularly at the elementary school, and the District is considering imposing additional mitigation fees on new development in order to help pay for needed new facilities. The District has land available for future school sites adjacent to the elementary school in Mammoth Lakes (12 acres) and in the Crowley Lake area (20 acres).

Adult education opportunities in the county are available in Mammoth Lakes. The Mammoth branch of the Eastern Sierra College Center, a division of Cerro Coso Community College, offers classes leading to a two-year Associate of Arts degree. The Town's Parks and Recreation Department offers a variety of recreational and adult education classes.

LIBRARY [www.monocoe.k12.ca.us/lib]
The Mono County Library District, administered by the County Board of Education, operates a countywide library system. The main library is located in the county building at Bridgeport; branch libraries are located at the schools in Coleville, Lee Vining and Benton, and at the community centers in June Lake and Mammoth Lakes (see Figure 5C). The library also operates a Bookmobile that circulates throughout the county. Books, articles and other material unavailable through the local library system can be acquired through the Mountain Valley interlibrary loan system out of Sacramento.

HEALTH SERVICES
Hospital and emergency care services are provided at Mammoth Hospital in Mammoth. Limited services are available at Mono General Hospital in Bridgeport. Serious cases are transported by helicopter to facilities in Bishop, Reno, Fresno or Southern California, depending on the case. Basic health care services are provided by several clinics in the county: the Toiyabe Indian Health Clinic in Walker, the Mono General Clinic in Bridgeport, and the Sierra Park Medical Center in Mammoth Lakes. In the past, the center's predecessor, Alpine Clinic, operated a clinic in June Lake under contract with the County at the county facilities at the June Lake Community Center. The Mono County Department of Public Health [www.monohealth.org] provides a variety of health care services at medical facilities located in Mammoth Lakes and Bridgeport. The Department acts as an information and referral center, providing health education materials and preventive medicine services, such as immunizations and screenings for a variety of conditions. The Department also administers a variety of state-mandated public health programs. Mental health services are provided through the County Mental Health Department, with offices located in Mammoth Lakes.

FIGURE 5A
COMMUNITY FACILITIES--CEMETARIES

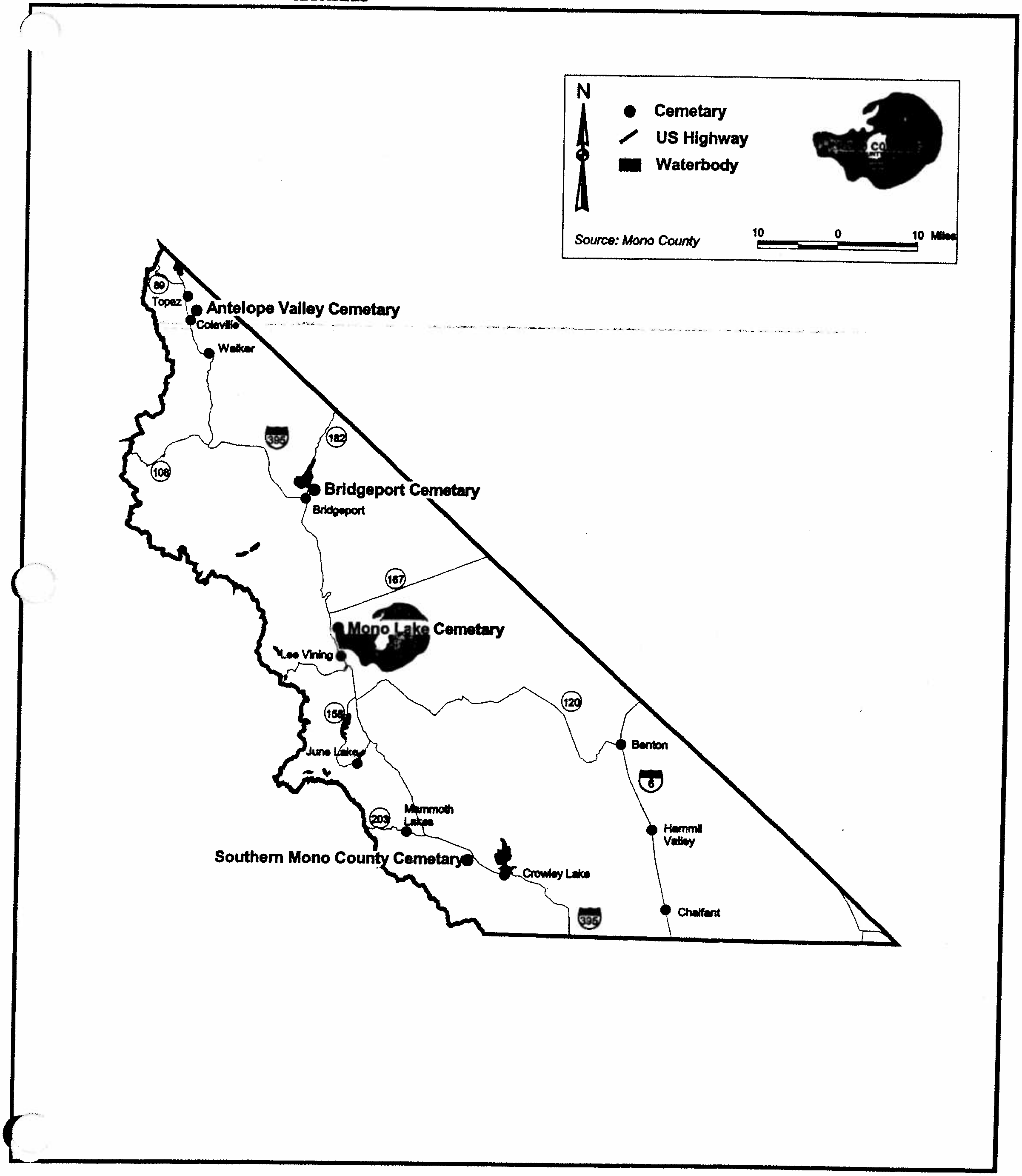


FIGURE 5B
COMMUNITY FACILITIES--SOLID AND LIQUID WASTE FACILITIES

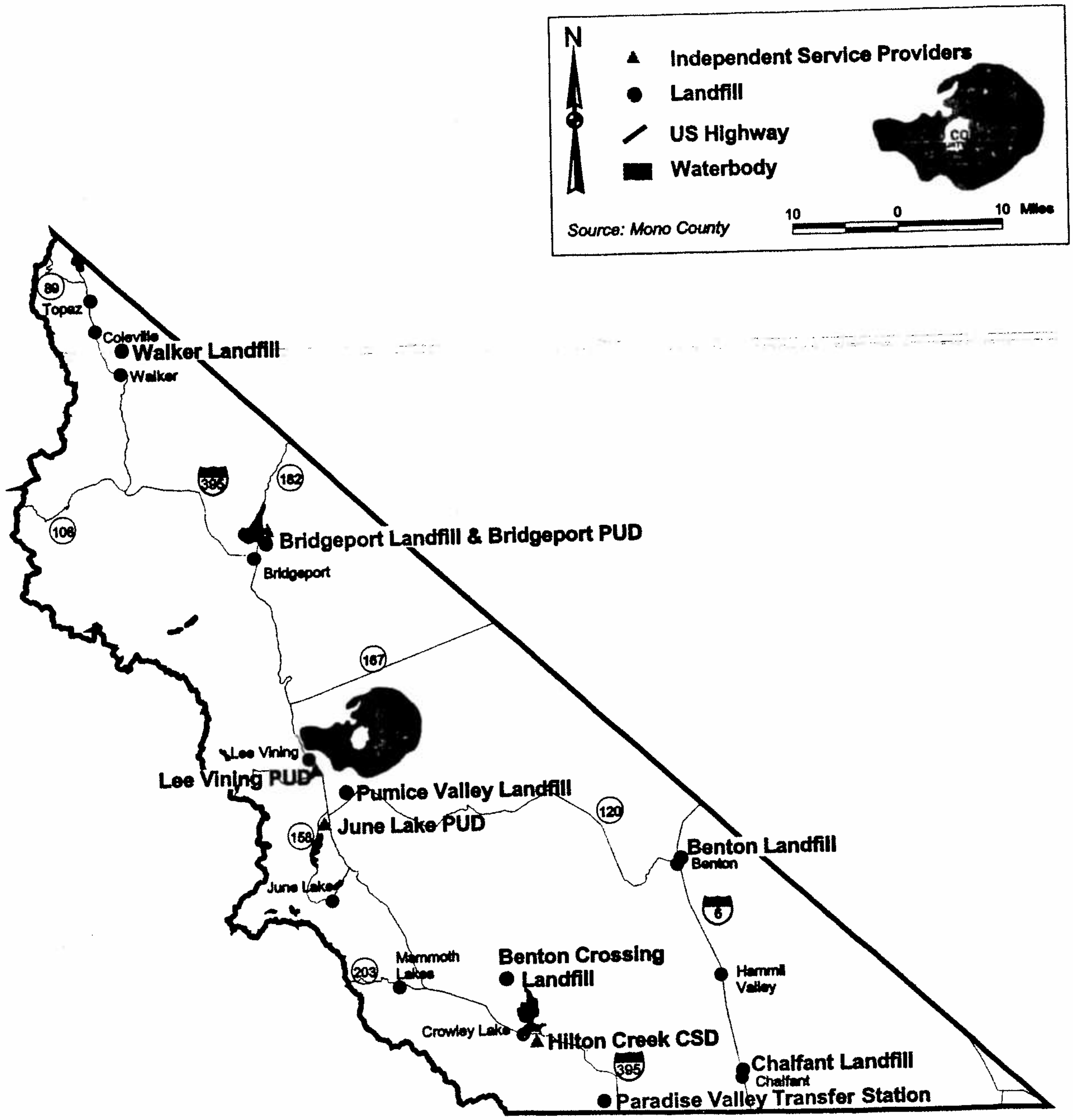


FIGURE 5C
COMMUNITY FACILITIES--LIBRARIES

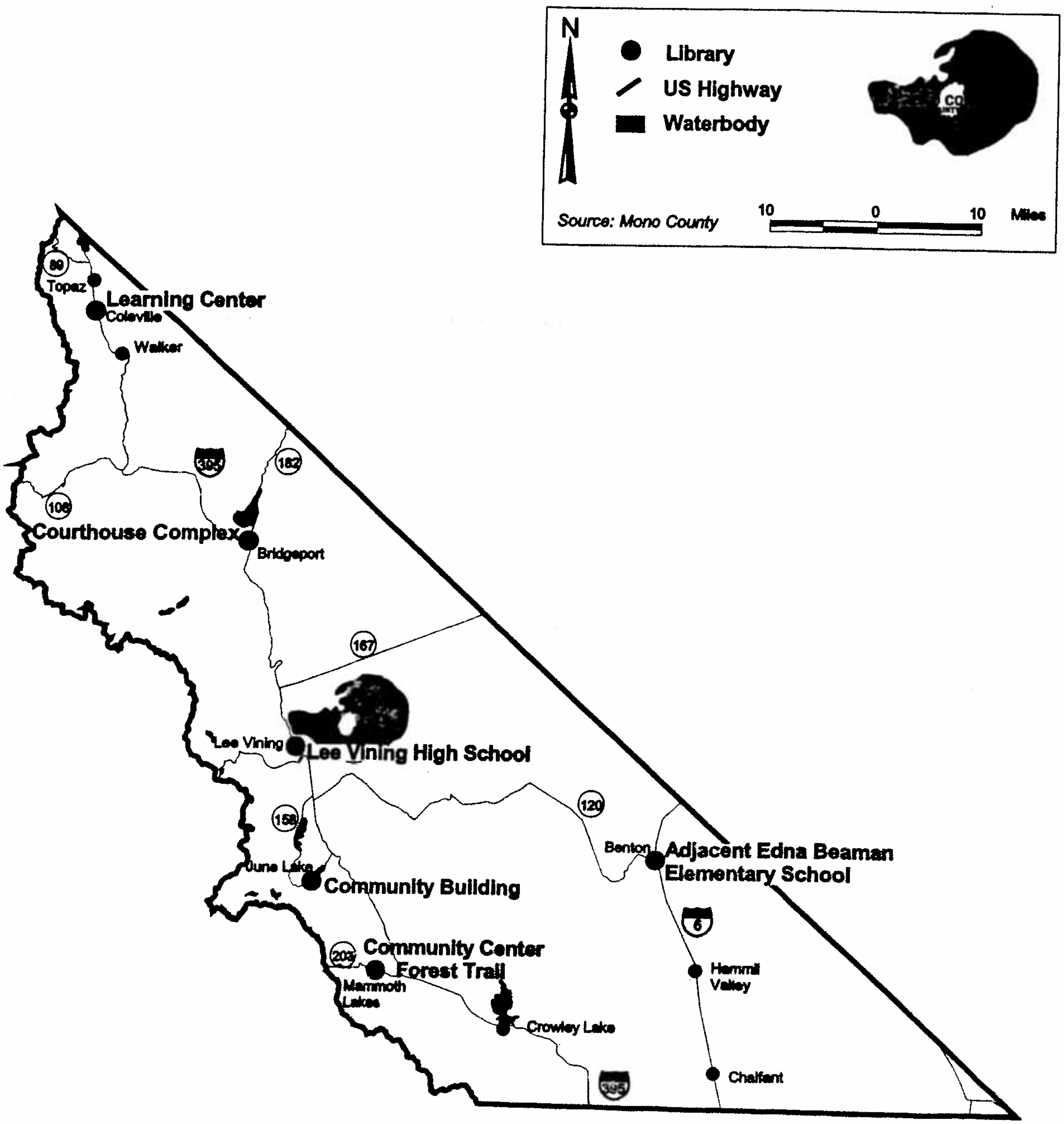


FIGURE 5D
COMMUNITY FACILITIES--FIRE STATIONS

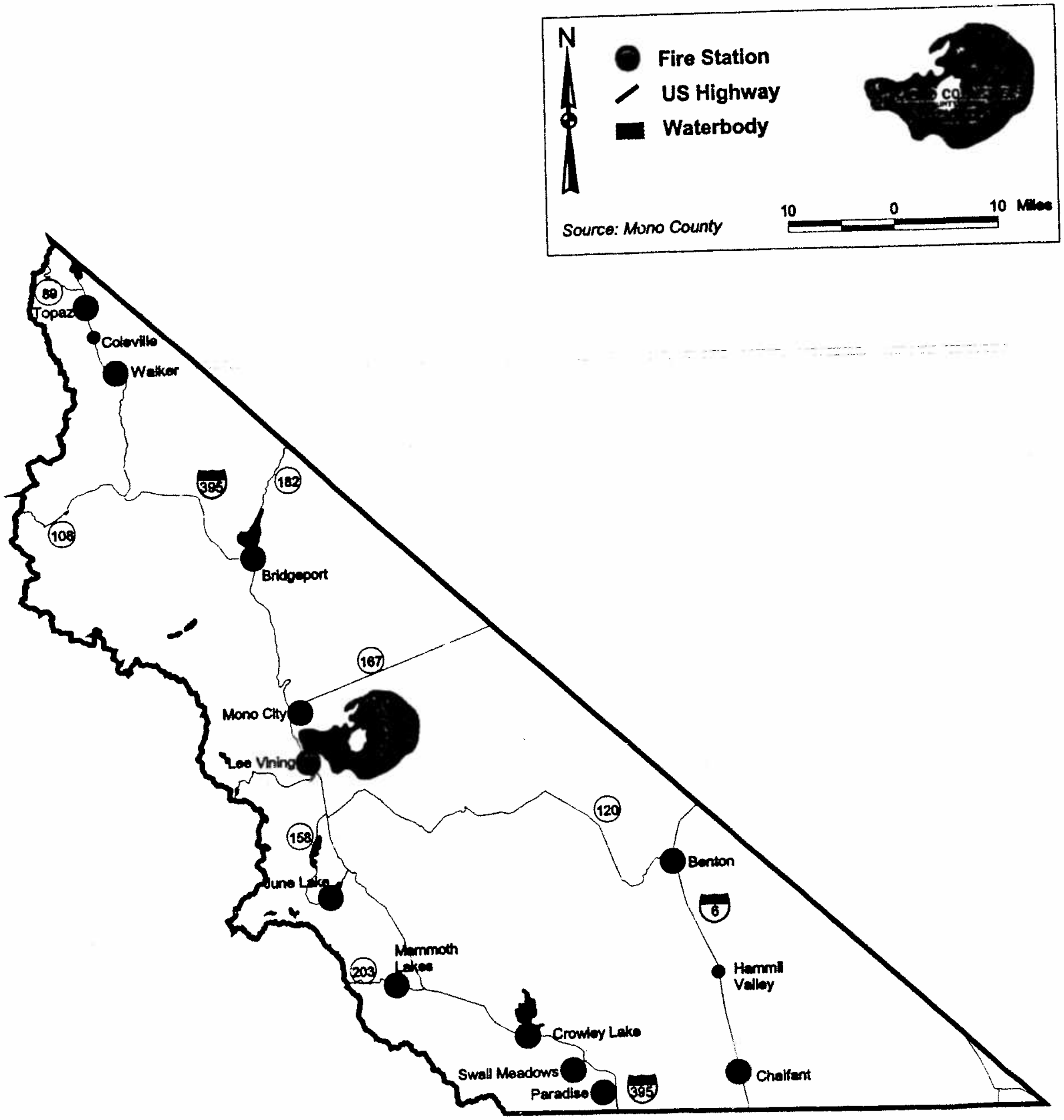
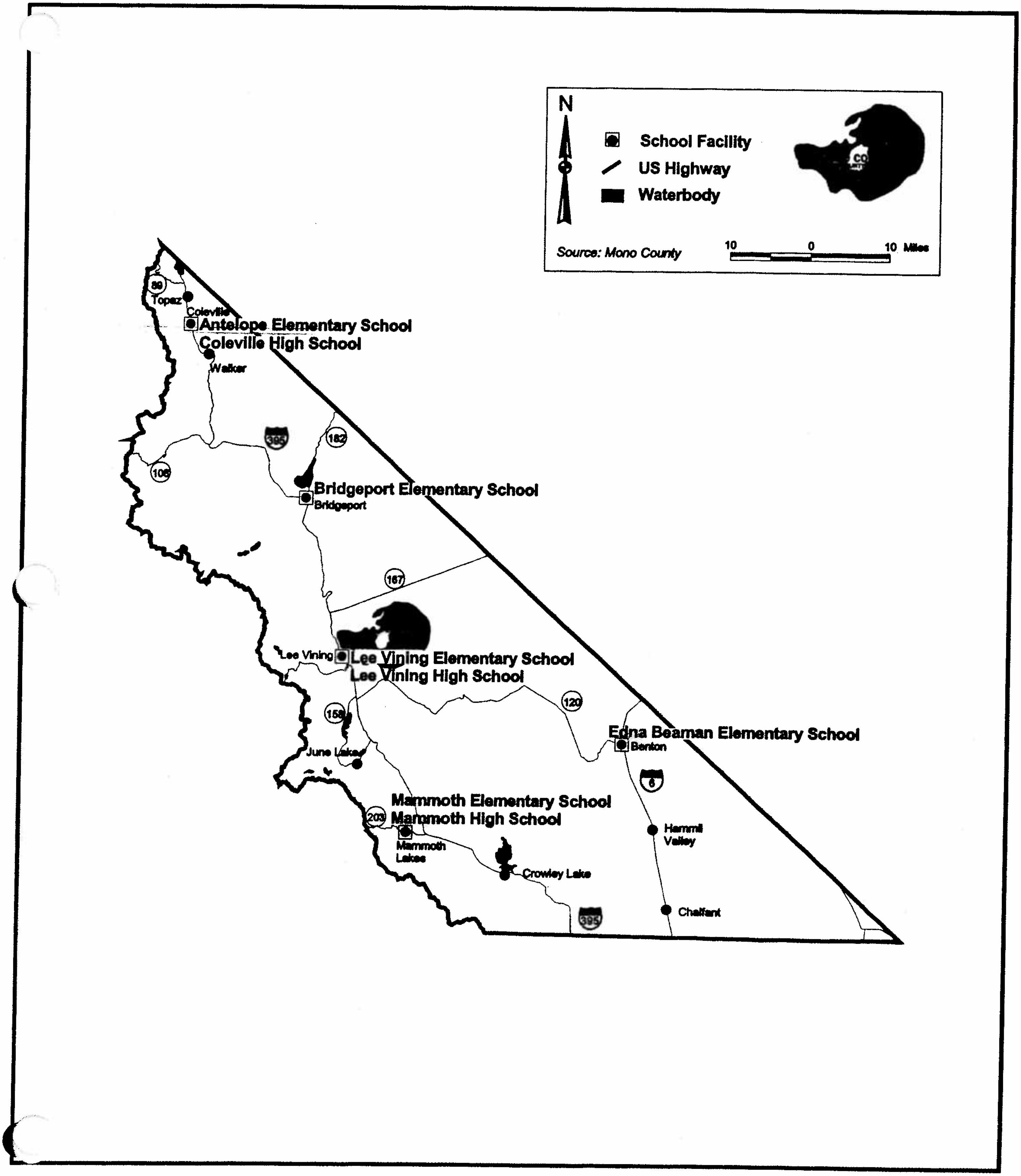


FIGURE 6
SCHOOL FACILITIES



PARAMEDIC SERVICES

The County Paramedic Program provides paramedic services. Units are located in Walker-Coleville, June Lake and Mammoth Lakes. Residents of the extreme southern portion of the county and the Tri-Valley area use emergency services from the Bishop area. Mammoth Hospital and Mono General Hospital also provide emergency medical response services, as do several of the Fire Protection Districts in the county (see Table 2).

FIRE PROTECTION

Local volunteer fire protection districts provide fire protection for community areas. Wildland fires on private property are the responsibility of the California Department of Forestry; wildland fires on public lands are the responsibility of the Forest Service and the Bureau of Land Management. The 11 fire districts in the county have mutual aid agreements with each other and with other state and federal agencies involved in fire protection. In order to serve new development, the fire districts have implemented mitigation fees so that new development will pay for the additional equipment necessary to protect that development.

With the exception of the Antelope Valley, all privately owned lands in Mono County are within the State Responsibility Area (SRA). The State of California recently adopted Fire Safe Standards for wildland fire protection for future development in the SRA. These regulations address emergency access, signing and building numbering, private water supply reserves for emergency fire use and vegetation modification; Mono County has adopted a local ordinance that has the same practical effect as the CDF regulations (Firesafe Regulations, Chapter 22 of the Land Development Regulations).

The 11 fire protection districts in the county provide fire prevention services through such activities as education and development review. The districts also provide varying levels of fire suppression and emergency medical response services to community areas. Table 2 provides a summary description of fire district service levels and capabilities. Additional information about each of the fire protection districts is available in Mono County Special Districts: Inventory of Services and in individual sphere of influence reports for the districts, prepared by Mono LAFCO and on file in the Planning Department.

POLICE SERVICES

The Mono County Sheriff's Department provides police services within the town boundaries by the Town of Mammoth Lakes Police Department and in the unincorporated area. The Sheriff's Department is also responsible for jail operations for persons arrested within the Town limits, coroner operations, processing and serving civil paperwork, and search and rescue operations. Contractual service is provided the Mammoth Lakes Police Department and the Mammoth Lakes Fire Protection District for dispatch service. The Police Department is charged a fee for this service; the Fire District is not. Sixty percent of the bookings for the jail are from Mammoth Lakes, 50% of the coroner's activities are within the town, 5% of the search and rescue efforts are within the town's limits, and 70% of the workload of the civil division is within the town limits.

The sheriff is also the designated County Director of Emergency Services and is responsible for implementing the Mono County Emergency Plan. The California Highway Patrol has primary responsibility for traffic control and accident investigation on state and federal highways throughout the county, including State Route 203 through Mammoth. The Sheriff's Department and the Town Police Department have mutual aid agreements with each other and with surrounding jurisdictions.

TABLE 2
FIRE PROTECTION DISTRICTS IN MONO COUNTY

District	Sq. Miles	# Stations	EMS Provided[a]	ISO Ratings[b]
Antelope	32	2	Yes	9
Bridgeport	6	1	Yes	7/9
Mono City	0.7	1	No	6
Lee Vining	4.9	1	Yes	6/9
June Lake	2.8	1	Yes	7
Mammoth Lakes	8	2	Yes	5/9
Long Valley	114	1	Yes	9
Wheeler Crest	4	1	No	10
Paradise	0.3	1	No	10
Chalfant	75	1	Yes	10
White Mountain	100	1	Yes	10

Notes:

a. EMS = Emergency Medical Services

b. The Insurance Service Office (ISO) uses a credit rating system to determine fire insurance rates in different areas. The grading system compares the fire protection that is needed in an area with the fire protection that is locally available. A rating of "1" represents the highest level of fire protection, the lowest fire hazard and generally lower rates. A rating of "10" indicates the lowest level of fire protection.

WATER SYSTEMS

Water for domestic, commercial and agricultural uses is supplied from local groundwater and surface water sources. There are a number of water providers in the county. Many of these providers are small private companies or privately owned systems. Public water systems include those owned and operated by the Birchim Community Services District (Sunny Slopes), Wheeler Crest Community Services District, Bridgeport Public Utility District, Lee Vining Public Utility District, June Lake Public Utility District and the Mammoth Community Water District. Information concerning the facilities and service capabilities of the public water providers is provided in the Mono County Special Districts: Inventory of Services, prepared by Mono LAFCO and on file in the Planning Department. In addition, the Sphere of Influence Reports prepared by LAFCO for each of these districts contains a discussion of the system's current and future capacity and ability to meet demand in its service area. Water supply and demand in June Lake is also discussed in detail in the June Lake Area Plan. All of these documents are on file in the Planning Department.

Mutual water companies provide water in Hilton Creek/Crowley Lake, Paradise, Mono City, the Mountain Meadows subdivision at Crowley Lake, the Pine Glade summer home tract adjacent to Sunny Slopes, and Virginia Lakes. Areas not served by a community water system or a mutual water system use wells or, in a few cases, a local surface water source. In addition to private wells on residential parcels, there are over 100 small independent governmental and privately owned and operated water systems throughout the county. These range from systems operated by the U.S. Forest Service at its campgrounds to a private system at Tom's Place.

Water supply is a primary constraint to development in the county. The amount of water available for local consumption is severely limited since much of the county's water is exported to Nevada and Southern California. Communities seeking to increase their water supply either must buy water from other entities or acquire additional water rights. The ability to acquire additional water rights is limited by the fact that the water exporters, the federal government or power companies hold most water rights.

Much of the water used for local consumption is groundwater. In most cases, the capacity of the groundwater basins is unknown and the long-term availability of water for development is also unknown. Several communities, although their water supply is sufficient for current development, do not have enough supply to accommodate future growth. These communities are looking for additional sources of water by drilling new wells or by buying water. The Tri-Valley Groundwater Management District regulates the export of groundwater from the Tri-Valley area. Groundwater management districts are being considered in other areas of the county.

WASTEWATER FACILITIES

The Bridgeport PUD, the Lee Vining PUD, the June Lake PUD, the Mammoth Community Water District and the Hilton Creek CSD (see Figure 5B) provide Community sewer systems. Development elsewhere in the county uses private or community septic systems. Information concerning the facilities and service capabilities of the community sewer systems is provided in the Mono County Special Districts: Inventory of Services, prepared by Mono LAFCO and on file in the Planning Department. In addition, the Sphere of Influence Reports prepared by LAFCO for each of these districts contains a discussion of the system's current and future capacity and ability to meet demand in its service area. Wastewater treatment in June Lake is also discussed in detail in the June Lake Area Plan.

Community sewer systems are generally adequate to meet future service demands. In areas not served by sewer systems, development may be limited by requirements pertaining to septic disposal. The Lahontan Regional Water Quality Control Board's other quality control plan for the Lahontan Region set minimum standards for construction of industrial sewage disposal systems.

SOLID WASTE & HAZARDOUS WASTE FACILITIES

Solid waste generated in the county is disposed of at the six county transfer and landfill sites (see Figure 5B). The County owns two of the sites (Benton and Chalfant transfer sites); two are leased from the BLM (Walker and Bridgeport transfer sites); and two are leased from the LADWP (Pumice Valley and Benton Crossing landfill sites). County employees or private contractors under direction of the Mono County Department of Public Works maintain and operate the sites. In Mammoth, a private contractor collects the waste and transports it to the landfill site. In other communities in the county, residents transport their own waste to the landfills. Detailed information about Solid Waste Management in the county is contained in the Solid Waste Management Plan (SWMP), currently being updated, and in operations plans for each landfill and transfer site. Information about hazardous wastes is provided in the Hazardous Waste Element and the Hazardous Waste section of this document.

CHAPTER 5
DEMOGRAPHICS & ECONOMIC DATA*

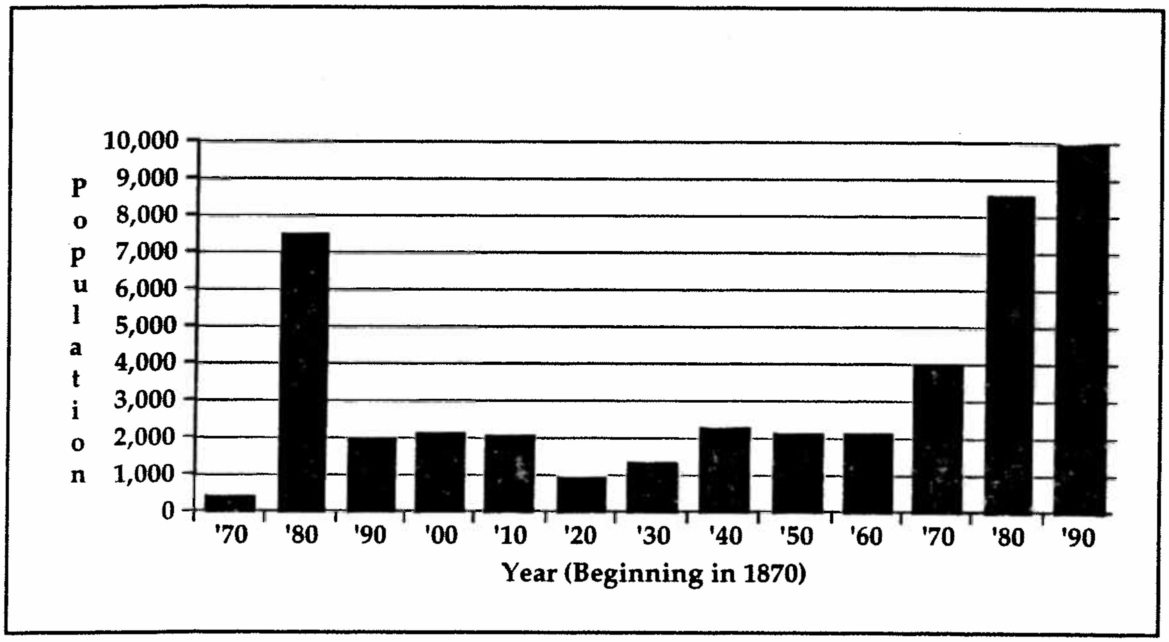
POPULATION CHARACTERISTICS

HISTORICAL POPULATION GROWTH

Figure 7 illustrates Mono County's historical population growth. Population growth over the past century is easily traced to ups and downs in the region's economy, first in mining, later in agriculture, and most recently in recreation. The tremendous jump from 1870 to 1880 is a result of the mining boom at Bodie. In the next decade, the boom subsided into a period of steady work that continued until the mine was shut down in the 1910s. The next large increase in population occurred in the 1960s when Mammoth Mountain Ski Area and the town of Mammoth Lakes began their rapid growth.

During the 1970s, the rural counties of California experienced a significant influx from the metropolitan areas of the state. Mono County grew from 4,016 persons in 1970 to 8,577 persons in 1980, an increase of 114%, one of the highest county growth rates in the state. The population of Mammoth Lakes increased by 198% between 1970 and 1980. During the early and mid-1980s, the growth rate in the county slowed, but by the late 1980s, the growth rate increased again, with most of the growth occurring in Mammoth Lakes.

FIGURE 7
HISTORICAL POPULATION



*Refer also to the section on "Plans and Policies" for cross-references to other documents that may provide additional site-specific demographic and economic data.

RECENT POPULATION GROWTH*

Mono County's population in 2000 was 10,900 with 5,350 (49%) in Mammoth Lakes and 5,550 (51%) in the unincorporated portion of the county (www.dof.ca.gov, Statistical Abstract, 2000, Table B-4). Table 3 shows the county's population growth over the past 30 years.

TABLE 3 Mono County Population, 1970-2000

1970	4,100
1980	8,700
1990	10,050
1993	10,450
1994	10,650
1995	10,550
1996	10,500
1997	10,500
1998	10,600
1999	10,700
2000	10,900

Source: www.dof.ca.gov, Statistical Abstract, 2000, Table B-4.

POPULATION PROJECTIONS

Table 4 shows population projections for the county for the next 20 years.

TABLE 4 Mono County Population Projections, 2000-2020

Year	Total Population	# and % 15+ Years	# and % 15- 69 Years
2010	12,561	10,504 (84%)	9,559 (76%)
2020	14,166	11,506 (81%)	9,991 (71%)

Source: www.dof.ca.gov , Population Projections by Year, Age and Race, 2000.

Table 5 shows population projections by community areas through the year 2020. The projections are based on the following assumptions: that the unincorporated area will continue to house approximately 50% of the total countywide population and that the population distribution in the unincorporated community areas will remain similar to the population distribution in 1990. The last assumption may not hold true. Antelope Valley is experiencing increasing development pressures from the Gardnerville/Carson City area; Chalfant is experiencing a similar pressure for expansion from the Bishop area; and the Long Valley communities are experiencing continuing pressure from residents who work in Mammoth.

It is important to note that the population projections shown in Table 4 are for permanent year-round residents. Mono County, and particularly community areas such as Mammoth Lakes and June Lake, experiences much higher peak populations during periods of heavy recreational use,

*Demographic and economic data in this chapter will be updated as pertinent data become available from the 2000 U.S. Census.

a factor that has a direct impact on housing, the transportation system, utilities and social services.

2000 CENSUS

Data from the 2000 Census just became available at the time of printing. The attached summary provides a brief overview of the new Census information. Additional information and analysis of the 2000 Census results will be integrated into the next update of the MEA.

SUMMARY OF 2000 CENSUS DATA FOR MONO COUNTY

Population

(From 2000 Census Data)

- United States – 281,421,906
- State of California – 33,871,648
- Mono County – 12,853
- Mammoth Lakes – 7,093
- Unincorporated Areas – 5,760

Unincorporated Communities Population

(From 2000 Census Data)

- Antelope Valley – 1,498
- Bridgeport – 711
- Lee Vining – 493
- June Lake – 613
- Long Valley – 1,146
- Wheeler / Paradise – 332
- Tri-Valley – 966

Table DP-1. Profile of General Demographic Characteristics: 2000

Geographic Area: Mono County, California

[For information on confidentiality protection, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total population	12,853	100.0
SEX AND AGE		
Male	7,059	54.9
Female	5,794	45.1
Under 5 years	727	5.7
5 to 9 years	836	6.5
10 to 14 years	897	7.0
15 to 19 years	825	6.4
20 to 24 years	998	7.8
25 to 34 years	1,932	15.0
35 to 44 years	2,366	18.4
45 to 54 years	2,064	16.1
55 to 59 years	678	5.3
60 to 64 years	554	4.3
65 to 74 years	668	5.2
75 to 84 years	248	1.9
85 years and over	60	0.5
Median age (years)	36.0	(X)
18 years and over	9,900	77.0
Male	5,534	43.1
Female	4,366	34.0
21 years and over	9,396	73.1
62 years and over	1,287	10.0
65 years and over	976	7.6
Male	537	4.2
Female	439	3.4
RACE		
One race	12,564	97.8
White	10,818	84.2
Black or African American	61	0.5
American Indian and Alaska Native	309	2.4
Asian	143	1.1
Asian Indian	2	-
Chinese	28	0.2
Filipino	17	0.1
Japanese	58	0.5
Korean	25	0.2
Vietnamese	1	-
Other Asian [1]	12	0.1
Native Hawaiian and Other Pacific Islander	11	0.1
Native Hawaiian	7	0.1
Guamanian or Chamorro	-	-
Samoan	-	-
Other Pacific Islander [2]	4	-
Some other race	1,222	9.5
Two or more races	289	2.2
Race alone or in combination with one or more other races: [3]		
White	11,074	86.2
Black or African American	94	0.7
American Indian and Alaska Native	410	3.2
Asian	213	1.7
Native Hawaiian and Other Pacific Islander	39	0.3
Some other race	1,325	10.3

Subject	Number	Percent
HISPANIC OR LATINO AND RACE		
Total population	12,853	100.0
Hispanic or Latino (of any race)	2,274	17.7
Mexican	1,892	14.7
Puerto Rican	73	0.6
Cuban	7	0.1
Other Hispanic or Latino	302	2.3
Not Hispanic or Latino	10,579	82.3
White alone	9,837	76.5
RELATIONSHIP		
Total population	12,853	100.0
In households	12,495	97.2
Householder	5,137	40.0
Spouse	2,597	20.2
Child	3,110	24.2
Own child under 18 years	2,712	21.1
Other relatives	517	4.0
Under 18 years	177	1.4
Nonrelatives	1,134	8.8
Unmarried partner	356	2.8
In group quarters	358	2.8
Institutionalized population	36	0.3
Noninstitutionalized population	322	2.5
HOUSEHOLD BY TYPE		
Total households	5,137	100.0
Family households (families)	3,145	61.2
With own children under 18 years	1,473	28.7
Married-couple family	2,597	50.6
With own children under 18 years	1,119	21.8
Female householder, no husband present	334	6.5
With own children under 18 years	228	4.4
Nonfamily households	1,992	38.8
Householder living alone	1,366	26.6
Householder 65 years and over	220	4.3
Households with individuals under 18 years	1,587	30.9
Households with individuals 65 years and over	714	13.9
Average household size	2.43	(X)
Average family size	2.98	(X)
HOUSING OCCUPANCY		
Total housing units	11,757	100.0
Occupied housing units	5,137	43.7
Vacant housing units	6,620	56.3
For seasonal, recreational, or occasional use	5,775	49.1
Homeowner vacancy rate (percent)	2.1	(X)
Rental vacancy rate (percent)	20.9	(X)
HOUSING TENURE		
Occupied housing units	5,137	100.0
Owner-occupied housing units	3,084	60.0
Renter-occupied housing units	2,053	40.0
Average household size of owner-occupied units	2.39	(X)
Average household size of renter-occupied units	2.50	(X)

- Represents zero or rounds to zero. (X) Not applicable.

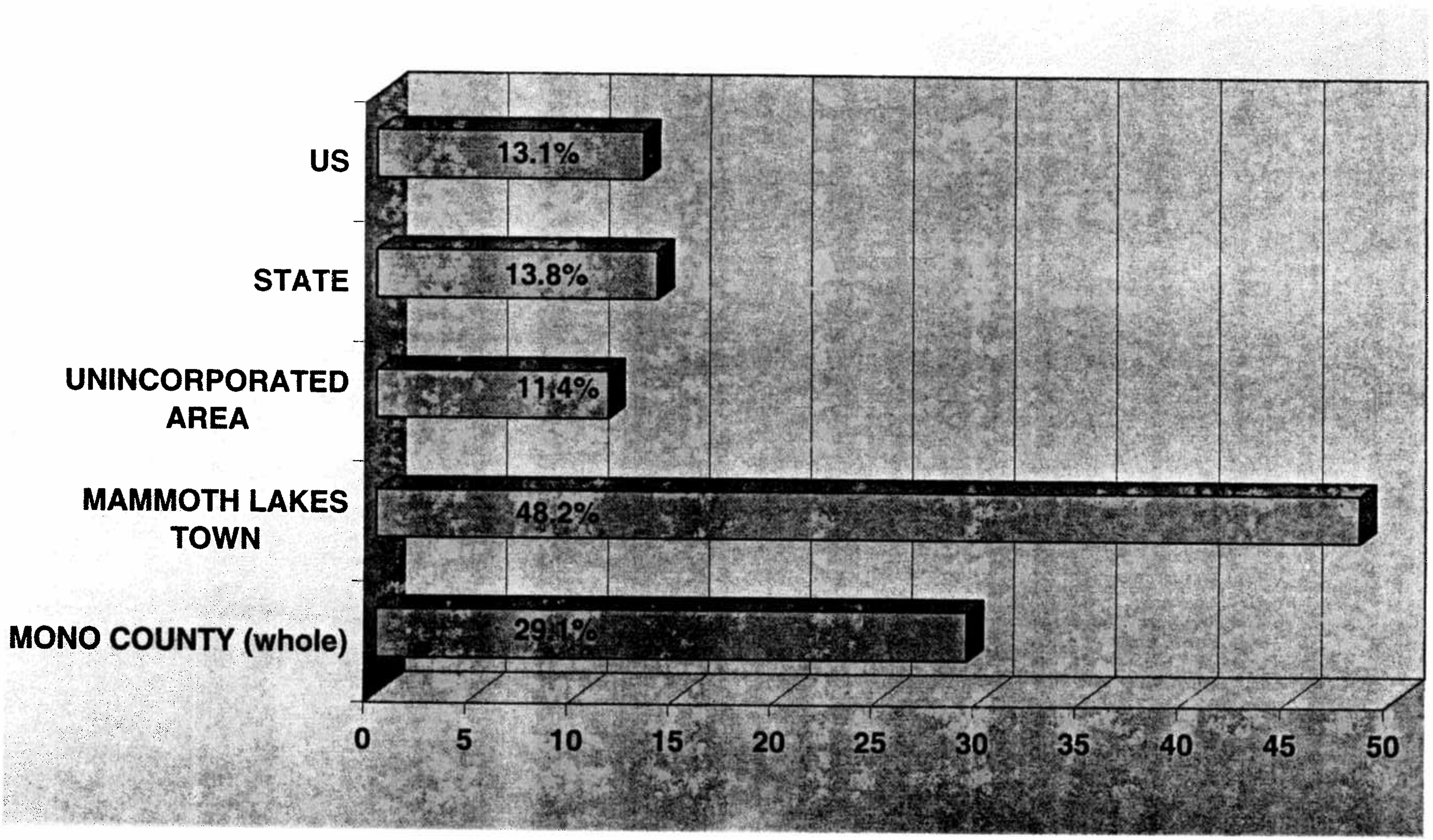
[1] Other Asian alone, or two or more Asian categories.

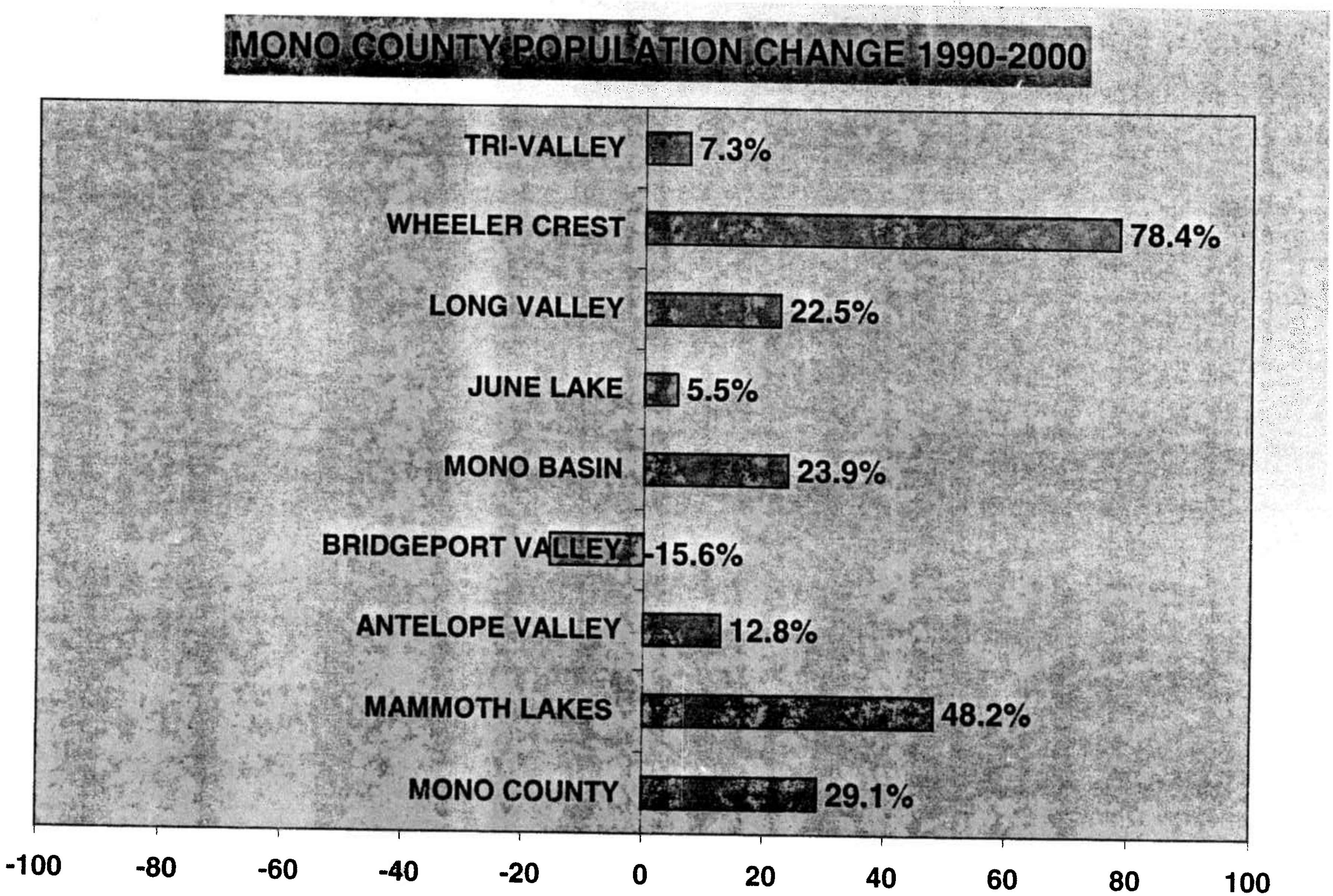
[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] In combination with one or more of the other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

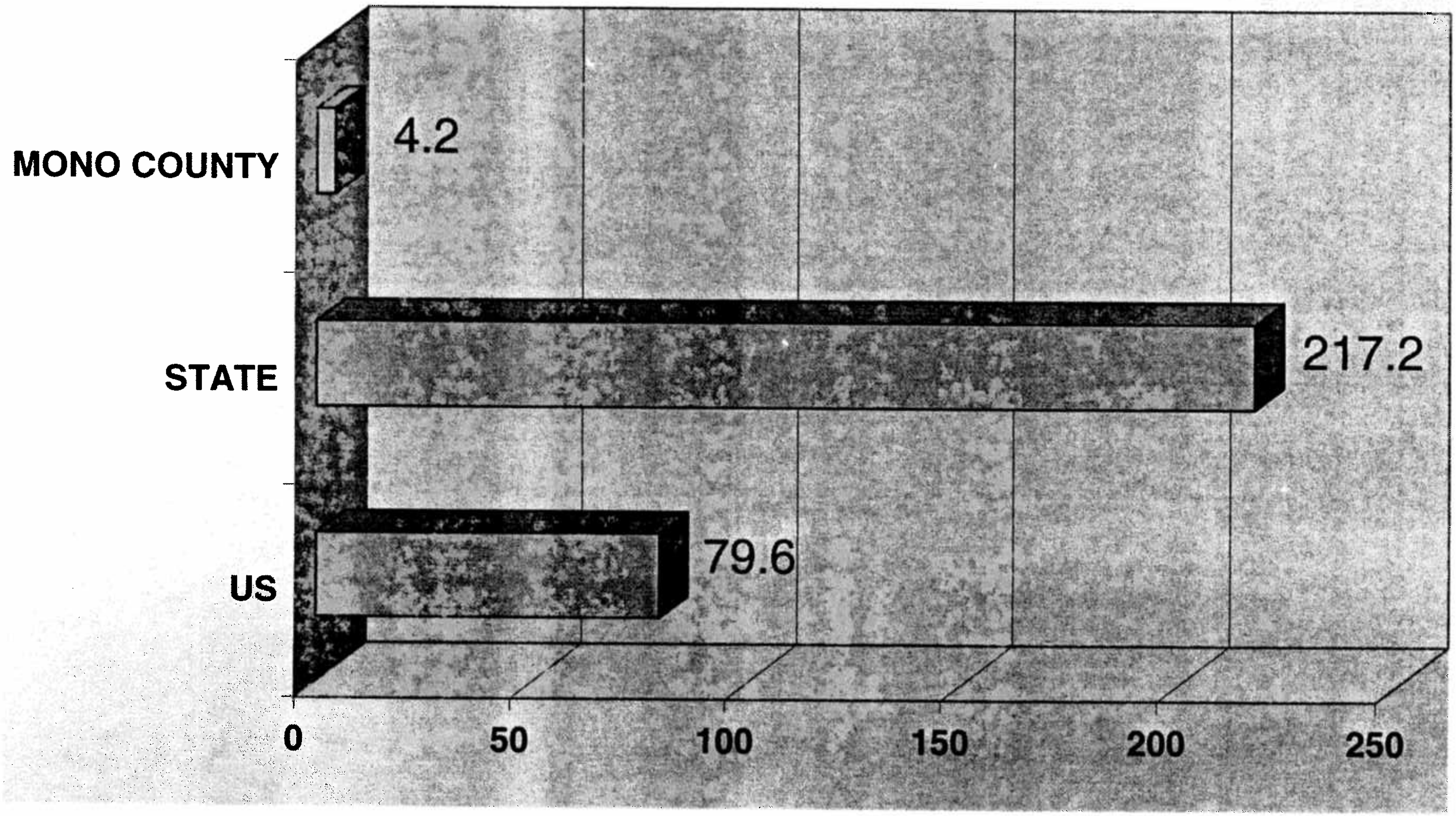
Source: U.S. Census Bureau, Census 2000.

POPULATION CHANGE 1990-2000

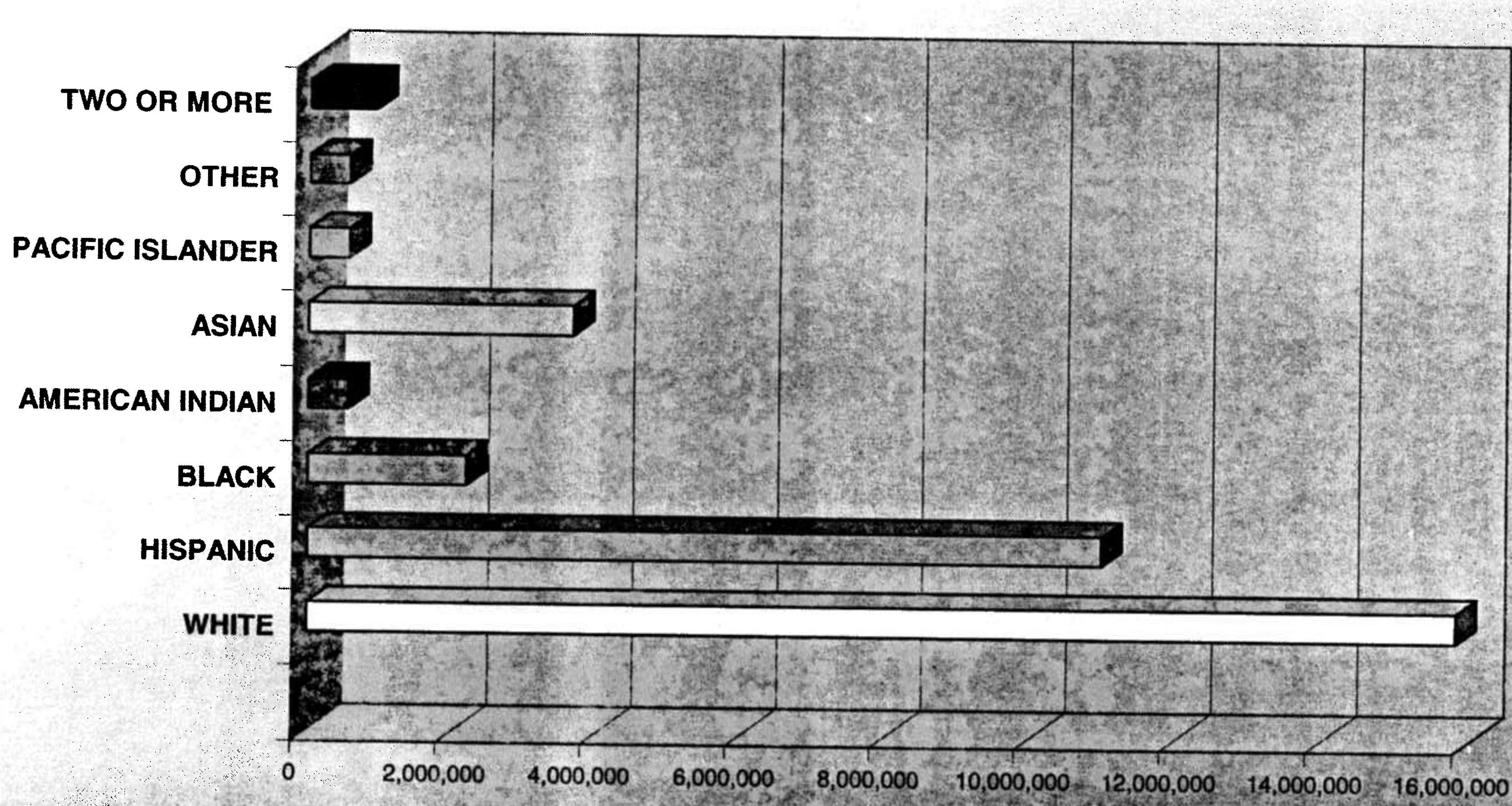



MONO COUNTY POPULATION CHANGE 1990-2000
TRI-VALLEY
7.3%
WHEELER CREST
78.4%
LONG VALLEY
22.5%
JUNE LAKE
5.5%
MONO BASIN
23.9%
BRIDGEPORT VALLEY
-15.6%
ANTELOPE VALLEY
12.8%
MAMMOTH LAKES
48.2%
MONO COUNTY
29.1%
-100
-80
-60
-40
-20
0
20
40
60
80
100

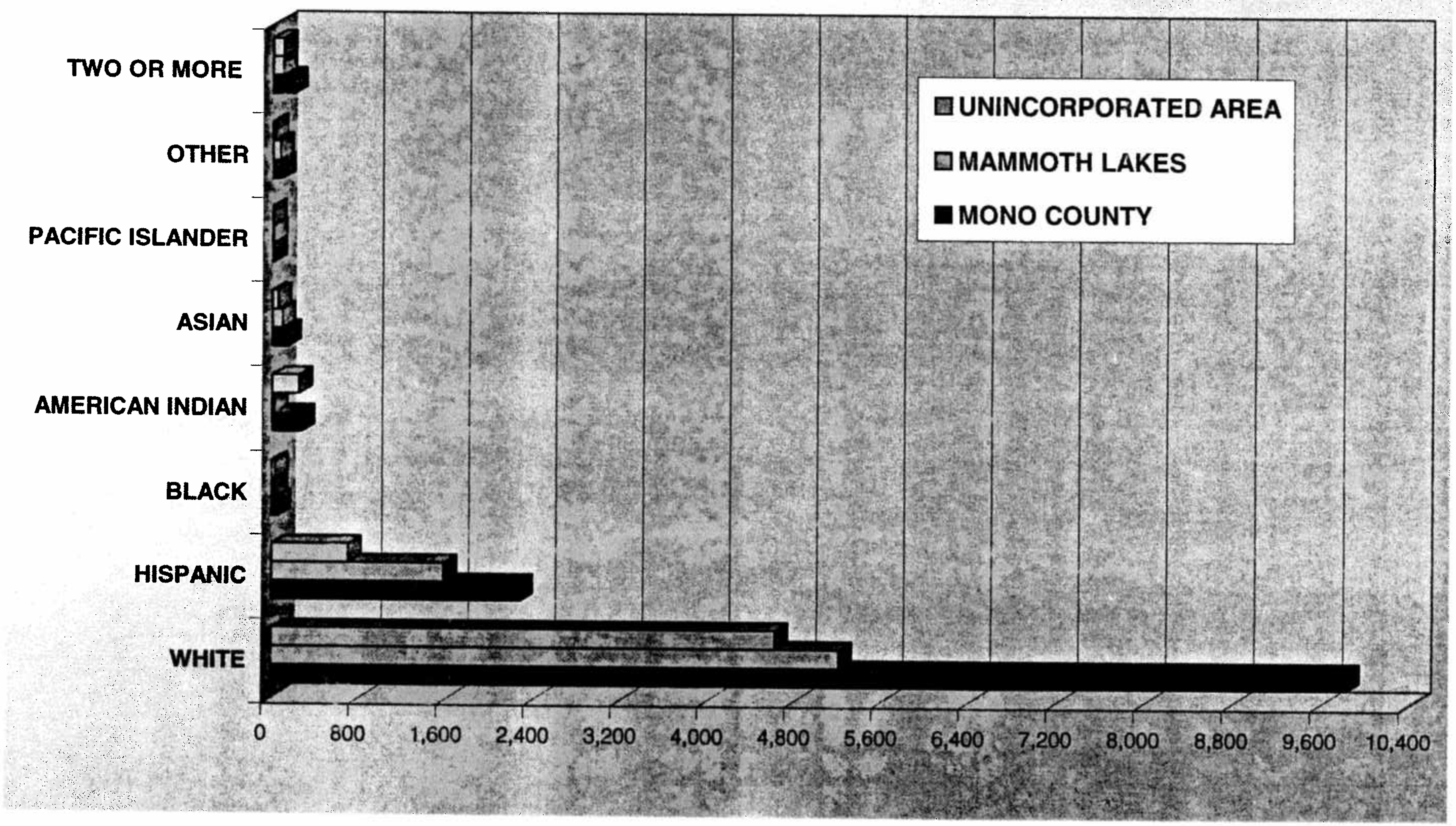
PERSONS PER SQUARE MILE



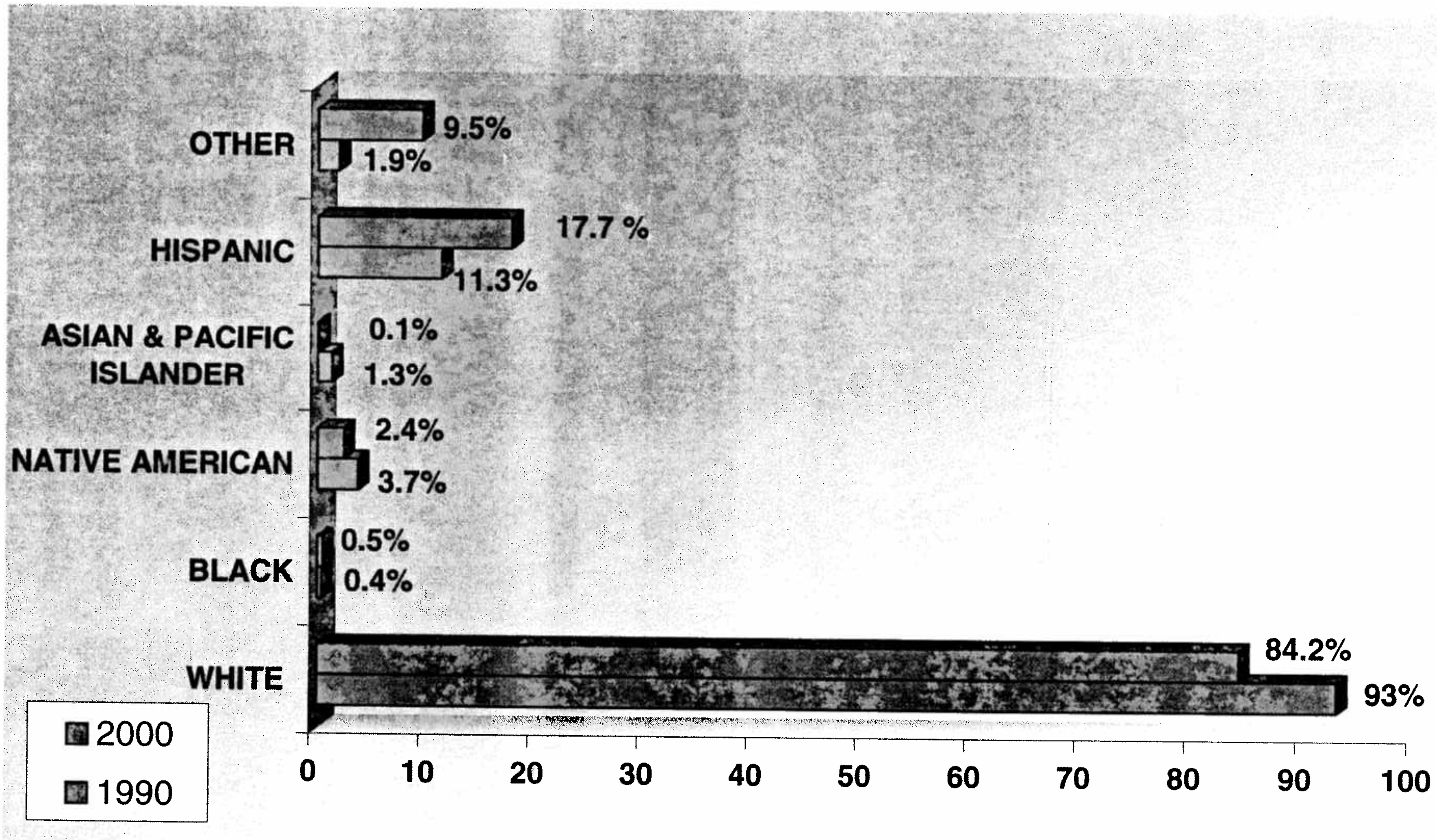
STATEWIDE ETHNIC DISTRIBUTION



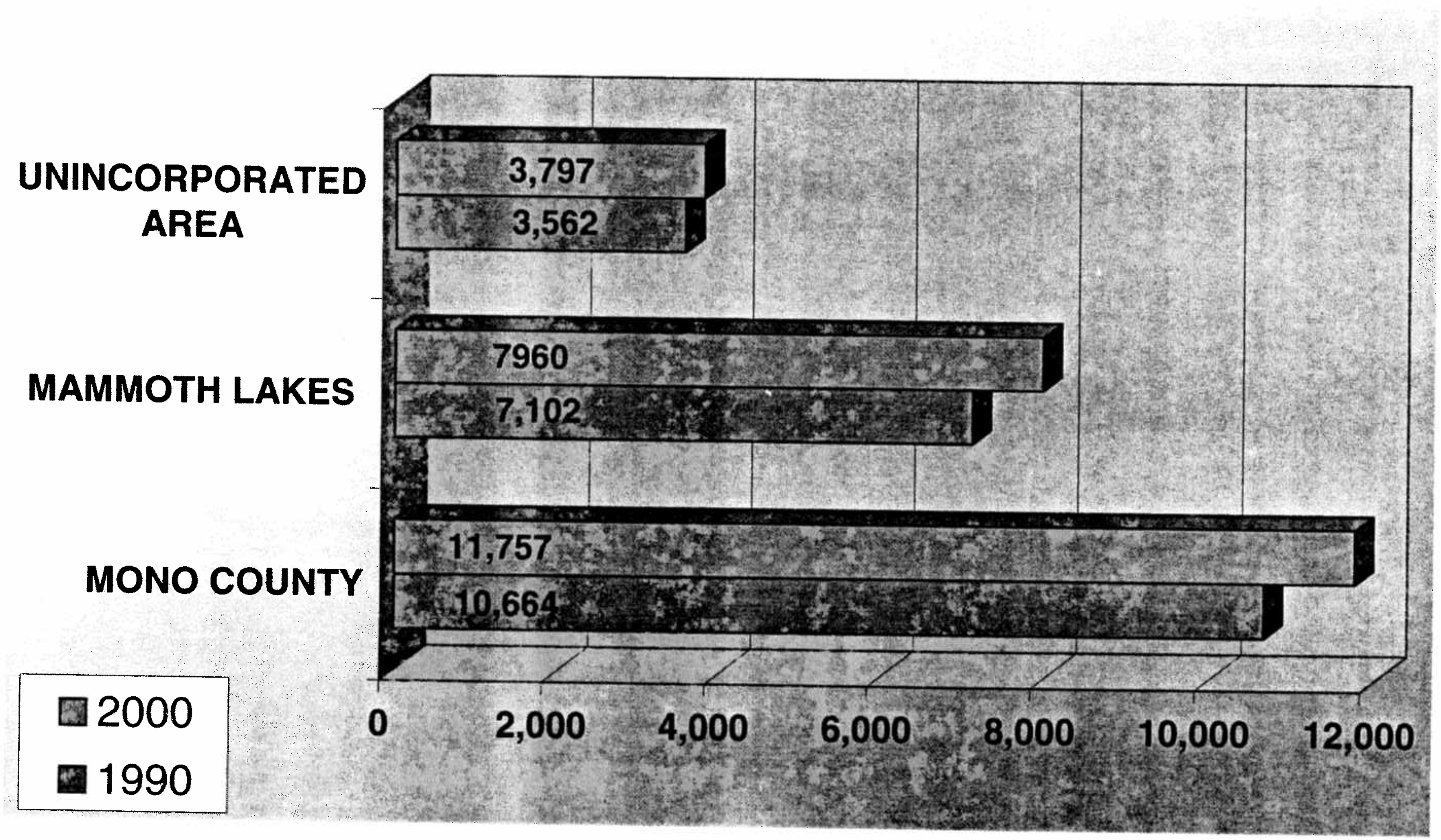
MONO COUNTY ETHNIC DISTRIBUTION

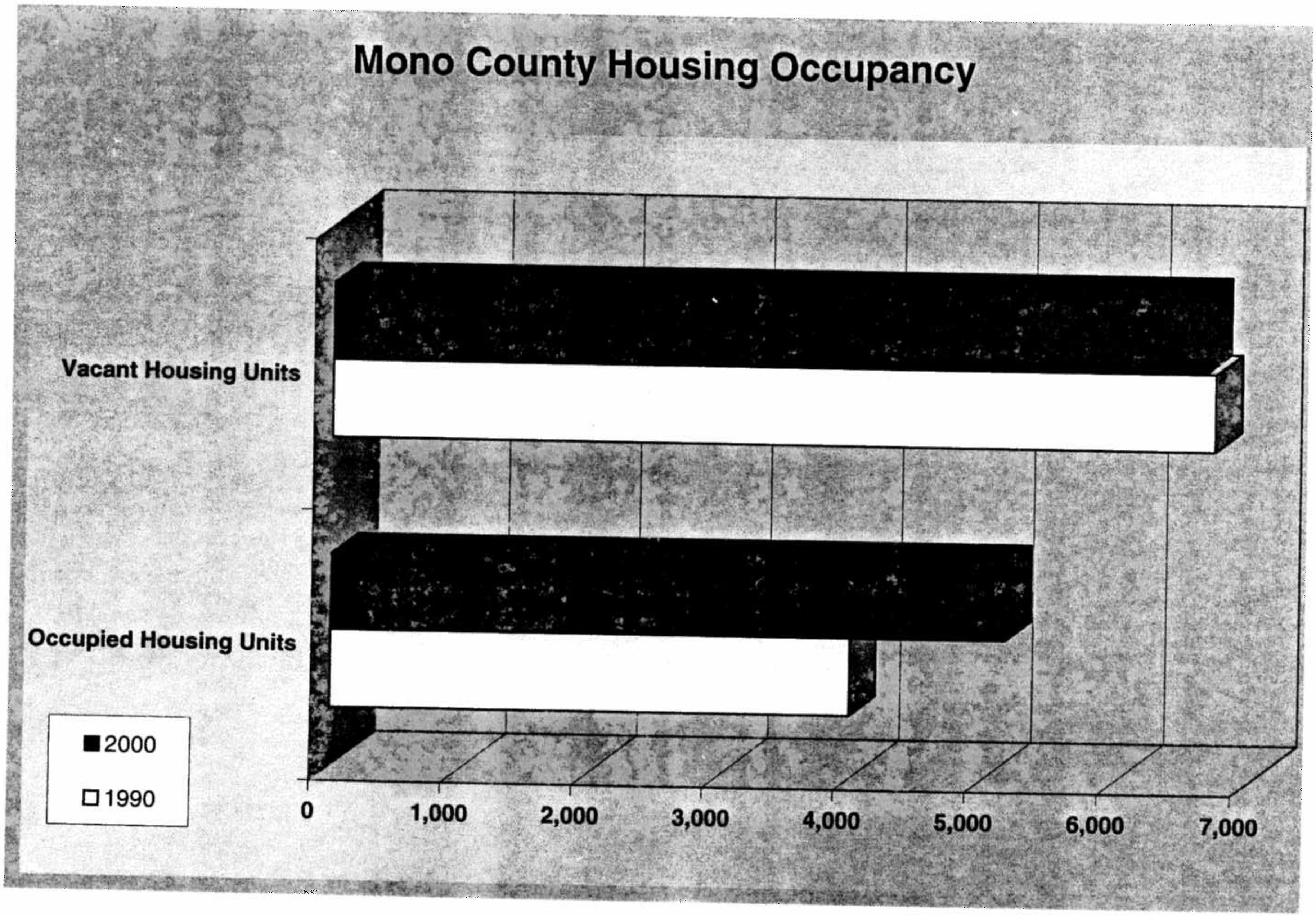


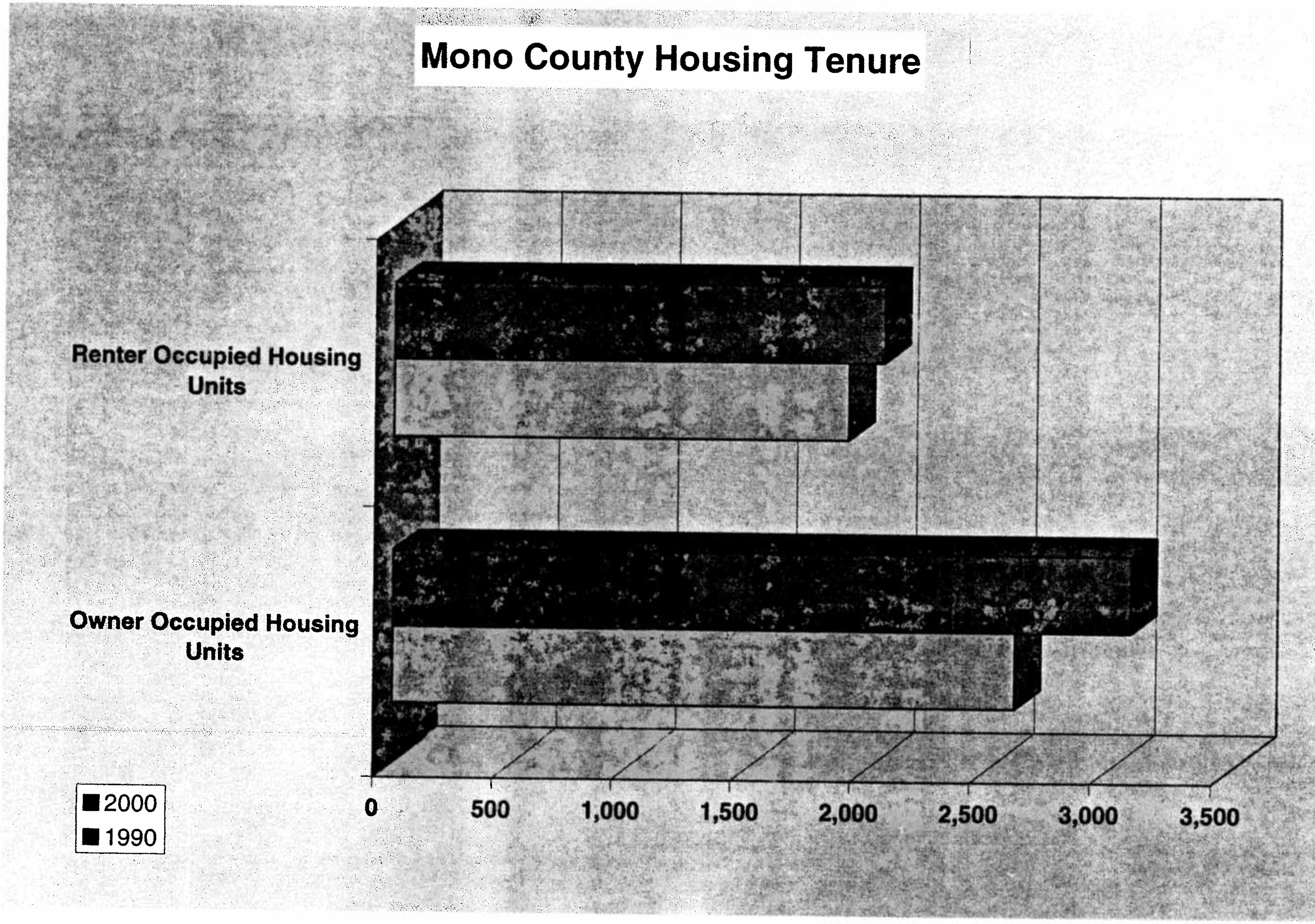
MONO COUNTY ETHNIC DISTRIBUTION

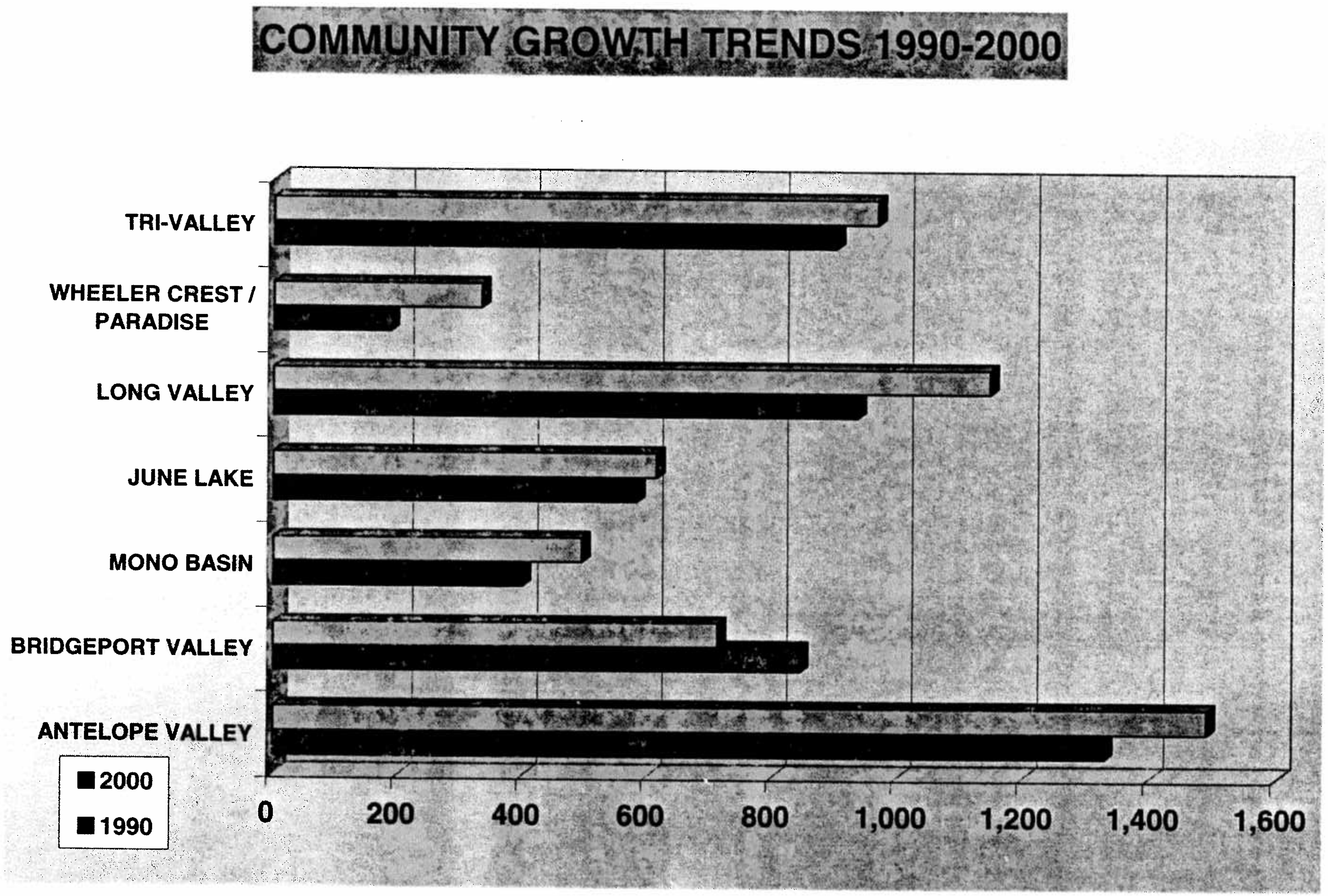


MONO COUNTY TOTAL HOUSING UNITS




Mono County Housing Occupancy
Vacant Housing Units
Occupied Housing Units
2000
1990
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000


Mono County Housing Tenure
Renter Occupied Housing Units
Owner Occupied Housing Units
0
500
1,000
1,500
2,000
2,500
3,000
3,500
2000
1990


COMMUNITY GROWTH TRENDS 1990-2000
TRI-VALLEY
WHEELER CREST / PARADISE
LONG VALLEY
JUNE LAKE
MONO BASIN
BRIDGEPORT VALLEY
ANTELOPE VALLEY
2000
1990
0
200
400
600
800
1,000
1,200
1,400
1,600

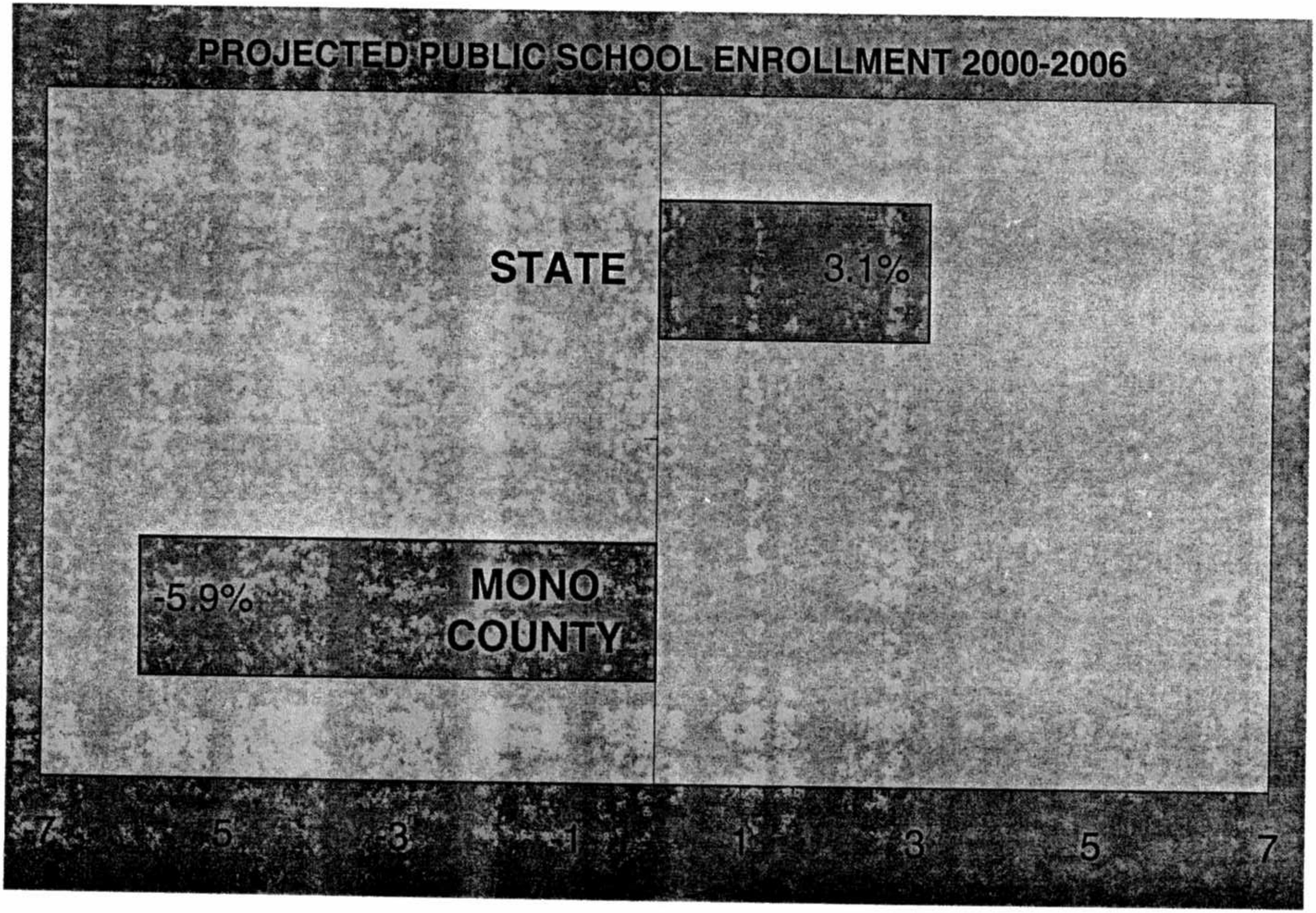

PROJECTED PUBLIC SCHOOL ENROLLMENT 2000-2006
STATE
3.1%
MONO COUNTY
-5.9%
7
5
3
1
1
3
5
7

TABLE 5
MONO COUNTY POPULATION PROJECTIONS BY COMMUNITY AREAS, 2000-2020

	2000 Pop.	% of 2000 Pop.	2010 Pop.	2020 Pop.
Mono County	10,900	100	12,561	14,166
Mammoth Lakes	5,350	49	6,155	6,941
Unincorp. Area	5,550	51	6,406	7,225
Antelope Valley	1,427	25.68	1,645	1,855
Bridgeport Valley	904	16.29	1,044	1,177
Mono Basin	427	7.7	493	556
June Lake	624	11.24	720	812
Long Valley	1,203	21.68	1,389	1,566
Tri-Valley	966	17.40	1,115	1,257

Notes: Percentages of population for Mammoth Lakes and the Unincorporated Area are a percentage of the total county population. The percent of population for the unincorporated communities is a percentage of the total unincorporated area population. These percentages are from the 1990 U.S. Population Census. Numbers may not equal 100 due to rounding.

Sources: www.dof.ca.gov , Statistical Abstract, 2000, Table B-4. 1990 U.S. Census, Population.

MAXIMUM POPULATION AT BUILDOUT

Table 6 shows the maximum potential buildout for the unincorporated areas of the county (Mono County Land Use Element). These figures indicate the maximum number of dwelling units allowed by the Mono County General Plan and the maximum population that would occur if all those dwelling units were built. In Mono County, a large percentage of dwelling units are second homes or vacation homes and are not occupied year round. With a maximum population at buildout of 69,550 persons, the maximum potential resident population would be 38,948 persons (assuming that the 56% occupancy rate identified in the 1990 Census remains constant).

TABLE 6
BUILDOUT BY PLANNING AREA—MONO COUNTY

Planning Area	Maximum Potential Dwelling Units	Maximum Potential Population	%Of County Wide Total
Antelope Valley	5,194	13,037	18.7
Swauger Creek/Devil's Gate	9	23	0
Bridgeport Valley	3,373	8,466	12.2
Bodie Hills	402	1,009	1.5
Mono Basin North	1,111	2,789	4.0
Mono Basin South	490	1,230	1.8
June Lake	3,970	9,965	14.3
Mammoth Vicinity	400	1,004	1.4
Long Valley	2,600	6,526	9.4
Wheeler Crest	645	1,619	2.3
Chalfant Valley	636	1,596	2.3
Hammil Valley	304	763	1.1
Benton Valley	3,819	9,586	13.8
Outside Planning Areas	4,756	11,938	17.2
Countywide Total	27,709	69,550	100

Notes: Maximum potential population is calculated assuming 2.51 persons per dwelling unit (1990 Census).
Numbers may not equal 100 due to rounding.

POPULATION COMPOSITION

In the 1990 Census, the ethnic composition of Mono County was predominantly white (93%), with 3.7% American Indian, <1% Black, 1.3% Asian and 1.9% Other Race. Persons of Hispanic Origin, that includes people of all races, encompassed 11.3% of the population.

The 1990 Census showed that the majority of the county's population continues to be in the 18- to 64-year-old age range, especially in the town of Mammoth Lakes. Only 6% of the total countywide population is 65 years or older, with the majority of those over 65 living outside Mammoth Lakes. The only noticeable change in the age composition of the county's population between 1980 and 1990 was a slight increase in the percentage of those 65 years or older (4% in 1980, 6% in 1990).

TABLE 7
POPULATION BY AGE, MONO COUNTY—1990

Age Group	Countywide	Mammoth Lakes	Unincorporated Area
0 - 4	814 (8%)	378 (8%)	436 (8%)
5 - 17	1,620 (16%)	665 (14%)	955 (19%)
18 - 64	6,906 (69%)	3,631 (76%)	3,275 (63%)
65+	616 (6%)	111 (2%)	505 (10%)
TOTALS:	9,956 (100%)	4,785 (100%)	5,171 (100%)

Median Age--Countywide 33 years, Town of Mammoth Lakes 30 years.

Source: 1990 Census.
Note: Percentages may not equal 100% due to rounding.

SPECIAL POPULATION GROUPS--HANDICAPPED AND DISABLED

The 1990 Census established that 407 persons in the unincorporated area (7.8% of the total unincorporated population) had work disabilities. Fifty-three percent of the total with work disabilities (217 persons) were prevented from working. The 1990 Census also reported that 420 persons over the age of 16 (8.1% of the total unincorporated population) had a mobility or self-care limitation; of that group 96% also had a work disability. The exact number of households unable to afford housing because of a long-term disability was unavailable.

The Inyo Mono Association for the Handicapped (IMAH) serves the developmentally disabled in Mono County ("developmentally disabled" is defined as an impairment of normal functioning, including mental retardation, cerebral palsy, epilepsy, autism and other neurological disorders). The association operates a group home in Bishop (Inyo County) and at present serves one client from Mono County. According to the Mono County Welfare Department, their office presently serves five handicapped residents in Mono County.

Although needs can vary widely, disabled persons need special facilities to help them overcome their disability or to make their housing more convenient, including wide doors to accommodate wheelchairs, handrails, lower countertops, etc. Conversion of conventional housing is usually beyond the financial capability of most disabled persons.

ECONOMIC DATA

ECONOMIC OVERVIEW

The following discussions are excerpts from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> The eastern side of the Sierra Nevada is in transition to being primarily an amenity-dependent economy. While export of water and power has long been a key activity, both dispersed and developed recreation are major industries. The region, containing both wilderness areas and Mammoth and June Mountain ski resorts, straddles the setting of the dispersed recreation of the southwestern slope of the Sierra and that of the developed recreation of the Tahoe Basin. Investment in transportation and urban cultural amenities may determine both the development trajectory of the region and the nature of the institutional mechanisms that arise to bind the southern California recreational users to the management of the region's predominantly public land. In contrast, the loop between urban water users, not just in Los Angeles but also in western Nevada, and riparian and lake-based beneficial uses within the region has been established over time as a result of legal action and judicial decisions. There may well be no surplus or slack left in water supply in this area. Unless the loop can be expanded to include alternative suppliers of water, legal action may remain the primary recourse for balancing water supply and obligations to protect the public trust. In the recreation-based eastern Sierra, recreation user fees may become an especially effective way to close the loop (SNEP, Vol. I, Ch. 3, p. 59-60).

> Immigrants to the Sierra Nevada are likely to accept lower incomes in exchange for amenities, but they also bring human and financial capital. New residents are likely to have higher incomes than most current residents, so their arrival puts pressure on land and housing prices. The more isolated communities of the northern and eastern Sierra Nevada are likely grow relatively slowly, with less pressure on land and housing prices. Existing patterns of human settlement in the Eastern Sierra are more stable [than the western foothills], and lower land prices make significant investments in centralized infrastructure uneconomic (SNEP, Vol. II, Ch. 11).

> Physical proximity to metropolitan areas is no longer the most important factor in exurban growth; economic and cultural links are crucial.... The exodus to exurbia is associated with the classic process of suburbanization and transformation of rural economies from a commodities-oriented, resource-extractive base to a services-oriented, amenity-driven base. Unlike the traditional resource-extractive base of rural areas, the base for the subtle, yet profound transformation of the 1970s and 1980s has been the increasing recognition of the amenity value of natural resources. This new valuation reflects a broad social change in the environmental values of Americans that has simultaneously challenged traditional approaches to land and resource management over the past three decades (SNEP, Vol. II, Ch. 11).

EMPLOYMENT TRENDS

Employment Rates (data from EDD Labor Market Information, www.calmis.cahwnet.gov)
In 2000, the average annual labor force in Mono County was 6,500 persons and the average annual unemployment rate was 5.5%. In December 2000, the labor force in Mono County was 7,400 and in Mammoth Lakes it was 4,130; the countywide unemployment rate was 4.0% while the unemployment rate in Mammoth Lakes was 5.2%.

The higher unemployment rate in Mammoth Lakes reflects the fact that Mono County's economy is based on tourism and outdoor recreation. Many businesses are open only seasonally or employ large numbers of seasonal workers that results in a significant transient labor force and seasonal variations in employment rates. Unemployment rates are generally highest in the spring months and lowest in the winter months.

Over the past decade, the average annual labor force in Mono County has increased from 5,580 persons to 6,500 persons, with seasonal highs of 7,400 persons. The average annual unemployment rate has varied from a low of 5.5 in 2000 to a high of 12.2 in 1991. The average annual unemployment rate has decreased in each of the past five years, from 10.6% in 1996 to 5.5% in 2000.

Employment by Industry (data from EDD Labor Market Information, www.calmis.cahwnet.gov)
The largest employment sector in Mono County (33% of the total in November 2000) is the services sector that includes hotels and lodging, health services and other services. Over the past decade, employment in this sector has decreased from 38% of total employment to the current 33%. Jobs in this sector are impacted by overall economic conditions and adverse weather conditions.

The second largest (24% of the total in November 2000) employment sector is retail trade, which includes food stores, eating and drinking places and retail shops. These jobs are also sharply affected by economic swings and weather fluctuations. Employment in the retail trade sector has remained stable since 1989 at 24% of total employment.

Government is the third largest employer (21% of the total in November 2000), offering one of the more stable, year-round employment opportunities. This sector includes local, state and federal government jobs. Since 1989, employment in this sector has increased from 12% of the total to 21% of the total.

Other significant employment sectors are construction and finance/insurance/real estate. Employment in the construction sector has decreased from 11% of total employment to 8%. Employment in the finance/insurance/real estate sector has remained stable at 8% of total employment.

Employment by Size of Firm (data from EDD Labor Market Information, www.calmis.cahwnet.gov)
In the third quarter of 1999, Mono County had a total payroll of $31,818,162--an increase of $4,370,508 since 1997. Between 1997 and 1999, the number of small-size firms decreased, the number of mid-size firms increased, and the number of large-sized firms remained stable (see Table 8).

TABLE 8
SIZE OF FIRM

Number of Reporting Units with Specified Number of Employees

	Total	0-4	5-9	10-19	20-49	50-99	100-249	250-499	500-999	1000+
1997	557	312	112	76	43	8	5	0	1	0
1999	611	345	112	91	49	8	5	0	1	0

Occupational Growth (data from EDD Labor Market Information, www.calmis.cahwnet.gov)
Occupational growth data from EDD are combined for Inyo and Mono counties and provide overall trends, rather than specific information. Between 1997 and 2004, the five occupations with the greatest absolute growth rate are projected to be cashiers (100 jobs), retail salespersons (80 jobs), amusement/recreation attendants (40 jobs), correction officers/jailers (40 jobs) and heavy truck drivers (40 jobs). The total increase in jobs between 1997 and 2004 is projected to be 950 jobs, an increase of 24.2% in Inyo and Mono counties combined.

For the same period, occupations with the most openings (Inyo and Mono combined) are projected to be cashiers (320 jobs), waiters (200 jobs), retail salespeople (210 jobs), food preparation workers (110 jobs), combined food service and preparation (120 jobs), and food counter attendants (100 jobs).

INCOME

According to the 1990 Census, in 1989 the median household income in the unincorporated area was $28,627; the median household income in Mammoth Lakes was $35,465. The median family income in the unincorporated area in 1989 was $33,354; the median family income in Mammoth Lakes was $38,724.

TABLE 9
1989 HOUSEHOLD INCOME, MONO COUNTY
(1990 CENSUS)

Household Income	Unincorporated	Mammoth Lakes
$0 - 4,999	102	86
5,000 - 9,999	152	105
10,000 - 12,499	65	68
12,500 - 14,999	123	49
15,000 - 17,499	95	58
17,500 - 19,999	134	82
20,000 - 22,499	102	83
22,500 - 24,999	122	92
25,000 - 27,499	89	66
27,500 - 29,999	76	89
30,000 - 32,499	73	146
32,500 - 34,999	41	43
35,000 - 37,499	118	113
37,500 - 39,999	67	66
40,000 - 42,499	103	56
42,500 - 44,999	58	47
45,000 - 47,499	50	106
47,500 - 49,999	54	35
50,000 - 54,999	90	70
55,000 - 59,999	93	93
60,000 - 74,999	73	193
75,000 - 99,999	112	72
100,000 - 124,999	11	96
125,000 - 149,999	13	25
150,000 or more	21	37
Median Income	$28,627	$35,465

TABLE 10A
PERSONAL INCOME FROM LABOR & NON-LABOR SOURCES BY MAJOR CATEGORY, 1970-1995

	1970	% of 1970 Total	1995	% of 1995 Total	New Income 1970-1995	% of New Income
Total Personal Income	67	100%	212	100%	145	100%
Farm & Agricultural Services	2	4%	-2	-1%	-4	-3%
Farm	2	3%	-2	-1%	-4	-3%
Agricultural Services	1	1%	1	0.2%	-0.2	-0.1%
Resource Extraction	0	---	1	0.5%	1	1%
Mining, Oil & Gas	0.1	0.1%	1	0.4%	1	1%
Lumber & Wood Products	0	---	0.1	0.05%	0.1	0.1%
Other Manufacturing (non-extraction)	0	0.4%	1	0.5%	1	1%
Services & Professional	27	41%	106	50%	79	54%
Transportation/Pub. Utils.	3	5%	4	2%	1	1%
Wholesale Trade	0.03	0.05%	2	1%	2	2%
Retail Trade	11	17%	29	14%	18	12%
Finance, Ins., Real Est.	1	2%	8	4%	7	5%
Services (Health, Legal, Bus.)	12	17%	62	29%	51	35%
Construction	6	10%	19	9%	12	9%
Government	16	24%	40	19%	24	17%
Non-Labor Income	17	26%	64	30%	47	33%
Dividends, Interest, Rent	11	16%	39	18%	28	20%
Transfer Payments	6	9%	25	12%	19	13%

NOTES: All figures in millions of 1995 dollars.
This table is a simplified version of original data obtained from the Bureau of Economic Analysis. Industrial sectors are represented as parts of major categories in order to ease interpretation of the data.

SOURCE: Alexander and Rasker. 1998. Economic Profiles of the Sierra Nevada.

TABLE 10B
PERSONAL INCOME EARNED IN SERVICE INDUSTRIES, RANKED BY SIZE, 1995

	1995	% of All Services
Services	62,155	
Hotels and other lodging places	36,039	58%
Business services	9,820	16%
Health services	3,790	6%
Engineering and management services	2,302	4%
Membership organizations	2,275	4%
Miscellaneous services	1,378	2%
Amusement and recreation services	1,294	2%
Legal services	985	2%
Personal services	871	1%
Auto repair, services and parking	836	1%
Private households	366	1%
Educational services	228	0.4
Miscellaneous repair services	136	0.2
Motion pictures	119	0.2%
Social services	n/a	n/a
Museums, botanical, zoological gardens	n/a	n/a

NOTES: All figures in thousands of 1995 dollars.
SOURCE: **Alexander and Rasker. 1998. Economic Profiles of the Sierra Nevada.**

In a note attached to the above table, Alexander and Rasker note that services are the fastest growing sector in Mono County in terms of employment and personal earned income. The Department of Commerce classifies services as those listed in the table above. Some economists also include other sectors as part of a broader category of "services and professional," including Transportation and Public Utilities, Wholesale and Retail Trade, Finance, Insurance and Real Estate, as well as Legal, Health, Business and other services. Defined this way, "services and professional" account for 50% of total personal income.

TABLE 10C
PERSONAL INCOME BY INDUSTRY GROUPINGS

	1988	1995	New Income	% Change	% of New Income
Total Personal Income	205,454	211,889	6,435	3%	
LABOR INCOME					
Agriculture	1,313	(1,912)	-3,224		
Mining	2,419	898	-1,521		
Construction	26,875	18,728	-8,147		
Manufacturing	799	1,079	280		
Total	31,406	18,793	-12,613	-40%	-196%
Transportation and Public Utilities	3,566	4,493	927		
Wholesale Trade	763	2,208	1,445		
Total	4,329	6,701	2,372	55%	37%
Retail Trade	26,488	29,156	2,668	10%	41%
Consumer Services:					
Hotels and Other Lodging	34,131	36,039	1,908		
Personal Services	1,004	871	-133		
Household Services	434	366	-68		
Repair Services	1,384	972	-412		
Motion Pictures	287	119	-168		
Amusements and Recreation	1,162	1,294	132		
Total	38,401	39,661	1,260	3%	20 5
Producer Services					
Finance, Insurance and Real Estate	7,793	8,016	223		
Legal Services	1,046	985	-61		
Business Services	9,040	9,820	780		
Engineering and Management Services	3,371	2,302	-1,069		
Membership Organizations	1,916	2,275	359		
Total	23,165	23,398	233	1%	4%
Social Services					
Health Services	6,133	3,790	-2,343		
Social Services	1,235	n/a	n/a		
Educational Services	91	228	137		
Total*	7,460	4,018	-2,2078	-46%	-34%
Government					
Federal, Civilian	4,822	7,082	2,260		
Military	6,605	5,945	-660		
State and Local	23,496	27,259	3,763		
Total	34,923	40,286	5,363	15%	83%
NON-LABOR INCOME					
Dividends, Interest and Rent	35,377	39,182	3,805		
Transfer Payments	18,159	25,200	7,041		
Total	53,536	64,382	10,846	20%	169%

NOTES: All figures in thousands of 1995 dollars. * Social services slightly underestimated due to disclosure restrictions. This table begins with 1988 because Engineering and Management did not exist as an SIC category until that year. SOURCE: Alexander and Rasker. 1998. Economic Profiles of the Sierra Nevada.

TABLE 10D
TRANSFER PAYMENT DETAILS, 1970-1995

	1970	% of 1970 Total TP	1995	% of 1995 Total TP	New Payments 1970-1995	% of New Payments
Total Transfer Payments (TP)	6,371		25,200		18,829	
Government Payments to Individuals	5,955	93%	23,511	93%	17,556	93%
Retirement	n/a	n/a	13,435	53%	n/a	n/a
Worker's Compensation	n/a	n/a	788	3%	n/a	n/a
Medical Payments	617	10%	4,963	20%	4,346	23%
Income Maintenance (Welfare)	676	11%	2,335	9%	1,659	9%
Unemployment Insurance Benefits	310	5%	2,101	8%	1,791	10%
Veterans Benefits	935	15%	538	2%	(397)	-2%
Federal Education and Training Assistance	n/a	n/a	102	0.4%	n/a	n/a
Other Government Payments	—	—	n/a	n/a	n/a	n/a
Payments to Nonprofit Institutions	244	4%	1,008	4%	764	4%
Business Payments to Individuals	n/a	n/a	681	3%	n/a	n/a

NOTES: All figures in thousands of 1995 dollars.
Transfer payments = payments to persons for whom they do not render current services.
Retirement = Old Age, Survivors and Disability Insurance payments (Social Security), Railroad Retirement & Disability payments, Federal Civilian Employee & Disability payments, Military Retirement, and state and local Government Employee retirement payments.
Workers' compensation = benefit payments from publicly administered worker's compensation insurance.
Medical payments = Medicare, Medical Vendor payments and CHAMPUS payments.
Income maintenance (welfare) = Supplemental Security Income (SSI), Aid to Families with Dependent Children (AFDC), Food Stamps and other income-maintenance programs such as emergency assistance, foster care payments and energy assistance payments.
Unemployment insurance benefit payments = unemployment compensation for state and federal civilian employees, unemployment compensation for railroad workers and unemployment compensation for veterans.
Veterans benefits = primarily compensation to veterans for their disabilities and payments to their survivors.
Federal education and training assistance = Job Corps payments, interest payments on Guaranteed Student Loans, federal fellowship payments and student assistance for higher education.
Other government payments = compensation for survivors of public safety officers and compensation of victims of crimes.
Payments to nonprofit institutions = payments for development and research contracts. For example, it includes payments for foster home care supervised by private agencies.
Business payments to individuals = personal injury liability payments, cash prizes and pension benefits financed by the Pension Benefit Guarantee Corporation.

SOURCE: Alexander and Rasker. 1998. Economic Profiles of the Sierra Nevada.

POVERTY LEVELS

Estimates prepared by the U.S. Census Bureau, Small Area Income and Poverty Estimates Program (see www.census.gov) show 997 persons (9.5% of the population) living in poverty in Mono County in 1995, approximately the same number (967 persons, 9.7% of the population) counted in the 1990 Census (see www.census.gov). Table 11 provides information on the number of persons receiving public assistance in Mono County. The number of aid recipients has fallen in recent years as a result of new federal and state requirements that require aid recipients to participate in work related activities.

TABLE 11
PUBLIC ASSISTANCE RECIPIENTS BY PROGRAM

	1997	1998	1999
CalWORKs (1999); AFDC (1997, 1998)			
Total	265	244	183
Adult	78	61	43
Children	187	183	140
Food Stamps	370	351	227
General Relief	17	4	4
Welfare to Work (1999); GAIN (1997)	26	NA	43

Notes: AFDC = Aid to Families with Dependent Children.
Food stamps include persons receiving public assistance and those not receiving public assistance.
GAIN = Greater Avenue for Independence. GAIN data are not available for 1998.

Source: Employment Development Department, Labor Market Information, Social & Economic Data, Table 1. See www.calmis.cahwnet.gov

WELL-BEING IN FOREST-DEPENDENT COMMUNITIES

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> The SNEP social assessment is based on an improved understanding of communities (defined as a locality-based collection of individuals) and an expanded definition of human dependence on the Sierra Nevada ecosystem. Communities located in or near forests have long been called resource-dependent communities. The nature of dependence is defined beyond simple economic reliance on commodity production. The SNEP assessment of community well-being is unique because it focuses on communities rather than county-level data (SNEP, Vol. II, Ch. 12).
>
> Although the concept of well-being is somewhat fuzzy to lay-people and controversial to sociologists, its measure in the SNEP assessment was composed of two elements: (1) measures of community capacity drawn from the knowledge of local experts, and (2) measures of socioeconomic status. Community capacity is a dynamic and multidimensional measure of the collective ability of residents to create and take advantage of opportunities and

adapt to a variety of circumstances. Capacity is the ability of a community to meet local needs and expectations and to respond to internal and external stresses. Three primary components of capacity were assessed: *physical capital*, which includes physical elements and resources in a community such as sewer systems, housing stock, schools and open space; *human capital*, which includes the skills, education, experiences and general abilities of residents; and *social capital*, which includes the ability and willingness of residents to work together for community goals. A low-capacity community is one in which residents generally do not work well together, do not have or use existing resources effectively, and adapt poorly, if at all, to change. Low capacity, then, reflects a reduced ability to improve local well-being, including socioeconomic status (SNEP, Vol. II, Ch. 12).

Basic Results for Mono County

Aggregation	Population	Socioeconomic Score (1 to 7)	Capacity Score (1 to 5)
Walker/Coleville/Topaz	1,412	2	4
Bridgeport/Twin Lakes/Swauger	742	4	4
Lee Vining/Mono Basin	415	5	4
June Lake	607	4	2
Mammoth Lakes	4,785	4	2
Long Valley/Wheeler Crest/Paradise	1,094	6	2

A scale depicting variation in selected socioeconomic factors for the community aggregation units was developed from the 1990 Census of Population and Housing data. The socioeconomic scale incorporated five primary categories: housing tenure, poverty, education, employment and children in homes with public assistance income (SNEP, Vol. II, Ch. 13).

The Antelope Valley aggregation (Walker, Coleville and Topaz) is in the bottom 10% of the socioeconomic scale of all Sierra Nevada aggregations. Antelope Valley has one of the highest percentages of people in poverty in the Sierra Nevada and a high poverty intensity scale. Poverty and poverty intensity in this aggregation are the highest in the southeast region. Almost 12% of the population is of Hispanic origin, and 10% of those over age 16 are Native American. The aggregation is one of the highest rated in capacity because, among other things, residents are quick to pool resources and pull together in times of need (SNEP, Vol. II, Ch. 13).

The highest rated aggregation in the southeast region on the socioeconomic score is Long Valley/Wheeler Crest/Paradise. The capacity score is 2, due primarily to a dispersed population and limited civic action (SNEP, Vol. II, Ch. 13).

The second highest rated aggregation on the socioeconomic scale is Lee Vining/Mono Basin. There are no children in families receiving public assistance in this aggregation. Census data indicate that both homeowners and renters have high incomes, with homeowners being some of the wealthiest in the Sierra Nevada. Community capacity is 4, the highest rating in the southeast region. Social capital has increased as a result of recognition of the importance of the landscape and place and consequent efforts devoted to protecting it. The area depends almost exclusively on recreation and tourism but has little control over the flow of tourists traveling over Tioga Pass and through Yosemite National Park. The National Park Service limits tourist bus volume and controls snow removal activities on the Tioga Pass road, which determine when the pass opens in the summer. The pass was described as an economic lifeline for the community (SNEP, Vol. II, Ch. 13).

The destination resort town of Mammoth Lakes is the center for a great many tourist-related activities associated with Mammoth Mountain. Typical of other destination resorts, Mammoth Lakes has one of the lowest proportions of homeowners to renters in the entire Sierra Nevada and has one of the two highest educated populations in the southeast region (the other is June Lake). Mammoth Lakes ranks in the middle of the socioeconomic scale for the region, rated at 4, and has a low capacity of 2. Good physical infrastructure and human capital do not offset the divisiveness between pro-development community members and those opposed to development. This conflict has made it difficult for people to work together. A high turnover rate due to many seasonal workers further reduces capacity (SNEP, Vol. II, Ch. 13).

CHAPTER 6
HOUSING*

HOUSEHOLD CHARACTERISTICS

A household is any person or group of persons, related or unrelated, occupying a housing unit as a place of residence. In 1990, there were 3,961 households countywide. Projections prepared by the State Department of Finance in 1991 project that by 2000 there would be 5,400 households countywide (unincorporated area and the town of Mammoth Lakes).

In 1990, 51% of all households in the county (2009 households) were in the unincorporated area of the county; by 2000, 48% of the total number of households in the county (2592 households) is projected to be in the unincorporated area.

TABLE 12
ESTIMATED AND PROJECTED HOUSEHOLDS, MONO COUNTY

	1980[1]	1990[2]	2000[3]
Unincorporated	1,816 (53%)	2,009 (51%)	2,592 (48%)
Mammoth Lakes	1,637 (47%)	1,952 (49%)	2,808 (52%)
TOTALS	3,453	3,961	5,400

SOURCES:
1. 1980 Census.
2. 1990 Census.
3. State Department of Finance 1991 Projections. Assumes continued 48/52 split between unincorporated area and Town.

TABLE 13
AVERAGE PERSONS PER HOUSEHOLD

	1970[1]	1980[2]
Unincorporated Area	2.83	2.43
Mammoth Lakes	2.72	2.40

SOURCES: 1. 1980 Census. 2. 1990 Census.

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*Refer also to the section on "Plans and Policies" for cross-references to other documents that may provide additional site-specific housing information.

Female-Headed Households
In 1990, female heads of households accounted for 409 persons (8% of the unincorporated area population) in 144 households (7% of the households in the unincorporated area). One hundred and forty-five persons in female-headed households in the unincorporated area were determined to be below poverty level in the 1990 Census. These people were distributed in 46 households.

Elderly
In 1990, 616 persons in the county were 65 years old or older. Eighty-two percent (505 persons) of the elderly lived in the unincorporated area; 18% lived in Mammoth Lakes. Eighty persons aged 65 years or older, living in the unincorporated area, were determined to be below poverty level in the 1990 Census.

HOUSING CHARACTERISTICS

Housing Stock
Between 1986 and 1990, the housing stock in the unincorporated areas of Mono County increased from an estimated 3,064 units (1986 State Department of Finance Estimates) to 3,565 units, an increase of 501 units or 16% of the 1986 housing stock (see Table 14). The percentage of single-family residences increased from 63% of the total housing units in 1986 to 70% in 1990. The percentage of mobile homes and other units increased from 20% to 23%; the percentage of two- to four-plexes decreased from 5% to 4%. There is an anomaly in the number and percentage of five or more units. The 1986 DOF estimates show 402 units of that type (13% of the total); the 1990 Census shows 65 units (2% of the total). This is probably due to differences in the methodology of counting units of that size.

TABLE 14
HOUSING UNIT COUNT, 1990--UNINCORPORATED AREAS

	Total Housing Units	Occupied Housing Units	Household Population	Vacancy Rate	Persons Per Household
SFR detached	2284	1192	3034	47.81	2.55
SFR attached	193	116	376	39.90	3.24
2- to 4-plexes	191	112	246	41.36	2.20
5 or more units	65	34	52	47.69	1.53
Mobile homes	762	508	1224	33.33	2.41
Other	70	47	118	32.86	2.51
TOTALS	3565	2009	5050	NA	2.51
SOURCE: 1990 Census.					

Housing Costs
In 1980, the median home value countywide, including Mammoth Lakes, was $106,000, an increase of 312% over the 1970 median home value of $25,700. The median home value in 1980 in Mammoth Lakes was 163,000. By 1986, countywide home values had decreased slightly to an average of $99,160, with Mammoth Lakes at an average of $135,000. In 1990, the median home value countywide, including Mammoth Lakes, was $159,900, an increase of 51% over the 1980

median home value. The median home value in Mammoth Lakes in 1990 was $201,700. The median home value in the unincorporated area in 1990 was $129,411.

TABLE 15A
HOUSING COSTS-- MEDIAN HOME VALUE

	1980[1]	1990[2]
Countywide	$106,000	$159,000
Mammoth Lakes	$163,000	$201,700

SOURCES: 1. 1980 Census.
2. 1990 Census.

TABLE 15B
HOUSING COSTS--MEDIAN CONTRACT RENT

	1980[1]	1990[2]
Unincorporated Area	$239	$363
Mammoth Lakes	$316	$512

SOURCES: 1. 1980 Census.
2. 1990 Census.

TABLE 16
INCREASE IN HOUSING VALUE, RENT AND HOUSEHOLD INCOME, 1980-1990

	1980	1990	Increase
Median Home Value	$106,000	$159,000	$53,000 (50%)
Median Contract Rent	$239/month	$363/month	$124/mo. (52%)
Median Household Income	$15,893	$28,627	$12,734 (80%)

SOURCE: U.S. Census, 1980, 1990.

NOTE: Home value figures are countywide. Rent and income figures are unincorporated area only.

Tenure and Occupancy
In 1986, the DOF estimated that the unincorporated areas of Mono County had a 34.1% vacancy rate. The 1990 Census showed this figure to be 43.65%. This unusually high vacancy rates reflects the large numbers of second homes and recreational homes in the area, many of which remain vacant for more than six months of any given year. The 1990 Census reflects that only 6% of the vacant units in the unincorporated area were for rent, and only 3% of the vacant units were

vacant-for-sale. Considering those figures, the overall vacancy rate of 43.65% is somewhat deceptive since most of the vacant units are not available for rent or purchase.

Unit Size

In analyzing the overall housing situation in Mono County, a comparison of the number of persons per housing unit and the number of rooms in existing structures is useful for identifying the unit size in greatest demand. This information can provide the county with an indication of the types of new units that should be built to meet future county needs. For the unincorporated area in 1990, the mean number of rooms per unit was 4.6. Twenty-eight percent of the total housing units in the county had four rooms, 25% had five rooms, and 75% of the total had from three to six rooms.

OVERPAYMENT

Federal housing programs define overpayment for housing as paying 30% or more of adjusted gross income for housing. The median gross rent in the unincorporated area in 1989 was $363, according to the 1990 Census. The median home value was $129,411. A household would need an annual income of approximately $43,500 to afford the median priced home and $18,000 to afford the median rent. The median household income in the unincorporated area was $28,627; the income limit for a very low-income household was $14,313, the limit for a low-income household was $22,901. The 1990 Census identified 175 renter households and 51 owner-occupied households with incomes of $20,000 or less that were overpaying for housing.

In 1989, approximately 3% of the renter-occupied housing units were paying 30% to 34% of their household income for gross rent (i.e., 22 households)[1]; approximately 25% were paying 35% or more of household income for gross rent (i.e., 187 households). All of the households paying 30% or more of their income for gross rent had a household income of $34,999 or less; the median household income for the unincorporated area in 1989 was $28,627. Approximately 87% of households with an income less than $10,000 (i.e., 84 households) were paying 35% or more of their income for gross rent. Approximately 39% of households with an income from $10,000 to $19,999 (i.e., 80 households) were paying 35% or more of their income for rent.

For owner-occupied housing units, the median monthly owner costs[2] in 1989 were $880 with a mortgage and $217 without a mortgage. According to the 1990 Census, 3% of the total number of owner-occupied units (i.e., 21 households) was paying 30% to 34% of their income for housing costs; 18% (i.e., 119 households) were paying 35% or more of their income for housing costs. Seventy-nine percent of households with an income less than $10,000 (i.e., 41 households) were paying 35% or more of their income for gross rent. Ten percent of households with an income from $10,000 to $19,999 (i.e., 13 households) were paying 35% or more of their income for rent. Thirty-five percent of households with an income from $20,000 to $34,999 were paying 35% or more of their income for housing.

OVERCROWDING

The U.S. Bureau of the Census defines overcrowding as more than one person per room (excluding bathrooms) in a housing unit. The 1990 Census provides data on tenure by persons in unit; however, it does not correlate these data with the number of rooms in those units.

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[1]"Gross rent" includes monthly contract rent plus the estimated average monthly cost of utilities and fuel, if paid by the renter.

[2]Monthly owner costs is the sum of payments for mortgages, deeds of trust, contracts to purchase, or similar debts on the property; real estate taxes; fire, hazard and flood insurance on the property; utilities; and fuels. It also includes monthly condominium fees or mobile home costs, where appropriate.

For the unincorporated area in 1990, the mean-number-of-rooms per unit was 4.6. Using the mean-number-of-rooms figure of 4.6, five or more persons per unit would constitute overcrowding. For the unincorporated area in 1990, there were 78 units with five persons, 67 units with six persons, and 26 units with seven or more persons. A total of 171 units, or 8.5% of the total number of households, had five or more persons. These figures give some approximation of the potential overcrowding in the unincorporated area. Thirty-three percent of the units with five or more persons were owner occupied; 66% were renter occupied.

In 1980, there were 116 overcrowded units in the unincorporated area, or 6.1% of the total number of households. The average number of persons per household in 1980 was 2.43; in 1990, it was 2.52. A small increase in the number of overcrowded households is not surprising, considering the overall economic climate during this period. The need for large-sized units, particularly for renters, will probably continue.

SUBSTANDARD HOUSING UNITS AND REHABILITATION

The majority of the housing units in Mono County are relatively new; only 745 houses (7% of the 1990 total of 10,664 housing units) were constructed prior to 1950. Nonetheless, there are a number of housing units in the county in need of rehabilitation or replacement.

In 1981, a countywide survey was conducted by the Inyo Mono Association of Governmental Entities (IMAGE, no longer in existence) to determine the extent of the need for housing rehabilitation/replacement at that time. The results suggested that there was a limited need for a rehabilitation/replacement program in Mono County; approximately 800 units, or 10%, of the total number of housing units in Mono County were identified as substandard. Eighty-one% percent of those units were identified as being worthy of rehabilitation.

The IMAGE study included housing units in Mammoth Lakes since the town was not incorporated at that time. The area-by-area analysis of housing conditions found that although the largest number and the greatest countywide proportion of substandard units were in Mammoth Lakes, the greatest area proportion occurred in the vicinity of Long Valley and in the Tri-Valley area (Benton, Hammil, Chalfant). Eighty-four percent of the substandard units identified in Mammoth Lakes were in need of minor rehabilitation; 45% of the substandard units in Long Valley were in need of major rehabilitation; and 44% of the substandard units in the Tri-Valley area needed replacement.

This survey was updated in February 1992, by the Mono County Building Department (see Table 17). Based on the best estimates of personnel in that department, approximately the same percentage of units are in need of rehabilitation at this time as in 1981 even though the overall number of housing units in the unincorporated area has increased since 1981. When comparing the figures in Table 17 to those in the original table prepared as a result of the 1981 survey, the percentage of countywide total figures for each area in 1992 may be somewhat larger than the 1981 figures since the 1981 figures included Mammoth Lakes, resulting in lower overall percentages for each area in 1991.

SPECIAL GROUPS HOUSING NEEDS

Handicapped and Disabled

Handicapped and disabled persons do not constitute a significant proportion of Mono County's population. The 1990 Census established that 407 persons in the unincorporated area (7.8% of the total unincorporated population) had work disabilities. Fifty-three percent of the total with work disabilities (217 persons) were prevented from working. The 1990 Census also reported that 420 persons over the age of 16 (8.1% of the total unincorporated population) had a mobility or self-care limitation; of that group 96% also had a work disability. The exact number of households unable to afford housing because of a long-term disability was unavailable.

TABLE 17
HOUSING CONDITIONS-- Unincorporated Area, 1992

	Minor Rehab[1] Needed	Major Rehab[2] Needed	Replacement[3] Needed	Total Substandard	Area Unit Totals
Antelope Valley					
Number (#)	31	48	17	96	700
% of S.T./A.T.[4]	32%	50%	18%	14%	
% of T[5]	22%	21%	12%	18%	
Bridgeport Valley					
#	14	25	22	61	692
% of S.T./A.T.	23%	41%	36%	9%	
% of T	10%	11%	15%	12%	
Lee Vining/Mono City					
#	5	12	16	33	253
% of S.T./A.T.	15%	36%	48%	13%	
% of T	3%	5%	11%	6%	
June Lake					
#	21	59	32	112	714
% of S.T./A.T.	19%	53%	29%	16%	
% of T.	15%	26%	22%	22%	
Long Valley/Swall Meadows					
#	49	51	14	114	790
% of S.T./A.T.	43%	45%	12%	14%	
% of T.	34%	22%	10%	22%	
Tri-Valley					
#	24	34	46	104	416
% of S.T./A.T.	23%	33%	44%	25%	
% of T	17%	15%	31%	20%	
Countywide Total (T)	144	229	147	520	3565
% of Countywide Total	4%	6%	4%	15%	

NOTES:
1. Minor rehabilitation needed: maintenance deficient; e.g., needs paint; minor structural deficiencies, roof damage.
2. Major rehabilitation needed: major structural deficiency; e.g. serious foundation problems.
3. Replacement needed: the cost of repairing structural deficiencies exceeds the value of the building.
4. % of S.T./A.T. = % of Substandard Totals/Area Totals.
5. % of T = % of Countywide Total.

(This table will be updated as soon as new information becomes available.)

The Department of Social Services reports that presently there are five handicapped persons receiving aid. No information is available regarding the nature of the housing units occupied by these residents. However, it can be presumed that the high cost of housing and the numerous two-story structures that are common in the heavy-snowfall areas of the county may make it difficult for handicapped and disabled persons to find adequate housing.

The Inyo Mono Association for the Handicapped (IMAH) has indicated that very few disabled persons reside in Mono County and that there is a suitable residential facility in Bishop to meet their needs.

Elderly
The 1990 Census reported that 505 persons (10% of the total population in the unincorporated area) residing in the unincorporated areas of the county were 65 years old or older.

According to the Census, 80 individuals 65 or older, or 13% of the senior citizen population, live either below or on the fringe of poverty. According to the Census, approximately 77% of all householders over the age of 65 in the unincorporated area own their own homes. Home ownership is a significant hedge against the inflationary rental environment that is probably the greatest factor why such a small percentage of elderly households are below or at poverty level.

Site and unit size availability are generally not a problem for the elderly in the county, because Mono County is a rural area with the propensity for lot subdivisions rather than home subdivisions, and mobile homes are permitted throughout the county on parcels zoned for single-family residences.

Due to the small number of poverty level elderly residents within the county, their needs can best be addressed through rehabilitation assistance for homeowners and rent assistance for low- and moderate-income elderly renters. Currently, there is no rental-assisted housing in the county.

Section 202 financing, Direct Loans for Housing for the Elderly or Handicapped, administered by the Department of Housing and Urban Development, is also available to qualified sponsors for the financing of construction of rental or cooperative housing facilities for occupancy by elderly or handicapped persons.

Emergency Shelter Needs and Homeless Housing
The need for emergency housing encompasses a large range of situations. Families otherwise able to provide themselves with adequate housing may be suddenly and unexpectedly faced with the need for emergency shelter as a result of fire or family breakup. Families only marginally able to meet their housing needs may be left without shelter when their present housing is sold, when a shared housing arrangement breaks down, from an inability to pay rent, or a number of similar reasons. Finally, there is a transient population, composed of both families and individuals, which has emergency shelter needs.

Through the joint efforts of the Mono County Department of Social Services and the Inyo-Mono Advocates for Community Action (IMACA) and their implementation of General Assistance/Relief and AB 1733, low income residents and transients in Mono County may be placed in a local or nearby motel on an emergency basis for up to 28 days. Other available programs for low-income residents include assistance in payment of the first and last month's rent for those who have been displaced or find themselves in need of emergency housing, and food vouchers that are available to qualified persons.

Mono County does not have a large homeless population, largely due to the severe winter weather conditions. In addition, the social services provided are not concentrated in one location, making it difficult for a homeless person to utilize them, especially since there is only limited public transportation within the county and the town of Mammoth Lakes. The County Department of Social Services processes approximately five to six homeless assistance cases annually, under the auspices of AFDC homeless assistance. This assistance is available only to families and pays for housing and utilities deposits. Current services are adequate for the needs in the area.

Emergency housing may also be a necessity during times of disaster, such as avalanches, floods, fires and earthquakes. According to the Mono County Multi-Hazard Functional Plan, prepared by the County's Office of Emergency Services, emergency housing may consist of any appropriate public or private building, depending on the size, location and nature of the disaster. Disaster shelters may be temporarily coordinated and/or funded by the American Red Cross, the Federal Emergency Management Agency, the local Department of Social Services, the Sheriff's Department and other appropriate private or quasi-public organizations.

Although the California Office of Emergency Services has suggested that a permanent, year-round emergency disaster shelter may be appropriate for Mono County, the cost of building such a facility is well beyond the reach of the County's budget. Until such time as additional funding becomes available, use of community centers, federal buildings and churches as evacuation centers/emergency shelters must suffice.

Female-Headed Households

In 1990, female heads of households accounted for 409 persons (8% of the unincorporated area population) in 144 households (7% of the households in the unincorporated area). One hundred and forty-five persons in female-headed households in the unincorporated area were determined to be below poverty level in the 1990 Census. These people were distributed in 46 households.

Large Households

A large household is one that has five or more persons. In areas that consist of two and three bedroom homes, such households may contribute significantly to overcrowding. In the past, overcrowding has not been a significant problem in the unincorporated areas of the county. Data from the 1990 Census show that in the unincorporated area, 165 households (8% of all households in the unincorporated area) had five or more persons.

Farmworkers

Large farm owners and ranchers in the Antelope, Bridgeport and Hammil valleys hire a limited number of farm workers and ranch hands. Housing for most of these employees is provided on site. If this type of housing were to be eliminated, it would be difficult for farm laborers to find adequate affordable housing.

Ethnicity

Three hundred and thirty-four Native Americans were reported by the 1980 Census, representing 3.9% of the county's population. The 1990 Census counted 368 Native Americans countywide, with 30 in the town of Mammoth Lakes and 338 in the unincorporated area. Although the number of Native Americans in the county remained fairly constant, the percentage declined from 3.9% of the total county population to 3.7%, due to the increase in the total population between 1980 and 1990.

The federal government provides housing for approximately 39 American Indian households in the Antelope Valley, 21 American Indian households in the Bridgeport Valley and 30 American Indian households in Benton. Utilizing the 1990 figure of 2.51 persons per unit, it appears that adequate housing is being provided for almost 70% of the Native American population in the unincorporated areas of the county.

U.S. Marine Corps
The Marine Corps Mountain Warfare Training Center, located off S.R. 108 west of Sonora Junction and north of Bridgeport, presently has a permanent staff of 250 persons in addition to 2,000 trainees. The Marine Corps constructed a 77-unit family housing project north of the community of Coleville in the Antelope Valley and is in the process of a major facility expansion, including on-site housing at the training site.

ENERGY CONSERVATION

Since the energy crisis of 1973-74, utility payments as a percent of housing costs have increased dramatically. Utilities now account for about 8% of the total monthly costs of maintaining a house built according to 1983 energy efficiency standards. With the present trend of rising housing costs, energy conservation can play a role in maintaining the affordability of housing.

The State Legislature has played an increasingly active role in energy conservation. Laws such as the Warren-Alquist Act have provided tax credits for the installation of solar energy devices and also require extensive insulation in new homes. Although the new standards seem extensive and costly, builders and consumers realize that the benefits in energy savings over the long run outweigh the initial cost, especially in colder climates such as Mono County.

Local governments can help ensure that utility payments do not prevent people from owning homes or pricing them out of their present homes. Through the building permit review process, local governments can encourage the orientation of homes on an east/west axis to maximize southern exposure and can require that mobile homes on single lots meet the National Manufactured Home Construction and Safety Standards Act of 1974 to provide for improved energy efficiency and cost savings.

The Mono County Building Department currently enforces the 1991 Uniform Building Code, the 1990 National Electric Code and the 1991 Energy Code. The Building Department also requires homebuilders to meet specific energy conservation minimums by imposing a maximum on the total amount of "glazing" or window area allowed, particularly on north-facing walls. The Building Department disseminates information on insulation types and the benefits of increasing insulation beyond the required minimums.

Local utility companies (i.e., Southern California Edison and Sierra Pacific Power), in conjunction with the Inyo-Mono Advocates for Community Action (IMACA), operate energy conservation programs for low-income families in Mono County. These programs focus on providing energy audits, storm window installation, water heater blankets, roof repairs, weather stripping, caulking, low-flow showerheads and wood stoves.

CHAPTER 7
TRANSPORTATION*

CHAPTER OVERVIEW

The information in this chapter is adapted from the Mono County Regional Transportation Plan (RTP), 2000, and includes a) a description of the existing transportation systems in the unincorporated areas of Mono County; b) an assessment of existing and projected transportation needs in the county; and c) an analysis of the assumptions used to develop the needs.

SUMMARY OF TRANSPORTATION SYSTEM

The transportation system in Mono County is typical of many rural counties. Private automobiles are the primary mode of moving people; trucks are the primary mode of moving goods. Throughout the county, the transportation system is a key support system that sustains the social, economic and recreational activities in the county. The terrain, the weather and the lack of a sufficient population base to support them have limited other modes of transportation. These factors continue to restrict the development of alternative transportation systems in the county.

U.S. Highway 395 is the principal route to and through Mono County. It is the only route suitable for emergency purposes and the principal route to the county's many recreational and tourist attractions. U.S. 6 and several state highways provide regional links to U.S. 395. The highway system will continue to be the main access for both residents and visitors to and through the county.

The county currently has 678.58 miles of county-maintained roads. Although most of the county roadway system is established, there remains a need for new facilities in some community areas, in order to alleviate congestion and provide for continued growth. Maintenance of existing roadways remains the highest priority for the county roadway system

Transit services in the county currently include inter-regional services provided by Greyhound; countywide services provided by the Mono County Transit System; and local services in the town of Mammoth Lakes provided by Mammoth Area Transit and private shuttle services. Countywide services are expected to increase in response to demand and the availability of funding.

Three public airports are located in Mono County: Mammoth/Yosemite Airport, Lee Vining Airport and Bridgeport Airport (Bryant Field). The Town of Mammoth Lakes owns and operates the Mammoth/Yosemite Airport, and the County owns and operates the Lee Vining and Bridgeport airports. The Town recently updated the Master Plan for the Mammoth/Yosemite Airport and is in the process of developing the airport to support 757-sized commercial aircraft service out of Dallas and Chicago.

Facilities specifically for non-motorized activities, such as bicycling, are limited. Many non-motorized activities occur on numerous trails and roads on public lands or on existing roadways where the shoulder may or may not be wide enough to accommodate the use safely. In past RTPs and Circulation Elements, the Mono County LTC adopted the policy that the most important effort that could be undertaken to enhance bicycle travel would be improved maintenance of

*Refer also to the section on "Plans and Policies" for cross-references to other documents that may provide additional site-specific transportation information.

existing roads that are used regularly by bicyclists. This effort requires that increased attention be given to the shoulder portion of roadways where bicyclists are expected to ride. Caltrans put increased sweeping into its maintenance budget and has received positive feedback.

LAND USE FORECASTS

Local Residential Traffic/Transportation

The Land Use Element of the County's General Plan contains policies that focus future growth in and adjacent to existing communities. Substantial additional development outside existing communities is limited by environmental constraints, the lack of large parcels of private land and the cost of providing infrastructure and services in isolated areas. Land use policies for community areas in the county (developed by the county's citizen Regional Planning Advisory Committees) focus on sustaining the livability and economic vitality of community areas. The General Plan anticipates that growth in the unincorporated area will occur primarily in the Antelope Valley, Bridgeport Valley, June Lake, Wheeler Crest/Paradise, the Tri-Valley and Long Valley. Traffic impacts will be most noticeable on U.S. Highways 395 and 6.

Commuters

Many county residents do not work in the community in which they live. Residents in the Antelope Valley commute to work in Bridgeport and in Gardnerville, Minden and Carson City in Nevada; residents of the Tri-Valley area commute to work in Bishop; and residents of Long Valley, June Lake and Benton commute to work in Mammoth Lakes. Bridgeport is the only unincorporated community with a large portion of its residents working in the community. Development in Mammoth Lakes and rising housing prices there are forcing many residents of Mammoth to move elsewhere (Crowley Lake, June Lake, Bishop) and commute to jobs in Mammoth Lakes. The separation between jobs and housing will continue, and will increase in the future due to the nature of the county's tourist-based economy. Traffic volumes will increase as this trend continues, particularly in the southern portion of the county (June Lake, Mammoth Lakes, Crowley Lake and Wheeler Crest).

Recreational/Tourist Traffic

Changes in recreational use patterns will affect land use in the county as well as the transportation system. Should a fuel energy crisis occur, either in supply or price, serious impacts on tourist/recreational traffic in Mono County could be experienced. As recreational use expands in the Resort Corridor along U.S. Highway 395, visitation and travel to points of historic, archaeological and scenic beauty in other parts of the county will increase proportionately, creating a need for additional transportation facilities, including pedestrian and bicycle facilities.

AIR QUALITY ATTAINMENT STATUS

National Non-Attainment Areas

As of 1999, the Mono Basin and Mammoth Lakes were designated as non-attainment areas for the national particulate matter (PM_{10}) standard, although the California Air Resources Board recommended that those areas be designated as attainment areas (see www.arb.ca.gov , National Area Designations Map—PM10). Particulate matter (PM_{10}) in the Mono Basin results from dust from the exposed lakebed of Mono Lake. PM_{10} in Mammoth Lakes is primarily a problem in winter, resulting from wood burning and re-suspended road cinders.

PM_{10} concentrations in the Mono Basin have been declining in recent years, as the level of Mono Lake rises and less lakebed is exposed [see www.arb.ca.gov , PM10 Air Quality Data Summaries (1993-1997)]. PM_{10} concentrations in Mammoth Lakes have remained relatively stable in recent years (ibid).

State Non-Attainment Areas

As of 1999, Mono County was designated as a non-attainment transitional area for the state ozone standard, indicating that the county is close to attaining the standard for that pollutant. Ozone data collected by the State Air Resources Board in Mammoth Lakes indicate that ozone concentrations have decreased in Mammoth in recent years and the area has not exceeded state or federal standards in recent years [see www.arb.ca.gov , Ozone Data Summary (1995-1998)]. In the past, the State Air Resources Board concluded that ozone excess in the Great Basin Air Basin (Alpine, Inyo and Mono counties) was caused by transport from the San Joaquin Valley Air Basin; the Great Basin Unified Air Pollution Control District adopted an Ozone Attainment Plan for Mono County that identified the county as an ozone transport area.

As of 1999, the county was also designated a non-attainment area for the state PM_{10} standard (see www.arb.ca.gov , State Area Designations Map—PM10).

Transportation Related Air Quality Mitigation

Transportation-related air quality impacts in Mono County occur only in Mammoth Lakes (PM_{10} emissions resulting primarily from re-suspended road cinders). As a result, the Air Quality Management Plan for the Great Basin Unified Air Pollution Control District (GBUAPCD) does not include any transportation related requirements other than for the town of Mammoth Lakes.

In compliance with GBUAPCD requirements, the Town has adopted an Air Quality Management Plan prepared by the GBUAPCD, including Particulate Emissions Regulations (Chapter 8.30 of the Municipal Code). These regulations set a peak level of VMTs (vehicle miles traveled) at 106,600 per day and direct that the Town review development projects in order to reduce potential VMTs. Methods to reduce VMTs include circulation improvements, pedestrian system improvements and transit improvements. The Plan also requires the Public Works Director to undertake a street sweeping program to reduce particulate emissions caused by road dust and cinders on town roadways.

The most current VMT count for Mammoth Lakes shows 70,105 VMT on a peak day in 1995. Town staff has utilized a linear growth rate to project a figure of 73,935 VMT for a peak day in 2000. The latest projection for VMTs at buildout is 109,400 per day, slightly higher than the limit of 106,600 per day set by the Particulate Emissions Regulations. The higher projection will require the Town to increase its transit ridership on peak days; the Town's draft Transit Plan is working toward that goal.

The Town has completed a Mammoth Multi-modal Transportation Plan Study Report that emphasizes restricting automobile parking spaces in favor of expanding the existing transit system and direct ski-lift access facilities and incorporating transit and pedestrian facilities into existing and future developments in order to reduce vehicle trips and improve air quality. Utilizing the recommendations in the Multi-modal Study Report, the Town has completed a Draft Transit Plan. Once that plan is adopted, it will be incorporated into the RTP.

PERFORMANCE CONDITIONS (LOS)

Performance conditions, or Levels of Service (LOS—see Glossary for an explanation of LOS), on state and federal highways are governed by Caltrans systems planning. The emphasis in District 9, that includes Inyo and Mono counties, is on maintaining and improving the interregional transportation network. Higher priorities are given to major improvements on principal arterial routes than to minor arterials or major collectors. Figure 8 shows Caltrans' planned LOS for state and federal highways in Mono County. Caltrans has been working to increase capacity on U.S. Highway 395, the route on which performance conditions are affected the most by traffic levels.

Performance conditions on local streets are generally not a concern since local streets typically carry only local traffic; state and federal highways serve as the main access to each community in the county and carry the greatest amount of traffic.

SAFETY AND OPERATIONAL ISSUES, INCLUDING EMERGENCY PREPAREDNESS

The Mono County Multi-Hazard Functional Plan, developed by the Office of Emergency Services, addresses a number of potential transportation-related hazards, including potential hazards from earthquakes, volcanic eruptions, floods and hazardous materials transport. It addresses emergency preparedness and emergency response for the regional transportation system, including identification of emergency routes. Alternative access routes in Mono County are limited primarily to the existing street and highway system due to the terrain and the large amount of publicly owned land. However, the County has developed alternative access routes for community areas that had limited access (i.e., the June Lake Avalanche Bypass Road, the Mammoth Scenic Loop north of Mammoth Lakes).

In past years, a number of airplanes, some commercial charters with numerous passengers aboard, have crashed in the high elevations of the Sierra. As air traffic increases, the likelihood of further aircraft accidents in the more inaccessible areas of the high country also increases. The FAA recently installed an instrumentation system at the Mammoth/Yosemite Airport intended to help reduce the numbers of accidents in that area.

The California Highway Patrol (CHP) tracks collisions in Mono County (see www.chp.ca.gov , Statistics, Tables 8a-8m). Between 1989 and 1998, Mono County had an average of six fatal collisions per year with an average of eight persons killed per year. During the same period, there was an average of 127 injury collisions per year with an average of 212 persons injured. Most collisions and injuries occur from November through February and June through July, the periods of heaviest tourist visitation.

Transportation related safety issues include the following:

- The potential for avalanches is a concern in community areas throughout the county; i.e., Twin Lakes, Virginia Lakes, Lundy Lake, June Lake and Long Valley, along U.S. 395 in the areas just north of Lee Vining, east of McGee Mountain and at Wilson Butte between Mammoth Lakes and June Lake, and along State Route 158, the June Lake Loop. In June Lake, the recently completed Avalanche Bypass Road provides an alternative route into June Lake that is intended to mitigate the impacts of potential avalanches along Hwy. 158.
- Increased levels of truck traffic on county highways are also a safety concern. U.S. Highways 395 and 6 have been identified as interstate truck routes and are experiencing increased levels of truck traffic. Safety concerns focus on the impact of oversized trucks on the safety and capacity of two-lane highway sections and the lack of paved shoulders and adequate sight distances. Narrow shoulders, when combined with the large numbers of RVs and trucks using the highways, create hazardous conditions if vehicles must pull over for emergencies. Narrow shoulders are also less desirable for bicyclists, especially when being passed by large trucks and RVs.
- Hazardous materials spills are a concern throughout the county. The potential for such accidents is highest on U.S. Highways 395 and 6. The Hazardous Waste Element of the County General Plan contains policies to address hazardous waste spills. The Mono County Multi-Hazard Functional Plan, prepared by the Office of Emergency Services, also contains policies and procedures to address hazardous materials, including hazardous wastes.
- The hospitals in Mono County have limited capacity for multi-casualty incidents. Accidents causing more than six to 10 serious injuries require transport of the victims to facilities outside the county. Many accident victims with critical injuries are also transported to facilities outside the county. During certain times of the year, or during certain hazardous conditions, access to various parts of the county may be limited.
- Due to the isolated nature of much of the highway mileage in the county, the extreme weather conditions experienced throughout the year, and the fact that cellular and car phones

may not work well in certain areas of the county, there may be a need to provide some type of emergency communications device (such as call boxes) at select locations along county highways.

MAINTENANCE OF THE EXISTING REGIONAL TRANSPORTATION SYSTEM

Overview

Mono County is a rural county located on the eastern side of the Sierra Nevada. The county has an area of 3,103 square miles and in 1999 had a total population of 10,800 persons. The county has one incorporated area, the town of Mammoth Lakes, which had a population of 5,325 in 1999. The county's other communities are scattered throughout the area, primarily along U.S. Highways 395 and 6.

Approximately 94% of the land in the county is owned by public agencies; approximately 88% is federally owned and is managed by the Forest Service and the Bureau of Land Management. The limited private land base limits the growth potential for permanent residents but it also provides the foundation for the county's tourist-based economy. The spectacular scenery in the county and the many varied recreational opportunities provide a tremendous recreational draw, especially for people from Southern California.

The transportation system in Mono County is typical of many rural counties. Private automobiles are the primary mode of moving people; trucks are the primary mode of moving goods. Throughout the county, the transportation system is a key support system that sustains the social, economic and recreational activities in the county. The terrain, the weather and the lack of a sufficient population base to support them have limited other modes of transportation. These factors continue to restrict the development of alternative transportation systems in the county.

Highway System

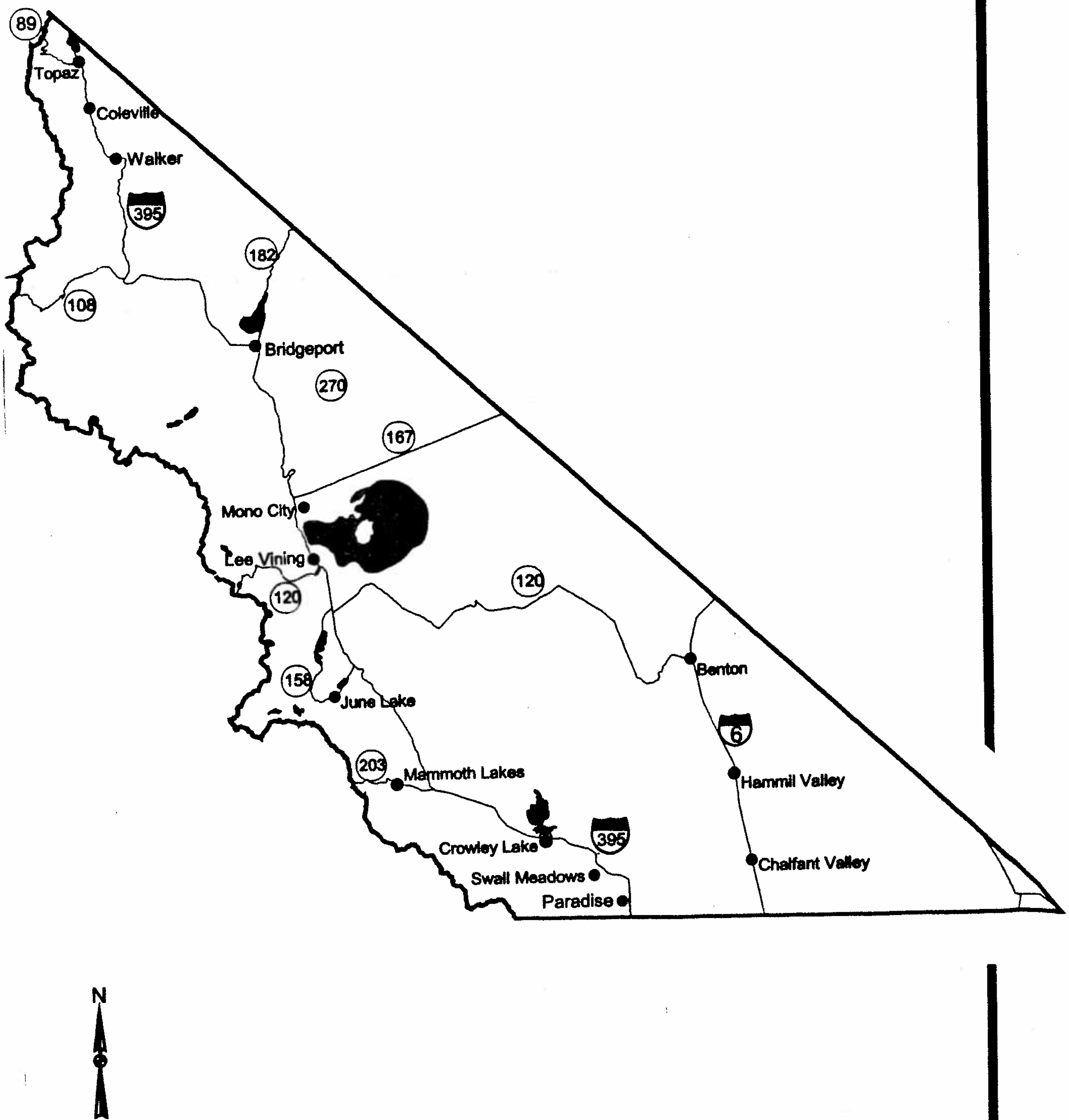
U.S. Highway 395 is the principal route to and through Mono County. It is the only direct route to and through the county for the shipment of goods and materials. It is also the only route suitable for emergency purposes and the principal route to the county's many recreational and tourist attractions.

U.S. Highway 395 extends approximately 120 miles from northwest to southeast Mono County. It provides regional transportation connections to Reno and Lake Tahoe to the north, the Bay Area and the Central Valley to the west, and the greater Los Angeles area to the south. In 1998, U.S. 395 carried annual average daily traffic (ADT) volumes of approximately 3,900 vehicles throughout the county (actual figures varied from 3,500 vehicles at the Nevada state line at Topaz to 5,500 vehicles at the northbound junction with State Route 203). Peak month ADT volumes varied from 9,600 at the northbound junction with Hwy. 203 to 4,700 in Bridgeport.

U.S. 395 in Mono County is identified as a regionally significant part of the Interregional Road System (IRRS), as a lifeline route, and as part of the National Truck Network on the National Highway System (NHS), which authorizes use by larger trucks and gives them access to facilities off the route. The majority of U.S. Highway 395 in Mono County is also identified as a freeway/expressway and as being eligible for scenic designation.

U.S. Highway 6 also provides regional transportation connections in Mono County. It extends over 30 miles in Mono County—toward Bishop in the south and toward Nevada to the north and east. In 1998, annual ADT volumes on U.S. 6 varied from 3,200 vehicles at the junction with U.S. 395 in Bishop to 840 vehicles at the northbound junction with State Route 120 in Benton.

FIGURE 8
EXISTING HIGHWAY SYSTEM, MONO COUNTY



Mono County GIS, 2001

U.S. 6 is a popular alternate route north when poor weather affects conditions on U.S. 395. U.S. 6 is identified as part of the National Truck Network on the National Highway System (NHS) and is on the eligible Interregional Road System (IRRS) State Route 120 extends nearly 60 miles through Mono County, from Tioga Pass in Yosemite National Park east to Benton. Other State Routes that connect to U.S. 395 include: Hwy. 89 (Monitor Pass), Hwy. 108 (Sonora Pass), Hwy. 167 (to Hawthorne, Nevada), Hwy. 158 (the June Lake Loop), Hwy. 270 (to Bodie), Hwy. 182 (from Bridgeport to Yerington, Nevada) and Hwy. 203 (to Mammoth). Highways 168 and 266, connecting Big Pine in Inyo County and Nevada, cross the extreme southeast corner of the county.

Tioga Pass, Sonora Pass, Monitor Pass and Hwy. 270 to Bodie are all closed during the winter, as are the northern portions of Hwy. 158, Hwy. 203 from the Mono County boundary west, and the portion of Hwy. 120 between U.S. 395 and Benton. During periods of heavy snowfall, Hwy. 167 and the southern portion of Hwy. 158 may also be closed. Figure 8 shows the existing highway system in the county.

INTERREGIONAL TRAVEL DEMAND AND CORRIDOR NEEDS

U.S. Highway 395

U.S. Highway 395 is, and will remain in the long term, the major access to and through Mono County and the major transportation route in the area. It connects the Eastern Sierra with Southern California and with the Reno/Tahoe region in Northern Nevada. The primary needs for U.S. 395 throughout Mono County are four-laning from the Inyo/Mono county line to Lee Vining; safe winter access countywide; increased passing opportunities; adding adequate shoulders during U.S. 395 maintenance projects to enable safe bike use; adequate Flexible Congestion Relief programs; and the development of sufficient revenue sources to meet these needs.

U.S. Highway 6

U.S. Highway 6, from the Inyo County line north of Bishop to the Nevada state line, provides regional transportation connections and is a major trucking route between Southern California and the western mountain states (Washington, Idaho, Montana). Caltrans has identified the primary purpose of the route as interregional traffic (largely trucks). The route is currently a maintenance only route with some improvements planned for the future as traffic volumes increase. The major local concern about U.S. 6 is safety during the periodic dust storms that occur in the area. Dust from plowed fields and from the deposits from flash floods blows across the highway decreasing visibility. Caltrans is working with local landowners to develop an irrigation plan to mitigate dust problems from plowed fields. Since the area is subject to flash floods, little can be done about dust resulting from flood deposits.

State Routes 120, 167, 182, 108 and 89

The remaining state highways in the county are two-lane minor arterials that provide interregional access east and west from U.S. 395 to Nevada and to the western side of the Sierra. Highways 120, 108 and 89, which cross the Sierra in high mountain passes, are closed in the winter. The main concern on these routes is continued adequate maintenance, including timely road openings following winter closures.

Mountain Passes

There is some interest in attempting to keep the mountain passes (Tioga, Sonora and Monitor) open as long as possible in order to increase access from the west and provide an economic boost to local communities. The Tioga Pass Council was formed to lobby to keep Tioga Pass open as long as possible. Residents in communities near Sonora and Monitor passes are also interested in keeping those passes open as long as possible. The Yosemite Area Traveler Information System (YATI, see www.yosemite.com), a multi-agency advanced technology effort, provides information about Yosemite National Park, including pass closures, to visitors traveling through Mono County to and from Yosemite.

CAPACITY ISSUES

Regional Problems

Capacity problems on the regional system occur on U.S. Highway 395 in northern Mono County, on State Routes 203 in the town of Mammoth Lakes and 158 in June Lake Village. Caltrans systems planning documents provide existing and long-range levels of service for those routes and proposed improvements.

The Caltrans District 9 System Management Plan states that the "overriding concern of the District [regarding U.S. 395] is the eventual four-laning ... [of the highway] to Lee Vining, in order to achieve a Concept Level of Service of B. North of Lee Vining, on U.S. 395, passing lanes, truck-climbing lanes and operational improvements will be necessary at specific locations to maintain a Concept Level of Service of C. There are environmental and geometric constraints prohibiting a higher LOS." U.S. 395 in northern Mono County is also nearing capacity in most of its two-lane sections, but there are environmental constraints to making technical improvements in that area.

Local Problems

Congestion on Hwy. 203 (Main Street) in Mammoth Lakes and between town and the ski area continues to be a problem in the winter. Traffic is also heavy during certain periods in the summer. The heavy traffic levels impact air quality in the Town, particularly in winter as a result of the re-suspension of cinders used on plowed roads. The Main Street Revitalization Project/Plan, which includes pedestrian pathways and bus shelters, is intended to reduce congestion. The Town has drafted a multi-modal transportation plan to further reduce congestion and is completing a Transit Plan that is intended to reduce automobile usage.

Congestion on Hwy. 158 in June Lake Village is a major concern. The June Lake Multi-modal Transportation Plan focuses on easing congestion in the Village by providing adequate off-street parking, alternate routes and alternatives to the automobile; safer routes for non-motorized forms of transportation; and linkages between various transportation modes and recreational destinations.

Average Daily Traffic Volumes

Table 18 shows Average Daily Traffic (ADT) volumes on Mono County Highways in 1990 and 1998. In many cases, particularly on the county's most heavily traveled routes (i.e., Highways 395, 6 and 203), traffic volumes have decreased between 1990 and 1998. Volumes have increased in other areas (e.g., Hwy 270, the "Bodie Road") as recreational use of those areas has increased.

SPECIALIZED NEEDS/RECREATIONAL TRAFFIC

Mono County experiences a great deal of recreational travel, both to and through the county. Most of that traffic occurs on U.S. 395 and in the summer months on State Routes 120, 108 and 89, which provide access to the area from the west side of the Sierra. Recreational traffic creates specific problems for the local transportation and circulation system, due both to the amount and type of that traffic. Winter ski weekends, particularly during peak holiday periods, result in a congested traffic pattern, both in communities and on the highway, that simulates rush hour traffic patterns found in more urban areas. Recreational events during the summer may also create congested traffic patterns, particularly in community areas.

Recreational travelers have special needs, such as turnouts/vista points, rest areas and information about local recreational areas, interpretive information, lodging and travel routes. Recreational travelers also create safety concerns on local highways and roads; sightseers often travel slowly, disrupting the traffic flow, and may stop along the road to enjoy the view or take photos, creating a hazardous situation. Recreational vehicles travel slowly on the many steep routes in the area, disrupting traffic flow, particularly in areas where the road is only two lanes wide. In community areas, recreational vehicles often have difficulty parking or use more than their share of limited parking spaces. Recreational vehicles account for 11% of the traffic in Mono County on U.S. 395 during the summer months.

Many of the needs of recreational travelers have been addressed by recently completed or ongoing projects. The continued four-laning of U.S. 395 should eliminate many of the problems resulting from slow-moving vehicles. Transportation enhancement projects related to the El Camino Sierra Scenic Byway have provided turnouts and information for travelers. The Yosemite Area Traveler Information System (YATI) provides travelers to the Yosemite area with information concerning travel routes, transportation options and lodging. The June Lake, Mono Basin and Bodie Hills multi-modal plans address parking in community areas and transportation linkages between communities and recreational areas.

TABLE 18
1990 & 1998 AVERAGE DAILY TRAFFIC (ADT) VOLUMES, MONO COUNTY HIGHWAYS

Route	Location	Peak Hour[a] 1990/1998	Peak Month[b] 1990/1998	Annual[c] 1990/1998
395	Junction 203 West [d]	710/970	9,600/9,600	6,000/5,500
	June Lake Junction [e]	640/690	6,000/6,800	4,000/3,900
	Tioga Pass Junction [f]	1,200/640	9,300/6,400	5,500/4,100
	Bridgeport [g]	950/550	7,800/4,700	5,000/3,300
	Sonora Junction [h]	1,050/510	7,500/4,700	5,200/2,750
	Nevada State Line	680/550	4,800/5,400	4,100/3,500
6	Junction 395 (Bishop)	190/310	3,300/3,400	3,200/3,200
	Benton Station	180/130	1,350/1,450	1,200/1,200
	Nevada State Line	200/95	1,250/930	1,050/840
168	Oasis, Junction 266 north	40/45	280/260	170/200
266	Oasis, Junction 168	10/25	160/190	110/130
203	Minaret Summit	140/180	1,100/1,450	850/1,100
	Minaret Junction	2,000/2,050	16,100/15,400	12,500/11,300
	Old Mammoth Junction	1,900/1,900	17,100/14,400	13,500/10,300
158	June Lake Junction 395	220/260	2,150/2,550	1,400/1,450
	Grant Lake Junction 395	120/110	900/700	600/460
120	Yosemite East Gate	360/250	2,050/2,000	1,500/1,350
	Tioga Pass Junction 395	500/380	3,500/3,800	2,200/1,100
	Mono Mills Junction 395	85/110	620/1,300	380/660
	Benton Station	50/70	460/700	400/400
167	Pole Line Junction 395	40/40	520/370	400/210
	Nevada State Line	35/25	460/300	350/190
270	To Bodie State Hist. Park	80/130	450/720	340/540
182	Bridgeport Junction 395	170/210	1,500/1,750	1,250/1,200
	Nevada State Line	130/110	510/380	440/300
108	Sonora Pass	100/140	710/860	440/420
	Sonora Junction 395	200/150	800/1,350	700/650
89	To Monitor Pass	80/120	520/620	360/520

Table 18 Notes:

a. These are estimated figures.
b. The peak month ADT is the average daily traffic for the month of heaviest traffic flow.

c. Annual average daily traffic is the total traffic volume for the year divided by 365 days. Some routes are regularly closed for one month or more during the winter; ADT figures for those routes reflects travel when the route is open. Routes regularly closed during the winter include the following:

   Route 89—Monitor Pass, Jct. U.S. 395 to Jct. Hwy. 4, 17.5 miles.
   Route 108—Sonora Pass, 6 miles east of Strawberry to 7 miles west of Jct. U.S. 395, 35 miles.
   Route 120—Tioga Pass, Crane Flat to 5 miles west of Jct. U.S. 395, 55 miles.
   Route 120—Mono Mills Road, 2 miles east of Jct. U.S. 395 to 6 miles west of Jct. U.S. 6, 37.6 miles.
   Route 158—June Lake Loop, Powerhouse to north Jct. U.S. 395, 8.6 miles.
   Route 203—Mammoth Lakes Road, Mono/Madera County line to 1 mile east.
   Route 270—Bodie Road, Jct. U.S. 395 to Bodie, 9.8 miles.

d. Reflects traffic turning into Mammoth. Counts on 395 going north from 203 are lower.
e. Reflects traffic turning into June Lake. Counts on 395 going north from 158 are lower.
f. Reflects traffic from 120 north on 395 toward Lee Vining. Counts on 395 going south from 120 are lower.
g. Reflects traffic going north out of Bridgeport. Counts on 395 going south from Bridgeport are lower.
h. Reflects traffic going north from the Sonora Junction. Counts on 395 going south from the junction are lower.

SOURCE: Caltrans 1990 and 1998 Traffic Volumes on California State Highways.

GOODS MOVEMENT

Goods movement to and through Mono County occurs on the interregional highway system; i.e., U.S. Highways 395 and 6. There are no railroads in the county and no airfreight services. As noted previously, U.S. 395 in Mono County is identified as part of the National Truck Network on the National Highway System (NHS) that authorizes use by larger trucks and gives them access to facilities off the route. U.S. 395 provides regional transportation connections and truck access between Southern California and Reno, Nevada.

U.S. Highway 6, from the Inyo County line north of Bishop to the Nevada state line, provides regional transportation connections and is a major trucking route between Southern California and the western mountain states (Washington, Idaho, Montana). It is also identified as a part of the National Truck Network, and Caltrans has identified the primary purpose of the route as interregional traffic (largely trucks).

Truck traffic in Mono County, primarily for commodity movement, is increasing. Between 1990 and 1997, total daily kilometers traveled by trucks on the highway system in Mono County increased from 74,816 to 118,573; approximately 73% of the daily truck traffic in 1997 was 5+ axle trucks. During that same period total daily kilometers traveled by all vehicles on the highway system in Mono County decreased from 11,216,892 to 1,071,396. In 1990, truck travel accounted for 6.15% of all travel on the highway system in Mono County; in 1997, truck travel accounted for 11.07%of all travel on the highway system in Mono County.

LOCAL CORRIDOR NEEDS

Overview

Local corridor needs include state highways that serve primarily local traffic (i.e., they do not provide interregional connections), county roads, city streets and public roads operated by various other local, state and federal agencies. Table 19 shows the mileage of maintained public roads in Mono County. Local corridor needs in the town of Mammoth Lakes are discussed later in this chapter under the heading Town of Mammoth Lakes.

TABLE 19
MILEAGE OF MAINTAINED PUBLIC ROADS AS OF DECEMBER 31, 1999

Jurisdiction	Mileage
County Roads	678.58
City Streets (Mammoth Lakes)	43
State Highways	310.56
State Parks	9.30
U.S. Forest Service	428.80
Bureau of Land Management	712.3
Bureau of Indian Affairs	4.4
Total	**2,186.94**

SOURCE: California Statistical Abstract, 2000, State Department of Finance, Table J-1; Mono County Road Department.

State Route 203
Hwy. 203 provides access from U.S. Highway 395 to Mammoth Lakes, to Mammoth Mountain Ski Area, Red's Meadow and Devil's Postpile in the summer months. Congestion on Hwy. 203 in Mammoth Lakes and between town and the ski area continues to be a problem in the winter, resulting in adverse air quality impacts, primarily from re-suspension of road dust and cinders. Traffic is also heavy during certain periods in the summer. Congestion and the resulting air quality impacts are the major concerns on Hwy. 203.

State Route 158
Hwy. 158, the "June Lake Loop," provides access from U.S. Highway 395 to the community of June Lake. There are operational and safety concerns on this route, particularly in the village and Down Canyon areas of June Lake. These concerns focus on easing congestion in the village by providing adequate off-street parking, alternate routes, alternatives to the automobile and safer routes for non-motorized forms of transportation.

County Roads
The county currently has 678.58 miles of County-maintained roads (County Road System Maps are included in Appendix D). Of that maintained mileage, 179.07 miles are paved, 168.47 miles are plowed in the winter and 197.87 miles traverse National Forest lands. Although most of the county roadway system is already established, there remains a need for new facilities in some community areas, such as June Lake, in order to complete the circulation system, alleviate congestion and provide for continued growth. The main access to all communities in the county is state highways; i.e., Highways 395, 158 and 6.

In addition to the county roads, there is an extensive network of private and federally controlled roads in the county, many of them unimproved. The federal roads, on lands managed by the Forest Service and Bureau of Land Management, are mostly unmaintained dirt roads that receive limited use from logging trucks and off-highway vehicles (OHVs). The Forest Service and the BLM have developed management plans for OHV use. The private roads in the county are mostly in community areas and are mostly substandard roads that do not meet the County Roadway Standards and as a result have not been accepted into the County Roadway Systems.

Substandard roads are a particular problem in June Lake. In 1981, the Mono County Public Works Department recognized the Loop's existing constraints to roadway construction and developed a special set of arterial/commercial and collector/residential road standards tailored in other areas of the county.

Major development projects have been able to comply with these standards, however the costs of upgrading older roads will continue to preclude their improvement and ultimate acceptance into the County maintenance program. This is true throughout the county. Property owners on private roads will continue to bear all maintenance costs, as public and private non-county roads do not qualify for state and federal maintenance funding.

On county roads, the primary needs for local streets and roads are snow removal, regular pavement maintenance and major rehabilitation. Heavy snowstorms, rapid freeze-thaw deterioration and heavy visitor traffic create an unusually high demand for snow removal and regular annual maintenance. The Mono County Road Department currently provides road surface and shoulder repair, signing, striping and snow removal, as well as minor and major improvements such as road surfacing and alignment improvements. Operating revenues that support these services are provided through various state and federal revenue generating programs, including state gas taxes, vehicle code lanes, timber receipts, federal and secondary funds, transportation allocations and motor vehicle license fee taxes.

The potential impact of large-scale future development on the county road system continues to be a major concern. Portions of the existing road system may not be adequate to accommodate anticipated traffic volumes from future development, particularly if that development is outside established community areas. There is a need for mitigation of future impacts to the transportation system and for a standardized means of assessing potential impacts from future projects.

Roads on Native American Lands

The transportation systems serving the Bridgeport Indian Colony and the Benton-Paiute Reservation include county roads, tribal roads and roads managed by the Bureau of Indian Affairs. Transportation needs for each location include road upgrades, ongoing road maintenance and new road construction to serve existing and proposed development (see Bureau of Indian Affairs. Benton-Paiute Reservation Transportation Plan; Bridgeport Indian Colony Transportation Plan).

TRAFFIC DEMAND, MONO COUNTY

Traffic demand projections for the unincorporated areas of Mono County are based on potential trip generation rates of projected residential land uses. The methodology used to compute those projections is explained in detail in the Mono County Regional Transportation Plan, 2000, Appendix A—Traffic Demand Projections, Unincorporated Areas. Table 20 summarizes the data presented in Appendix A of the RTP.

TABLE 20
TRAFFIC DEMAND PROJECTIONS, MONO COUNTY

	Estimated Avg. Vehicle Trips	Estimated Peak Hour Vehicle Trips	Estimated % Increase over current ADT
Antelope Valley	334.2	35.7	1.5%
Bridgeport Valley	330.4	35.2	1.2%
Mono Basin	120.8	12.9	2.5%
June Lake	271.4	27.7	14.5%
Long Valley	328.8	33.9	4.9%
Tri-Valley	172.5	18.6	9.8%

The analysis notes that the estimated increases over current Average Daily Traffic (ADT) figures are not significant increases. The Alternative Access Route into June Lake is expected to help mitigate the expected traffic increase in June Lake.

DEMAND MANAGEMENT STRATEGIES

Transportation Demand Management (TDM) refers to measures designed to reduce vehicle trips, trip lengths and congestion. TDM encourages wider use of transit, vanpools, carpools and other alternatives to the single-occupant automobile. TDM measures provide alternatives to large investments in new highway and transit systems, which are limited by lack of money, adverse community reactions and other factors. TDM measures are designed to modify travel demand patterns, resulting in lower capital outlays. They may be implemented within a short timeframe and evaluated quickly. Several policy issues arise in determining the extent to that TDM may be used to reduce congestion, including the effectiveness of voluntary vs. mandatory measures, and the need to apply them only to new development or to all employers of a specific size.

The transportation system in Mono County does not experience severe congestion except in limited areas and at limited times. Due to a number of factors, some TDM measures are not particularly viable options in the unincorporated areas of Mono County at this time. Bicycling is generally not a year-round option for commuters in many areas of the county due to the long distances traveled and severe winter weather conditions. There is some potential in county communities to increase pedestrian facilities; the county is in the process of developing planning principles to convert county communities (i.e., Crowley Lake, Lee Vining, June Lake and Bridgeport) to more walkable communities. Mammoth Lakes is also developing more pedestrian-oriented facilities.

Due to the high number of people who work outside the community in which they live, there may be additional potential for carpooling or vanpooling. Currently, Mammoth Mountain Ski Area provides vanpooling services for its employees, county employees in the Antelope Valley carpool to Bridgeport, and informal park-and-ride areas are in use throughout the county (e.g., at the junction of Routes 203 and 395 and at the June Lake Junction). There is a potential to improve and provide additional park-and-ride facilities and to encourage carpooling, especially in the Mammoth Lakes vicinity. Eventually, bus or shuttle service to Mammoth Lakes from surrounding communities may be desirable.

The use of transit for commuter and everyday transportation demand management purposes in Mono County is somewhat limited due to the long distances traveled and the relatively small population base. Outside of Mammoth Lakes, transit use within community areas is not a viable option. Transit service to recreational destinations, however, is a viable TDM measure in Mono County. Shuttle service to Devil's Postpile National Monument has been in place for many years in order to reduce traffic impacts. In 2000, the Yosemite Area Regional Transportation System (YARTS) will begin a pilot program providing shuttle service from Lee Vining (and other counties surrounding Yosemite National Park) to Yosemite Valley. There may be the potential to develop shuttles to other popular recreation destinations in the county, such as Bodie State Historic Park, in order to reduce environmental impacts from increasing traffic to those destinations. The multi-modal plan developed for the Bodie Hills supports the development of shuttle service.

Recent technological advances may also contribute to transportation demand management. As more people are able to conduct their business electronically via telecommunications networks, commuter travel demand should decrease. In addition, advanced technological applications are being used for transportation demand management purposes in Mono County [i.e., the Yosemite Area Traveler Information System (YATI)].

PARKING MANAGEMENT

The Mono County Land Development Regulations generally require on-site parking. Single-family residences must provide two parking spaces (three in June Lake), and other uses must provide a specific number of parking spaces based on the intensity of the use. Most parking provided in commercial areas is uncovered, either on-street parking or parking lots.

Parking issues and needs include the following:

- There is a lack of adequate parking in community areas such as June Lake and Lee Vining. Limited parking aggravates traffic flow, increases traffic hazards and may limit the economic health of an area. Parking for buses and large trucks is a problem in some areas. Future development, particularly recreational areas and associated commercial uses, will greatly increase the demand for parking facilities.
- On-street parking is also a problem in some areas. In the winter, on-street parking may hinder snow removal operations. In some communities, on-street parking of large trucks creates a nuisance.
- Some community areas lack coordination of parking. Lee Vining residents are concerned about the overabundance of small, dispersed parking areas and the resulting loss of trees. They would prefer creating community parking areas instead of a requiring businesses to provide small individual parking areas. There is also a need to designate or develop a site in Lee Vining for parking large trucks.

ENVIRONMENTAL AND ENERGY IMPACTS

Impacts Resulting from Transportation System Improvements

Environmental impacts resulting from improvements to the transportation system will be limited in Mono County since much of the system is already in place. Road development occurs primarily in developed community areas or adjacent to existing highways. Mono County RTP and General Plan policies focus development in community areas and encourage the use and improvement of existing facilities, rather than construction of new facilities. General Plan policies require future development with the potential to significantly impact the environment to assess the potential impact(s) prior to project approval and to recommend mitigation measures to avoid mitigating the identified impacts, both on site and off site. The previous requirement also applies to potential impacts to the transportation system. In addition, RTP and General Plan policies promote preservation of air quality and scenic resources.

Environmental Mitigation Measures and Enhancement Projects

Caltrans, the Forest Service, the Bureau of Land Management (BLM), the California Department of Fish and Game (DFG), the Local Transportation Commission (LTC), the County, the Town of Mammoth Lakes, and other interested agencies and organizations have been working together to incorporate environmental mitigation measures and enhancement projects into the planning process for road improvements to both state and local circulation systems. RTP policies encourage this type of cooperation and identify potential environmental mitigation and enhancement projects. Environmental enhancement grants have been received for several projects, including the El Camino Sierra Scenic Byway and the Main Street Promenade in Mammoth Lakes.

Impacts to Local Wildlife from Increased Use of System

Increased use of the transportation system may result in impacts to local wildlife. Limited visibility, road speeds, migration paths and driver error result in road kills of deer, rodents, mammals and birds. Caltrans has long endeavored to solve this dilemma by designing roadways and highways in a manner that increases visibility and by limiting the amount and type of vegetation along the shoulders. They have been diligent in providing ample signing opportunities to warn the unaware driver of the deer migration paths and nearby habitats.

Caltrans is continuing to assess the potential benefits of additional signing and other measures. Deer crossings under highways have proven effective in some areas, but it is costly since it necessitates six miles of 10-foot fencing on each side of the crossing for it to be effective. The recently completed June Lake Avalanche By-Pass Road includes a number of mitigation measures pertaining to mule deer, including installing "guzzlers" to provide a water source on the uphill side of the road to lessen the number of deer crossings; reducing cut and fill slopes in heavy deer crossing areas and prohibiting the use of fencing along the heavy deer use portions of the road.

COMMUNITY NEEDS AND ISSUES

This section outlines transportation concerns that have been identified by Community and Regional Planning Advisory Committees as being important issues in their communities.

Antelope Valley (Topaz, Coleville, Walker)

- The priority concern in the area is safety improvements on U.S. Highway 395 and Eastside Lane. Residents would like to see turn lanes at heavily used areas on U.S. 395, such as the high school in Coleville. On Eastside Lane, the safety concern is the first turn on Eastside north of its intersection with U.S. 395.

- Residents of the Antelope Valley consider their existing community road system, much of which is unimproved private roads, to be adequate and do not want those roads to be improved.

- Residents question the need for four-laning U.S. 395 in the Antelope Valley, especially since Nevada presently has no plans for four lanes. Residents would prefer that the route remain two lanes with operational improvements such as shoulder widening, fences and underpasses for deer and potentially some landscaping. Residents are also interested in retaining the scenic qualities of U.S. 395 between communities, and are concerned about the environmental and economic impacts of potentially relocating U.S. 395 to Eastside Lane.

- There is a great deal of interest in a loop bike route throughout the valley for use by touring bicyclists. There is some interest in providing facilities for pedestrians and equestrians along a similar loop route. There is not a great deal of interest in providing routes for mountain bikes.

Swauger Creek/Devil's Gate

- Restricting fence design to facilitate the migration and movement of wildlife, with particular attention given to deer migration routes and protection from highway traffic.
- Establishing a speed limit of 25 mph on all secondary roads.
- Limiting development of new secondary roads to those necessary for access to private residences; minimizing the visual impact of roads, using construction practices (drainage, culverts, road bases and finishes) that minimize dust and erosion problems; and prohibiting construction on designated wet meadow areas.

Bridgeport Valley

- Residents of Bridgeport are concerned about safety along U.S. Highway 395 and State Route 182 from the Evans Tract to the dam at Bridgeport Reservoir. Many residents bike and walk along the shoulders of the highways in this area. Residents would like to recommend shoulder widening along U.S. 395 and Hwy. 182 from the Evans Tract to the dam as a priority item.
- Other safety concerns include how to enforce the speed limit through the town, and the design of several intersections, including the Hwy. 182/U.S. 395 junction, the Emigrant Street

junction with U.S. 395 and the Twin Lakes Road junction with U.S. 395 south. The number of deer kills on Twin Lakes Road from the start of the Hunewill Hills to Twin Lakes is also a concern.

- Parking is a problem on Main Street and around the county buildings, especially during the months when there are the most visitors and when court is in session. There is some interest in providing additional off-street parking for county employees, people attending court and visitors to the area, possibly next to the Probation Department or on empty lots on Emigrant Street.
- There is interest in developing a bike lane connecting Bridgeport and Twin Lakes, either by widening the shoulder or by creating a separate bike path that parallels the existing roadway. There is also some interest in eventually developing a loop bike trail by connecting the Twin Lakes bike trail to Buckeye Canyon Road and linking that segment to a trail around the reservoir.

Bodie Hills (Issues/Needs identified in the Bodie Hills Multi-modal Plan)
Issues in the Bodie Hills include improving transportation facilities and upgrading parking facilities, particularly for buses, at Bodie State Park. The Bodie Planning and Advisory Committee has recommended the use of unique and historically compatible modes of travel to Bodie, such as reactivating the old railroad grade from Mono Mills to Bodie, providing for equestrians and horse-drawn wagons and carriages in the state park, and establishing a trail system in the Bodie Hills that provides for equestrian, cycling and pedestrian use.

- Transportation improvements into the park and in the area surrounding the park are also needed. Paving State Route 270 up to the cattle guard at the edge of the Bodie Bowl and designating Hwy. 270 as a scenic highway with turnouts and interpretive displays are recommended. Paving of Cottonwood Canyon Road to Bodie is recommended to reduce dust. If visitation continues expanding beyond the carrying capacity of Bodie State Park and to accommodate wintertime visitors, a visitors' center near the intersection of Hwy. 270 and U.S. 395 is recommended. Also, there is some interest in constructing a satellite parking facility and shuttle bus service outside the Bodie Bowl.

Mono Basin (Issues/Needs identified in the Mono Basin Multi-modal Plan)
Community goals for the area include the following:

Maintain the small town quality of life for residents.
Increase tourism opportunities—develop Lee Vining as a destination rather than a quick-stop highway town.
Improve visitor services.
Maintain and increase the attractiveness of the community.

- There is an opportunity to enhance the visual appearance of Lee Vining along U.S. 395. Enhancements may include: landscaping, raised pedestrian crossings with variations in pavement texture/appearance, street furniture, revised parking configurations and provisions for the convenient loading and unloading of tour buses.
- The Caltrans and Mono County road maintenance facilities detract from the appearance of the Lee Vining commercial district. There is an opportunity, as these facilities are relocated, to redevelop those properties in a manner that contributes to an attractive main street appearance. There is also an opportunity to coordinate road maintenance facility needs of other entities, such as Mono County and the Forest Service, with the relocation of the Caltrans shop. If these facilities are not relocated, there is a need to enhance their appearance through landscaping, solid fencing, painting, etc.
- There is an opportunity to balance competing needs through reengineering the five-lane section of U.S. Highway 395 through Lee Vining. Competing needs include: convenient parking for business patrons; slower traffic, bike lanes and pedestrian facilities for residents;

traffic flow in front of businesses; and convenient interregional travel for motorists traveling through Mono County.

- As U.S. Highway 395 improvements occur directly north and south of Lee Vining, there will be opportunities to provide visual interest and community gateway design enhancements.
- There is community concern that the conventional traffic-planning goal of moving the most possible traffic at the highest feasible speed should not be the priority for U.S. Highway 395 through Lee Vining. Pedestrian safety and comfort, roadway aesthetics and community economics are of equal or greater concern to the community.
- There is a need for pedestrian improvements throughout Lee Vining and adjacent areas. These improvements may include:
  a. Safe pedestrian crossings across U.S. Highway 395 in Lee Vining. Improvements to slow traffic may include: variations in pavement surface, raised intersections, reconfigured traffic lanes, flashing caution lights and crosswalk landmarks.
  b. A flashing yellow light on U.S. 395 north of Lee Vining, to slow southbound traffic entering Lee Vining.
  c. Post and enforce slow speed limits along U.S. 395 within Lee Vining to minimize conflicts with pedestrians crossing the highway. Speeds on U.S. 395 along Mono Lake should also be lowered to minimize conflicts with recreational visitors to the lake.
  d. Additional pedestrian trails to and from local activity nodes, such as the Mono Basin Visitor Center and Mono Lake.
  e. Improve the existing sidewalk surface in Lee Vining to provide a continuous and attractive walkway along the length of the U.S. 395 frontage in Lee Vining.
- There is need for bikeway improvements throughout the Mono Basin. There are opportunities to include wider shoulders adequate for bike use as part of scheduled road maintenance projects and to provide other improvements for cyclists.
- Lee Vining lacks adequate parking facilities for visitors and buses in the summer months. Much of the existing commercial district lacks sufficient area for onsite parking. Trucks parked throughout the community with idling engines cause air and noise pollution and detract from the attractiveness of the community. Potential solutions to these issues include the following:
  a. Restrict truck parking and engine idling in certain areas of Lee Vining and consider siting a truck parking facility in the region.
  b. Tailor parking standards to meet Lee Vining's unique conditions.
  c. Acquire land and develop one or more community parking areas for the Lee Vining business district. The existing Caltrans and county road shops, when vacant, could serve as community parking areas.
  d. Design parking facilities to enhance the appearance of the business district. Design standards should ensure that future parking areas are well landscaped, sited in scale with adjacent structures, and appropriately buffered from adjacent sensitive land uses.
- There is a need to consider future expansion of Lee Vining when determining community-parking needs.
- State Route 120, both west through Yosemite and east to Benton, is closed in the winter. There is local interest in keeping both sections of the highway open longer and in maintaining Hwy. 120 east to Benton for winter access. There is a need to consider different approaches to increase funding and responsiveness to maintenance needs on Hwy. 120 through Yosemite, including:
  a. Organizational options, such as Caltrans assuming maintenance responsibility.
  b. Establishing a Tioga Pass Authority to maintain the road.
  c. Using Park fees for road maintenance.

- There is a need to provide safe access around avalanche hazards on U.S. Highway 395 just north of Lee Vining. An avalanche bypass road north of Lee Vining would funnel traffic through the Mono Basin Visitor Center and could also improve access to the tufa area just north of the Visitor Center.
- Local transit services (Mono County Transit Service) could be expanded and improved to better link Lee Vining and Mono City with other communities along the U.S. 395 corridor. Local transit should also link Lee Vining with other eastside attractions such as Bodie, South Tufa and the Lee Vining Airport. Transit vehicles should provide storage for bicycles and backpacks.
- Low cost backpacker shuttles should be considered to reduce multi-day parking.
- The Lee Vining Airport lacks a comprehensive master plan. An airport master plan, along with an updated airport land use plan, is needed to coordinate improvements and land uses for the airport vicinity. As one of the public airports closest to Yosemite National Park, there is the potential to increase use of the Lee Vining Airport by Yosemite visitors.

June Lake (Issues/Needs identified in the June Lake Multi-modal Plan)

- State Route 158, a two-lane County-designated scenic highway and the June Lake Loop's major roadway, experiences traffic congestion during peak periods in the winter and summer. Winter travel is further hindered by wintry weather conditions.
- Traffic congestion is expected to increase as a result of improvements to June Mountain Ski Area and associated development. Increased traffic will aggravate congestion and conflicts between vehicles and pedestrians, as well as the frequency of accidents.
- Steep slopes, sensitive environmental habitats and a limited right-of-way hinder the widening of Hwy. 158.
- Small lot configurations, building encroachments into setbacks, and fragmented ownership impede roadway improvements. The inability to provide adequate access to some private lands will limit the development potential of those lands.
- June Lake Village—the central commercial and retail district—lacks a cohesive and integrated system for traffic, parking and pedestrian circulation. Also, Caltrans reports that the rate of accidents along Hwy. 158 in the June Lake Village exceeds the statewide average for similar highways.
- Presently, the Loop lacks alternatives to automobile use. Future land uses and recreational opportunities will depend heavily upon a properly designed and integrated circulation system.
- Parking in the Loop's commercial centers and at recreational facilities is limited or restricted. The lack of adequate parking aggravates traffic flow, creates traffic safety hazards and may constrain tourist sales revenues as well as future development. In winter, on-street parking hinders snow removal and internal circulation.
- Snow removal on Hwy. 158 in the village during business hours causes traffic delays and parking problems for businesses. Limited snow storage sites have not been established. At times, pedestrians must share plowed roadways in the Village with vehicles, increasing traffic congestion and safety hazards.
- The limited circulation system creates both internal and external circulation problems. Restricted internal circulation could hamper fire fighting or other emergency efforts. Limited external access; i.e., mobility between the Loop and U.S. 395, could hinder evacuation efforts in the event of a major catastrophe.
- Many June Lake Loop roadways feature improper grading, shoulder improvements, setbacks and roadway design. These features increase the cost of maintenance, repair and snow

removal; limit access for emergency service vehicles; and add to erosion and traffic circulation problems.

- Sidewalks along both sides of Hwy. 158 through the Village are the only existing pedestrian trails. Sidewalks feature either an asphalt or concrete surface and vary in width from approximately 4', predominantly on the west side, to 2' on the east side. Obstructions such as stairs with handrails and driveways to individual businesses, portable business signs and signposts clutter the sidewalks.
- Field surveys with Caltrans personnel have indicated that a June Lake Village project featuring a connector road, community parking lots and pedestrian improvements could qualify for TEA 21 funding due to its multi-modal aspect of relieving traffic congestion.
- Many roadway easements were drawn without regard for the existing topography or the feasibility of constructing future roadways. Numerous property owners abutting "unbuildable" roadway easements have applied to abandon the public's interest in existing paper roads. The Street and Highway Code establishes the procedure for the County to abandon its interest in public rights-of-way. Under the Code, roads eligible for abandonment must be impassable and the County must not have expended public funds on the road in the last five years. The County Board of Supervisors vacates public rights-of-way on a case-by-case basis after receiving a petition from adjacent property owners, noticing adjacent property owners about the proposal, and holding a public hearing on the proposed vacation. There is an opportunity to identify routes that may be vacated.
- After the County vacates the public interest in rights-of-way along street easements, the property under the former easement reverts to the property owners adjoining the former road easement. Street abandonment often benefits property owners adjacent to roadways by enlarging existing parcels and providing more area for development.
- The County's vacation of road rights-of-way could hinder future fire protection or emergency service efforts by limiting access. Abandonment could also hinder the activities of the JLPUD or SCE, which currently use existing roadway easements for access and for the location of sewer and water facilities and electrical facilities.
- The June Lake Loop lacks distinctive street signs that blend in with the mountain character of the community. As part of the 911 emergency-response program, the County has started to install common street signs throughout the county. The signs are constructed out of redwood and mounted on a single 4 x 4 wooden support post. The signs are brown in color and feature white letters routed into the sign face.
- Public transportation in June Lake is limited to one intercity transit system, one inter-regional bus line, one employee bus line and limited shuttle bus service provided by a local reservation service. Private charter bus lines for organized alpine skiing trips or other traveling groups also offer non-scheduled regional and inter-regional transit service. There is an opportunity to increase transit access to and throughout the June Lake community.
- The June Lake Loop can greatly benefit from improved and expanded pedestrian trails to improve safety, to increase pedestrian traffic in commercial areas and to expand the range of recreational opportunities. Currently, most of June Lake's trails are on public lands managed by the U.S. Forest Service and provide access to destinations outside the community. Figure 4 shows existing trailheads and trails in the Loop. There is an opportunity for pedestrian trails on private lands to link major commercial centers with residential development, lodging facilities and recreational nodes.
- Cross-country ski trails, which do not exist in the Loop, could link future development and provide an alternative to automobile travel.

- Potential cross-country ski trail alignments in the Loop are severely limited by avalanche dangers. Other factors limiting trails include the availability of snow on a consistent basis and the existence of private property predominately in the flatter areas of June Lake.

Mammoth Vicinity/Upper Owens

- Maintaining the scenic corridor along U.S. Highway 395 and providing bike routes in the western portion of Long Valley on existing roadways.

Long Valley (Long Valley, McGee Creek, Crowley Lake, Aspen Springs, Sunny Slopes)
Issues in the Long Valley area (i.e., the communities of Long Valley, McGee Creek, Crowley Lake/Hilton Creek, Aspen Springs and Sunny Slopes) include maintaining the rural recreational character of the area while developing an effective and safe circulation system. Long Valley residents are interested in providing adequate emergency access, upgrading local roads to county standards, discouraging traffic in residential areas and encouraging alternative transportation systems within the communities.

- Residents have expressed an interest in providing bike lanes in the following areas: along Crowley Lake Drive from Tom's Place to Long Valley; around Crowley Lake to the Benton Crossing Road; from Long Valley to the Convict Lake Road so that bicyclists can ride off U.S. 395; from Long Valley to Mammoth Lakes, possibly along the utility right-of-way; and along South Landing Road.
- One local safety issue is providing routes for pedestrians and cyclists in the Crowley Lake/Hilton Creek area, along Crowley Lake Drive and South Landing Road, either by increasing the shoulder or providing separate routes. A portion of South Landing Road is currently a private road. In order to increase the shoulder there, the County would need to acquire dedications from some property owners. The recently completed bikeway along Crowley Lake Drive from South Landing Road to the community center has increased bicycle safety in the community of Crowley Lake. Interest has also been expressed in developing improved trails along portions of the Whiskey Creek riparian corridor through portions of the community.
- Residents are also concerned about safety at the intersection of Lower Rock Creek Road and U.S. Highway 395. There is some interest in eliminating that intersection and realigning Lower Rock Creek Road so that it terminates at Crowley Lake Drive at Tom's Place.

Wheeler Crest/Paradise (Swall Meadows, Pinon Ranch)

- Residents are interested in providing an improved transportation system that protects and accesses the unique scenic, recreational and environmental resources of the area. Alternative transportation systems, both within the community area and linking the area to other communities in the region, are a major concern. Residents in Paradise are interested in providing a bike path between Paradise Estates and the Inyo County line.

Tri-Valley (Benton, Hammil, Chalfant)

- Residents are interested in safety and access to the rest of the county. Issues in this area include the provision of adequate and safe access to U.S. 6 with sufficient distances between access points; the provision of winter access to the rest of Mono County (i.e., completing the paving of the Benton Crossing Road); safety along U.S. 6 during hazardous conditions (primarily dust storms); the provision of rest stops along U.S. 6; the inclusion of U.S. 6 into the countywide scenic highway system for its historic significance; and the provision of a bike path connecting Bishop and Chalfant, either by widening the shoulders along U.S. 6 or by providing an alternative route along the abandoned railway lines east of U.S. 6. Residents also believe that there is a need for a fire station and an emergency landing strip in Hammil.

Oasis

- Oasis, in the extreme southeastern corner of the county, is separated from the rest of the county by the White Mountains. Access to the area is either from Nevada, or on Hwy. 168, which connects Big Pine in Inyo County to Oasis. Hwy. 266 connects Oasis to roads in Nevada. Oasis is an agricultural area and has no transportation needs aside from regular maintenance of the existing highway system.

RESOURCE SHARING AND PARTNERSHIP OPPORTUNITIES

The County, the Town and the LTC currently participate in several resource sharing/partnership projects:

- The County has initiated a collaborative regional transportation planning process with Kern and Inyo counties to pool STIP funds for high priority projects for access from Southern California;
- The County has shared funds with Caltrans to complete the Rush Creek four-lane project;
- The County continues to participate in YATI and YARTS along with Yosemite National Park, Caltrans and other counties surrounding Yosemite; and
- The Town has partnered with Mammoth Mountain Ski Area to improve Mammoth/Yosemite Airport and market airline service to Mammoth.

RTP policies promote the development of additional resource sharing and partnership projects as the opportunity arises.

COORDINATION WITH CALTRANS SYSTEM PLANNING

Caltrans conducts long-range planning ("System Planning) for all state routes at the District level. System Planning is composed of three elements: 1) Route Concept Reports (RCRs); 2) Route Development Plans (RDPs); and 3) District System Management Plans (DSMPs). The RCR is a concept, with supporting rationale, of how the route should operate and what the physical facility should look like over the next 20 years. The RDP identifies fundable improvements over the next 10 years leading toward attainment of the route concept. The DSMP outlines the system management guide. Since the major roadways in Mono County are state and federal highways, there is a need for close coordination of planning between Caltrans, the Local Transportation Commission, the County, the Town of Mammoth Lakes, and federal and state resource management agencies since much of the land crossed by highways is federal land.

There is the potential to incorporate environmental mitigation measures and enhancement projects into the planning process for road improvements to both state and local circulation systems. Caltrans, the Forest Service, the BLM, the DFG, the LTC, the County, the Town of Mammoth Lakes and other interested agencies and organizations should identify appropriate mitigation measures and potential enhancement projects during the planning stages for roadway improvements and then work together to ensure that identified measures are implemented. There is the potential to obtain cooperative funding for projects.

CROSS-JURISDICTIONAL COMMUNICATION NETWORK NEEDS

The County and the Mono County LTC have been working to improve communications concerning transportation projects and needs with surrounding counties and with other service providers within the county.

- The County has initiated a collaborative regional transportation planning process with Kern and Inyo counties to develop high priority projects for access from Southern California;
- The County continues to participate in YATI and YARTS along with Yosemite National Park, Caltrans and other counties surrounding Yosemite; and

- The LTC has partnered with Caltrans in an outreach effort to provide local residents with easier access to information concerning transportation projects in the region in order to increase community participation in the planning process.

SCENIC ROUTES/SCENIC HIGHWAY DESIGNATION

Most of Mono County's scenic resources are visible from the highways and are experienced by visitors primarily from the highways. The county's scenic resources are an important component of its environmental and economic well-being; as a result, there is a need to preserve and improve the scenic qualities of the highways and the scenic resources visible from the highways.

Designation as a State Scenic Highway limits the type of development that can occur in the scenic highway corridor. State-designated Scenic Highways in Mono County include the following segments (see Figure 9):

- Route 89 between post mile 3.2 and the Alpine County line, post mile 7.6.
- U.S. Highway 395, from the Inyo County line to just south of the town of Walker, a distance of 101 miles.

County-designated Scenic Highways are shown in Figure 10 and described in the scenic highway section of Chapter 8, Visual Resources. County-designated Scenic Highways are subject to Mono County General Plan policies (Conservation/Open Space Element, Visual Resource policies) and to the requirements of the Scenic Combining District in the county's Land Development Regulations, both of which restrict the type of development that can occur in the scenic highway corridor.

Federally designated Scenic Byways in Mono County include the El Camino Sierra Scenic Byway project, which encompasses Hwy. 120 in Lee Vining Canyon and U.S. 395 from the Nevada state line in Mono County to southern Inyo County. Federal funds have been used to provide enhancement projects such as scenic byway kiosks, scenic vista points and rest areas along the El Camino Sierra Scenic Byway.

There is some interest in providing additional turnouts and scenic vista points along scenic routes throughout the county. Additionally, there is interest in preserving agricultural and open-space lands for their scenic value.

Caltrans and the County maintain several roadyards adjacent to U.S. 395 throughout the county. There is some interest in screening or relocating the existing facilities in order to reduce the visual impacts of those facilities.

TRANSIT

Existing Transit Services

The following transit services are currently available in Mono County:

<u>Inter-Regional Transit</u>

Greyhound Lines Inc. provides scheduled inter-regional transit service between Los Angeles and Reno, with one northbound and one southbound bus per day. The service is not conducive to use by local residents due to current scheduling and the lack of designated stations.

Private charter lines also offer unscheduled regional and inter-regional transit service. In winter, most charter services originate from the Southern California area and provide round trip transportation for organized ski trips. In the summer, most charter services coming to the county are part of package tours. Tour and charter bus volumes are presently highest in the summer months, although volumes are also high on peak winter ski weekends. The California Highway Patrol estimates that approximately 40 buses per day use the highways through Mono County between June and October.

Countywide Public Transit/Inyo-Mono Transit
Inyo-Mono Transit provides transit services throughout the county and to Bishop and Carson City. It provides scheduled and demand-responsive services for senior citizens, handicapped persons, low-mobility persons and the general public.

Yosemite Area Regional Transportation System (YARTS)
A two-year demonstration project to provide a "positive alternative choice for access to (Yosemite National Park) for visitors, employees and residents begins in May 2000 (for further information see www.yosemite.com). Service will be provided to and from Lee Vining in Mono County (and locations in Mariposa and Merced counties) on a schedule that connects with the Yosemite National Park shuttle service. Bus shelters will be provided at two locations in Lee Vining; bus signs will be provided at two additional locations in Lee Vining.

Mammoth Area Transit (MAT)
Public transit service is provided in Mammoth Lakes by MAT. This system is not intended to provide comprehensive services to local residents, but is designed to transport visitors in Mammoth Lakes to a variety of ski, recreational, dining, lodging and retail areas. The system is operated by Mammoth Mountain Ski Area and currently operates in the winter. The shuttle buses are used in the summer as a tourist shuttle from Mammoth Mountain Inn to Red's Meadow and Devil's Postpile National Monument.

Mammoth Lakes is in the process of developing a Dial-A-Ride service to meet local transit needs in Mammoth Lakes. Inyo-Mono Transit will provide that service.

Lodging-based Shuttles
Condominiums and hotels in Mammoth Lakes and June Lake provide this service. These shuttles provide on demand service to the Mammoth/Yosemite Airport and to the ski areas for lodging guests.

Taxicab Service
Services are currently provided by a taxicab service and a shuttle service, offering demand responsive service on a metered basis. Both services are based in Mammoth Lakes.

Mammoth Mountain and June Mountain Ski Areas
The ski areas provide scheduled employee van shuttle service between Bishop, Mammoth and June Lake. Ridership is restricted to ski area employees living in Bishop.

Inyo Mono Area Agency on Aging
IMAAA serves the transportation needs of senior citizens. The Agency takes seniors shopping, to the doctor, or to obtain other services, locally or long distance. Senior trips go to destinations such as AARP conventions, Reno, or Los Angeles. IMAAA runs a meals-on-wheels program and helps distribute government surplus food throughout the county.

Toiyabe Indian Health Project
The Toiyabe Indian Health Project provides transportation for Native Americans and their families for shopping, medical and other necessary purposes. Based in Bishop, the project provides transportation in both Inyo and Mono counties.

School Buses

The county's dispersed population and the location of its public schools require some students to travel many miles to and from school. Both the Eastern Sierra Unified School District and the Mammoth Lakes School District provide bus services for their students.

Transit Dependent Populations

Transit needs may be assessed in terms of those segments of the population that are dependent on some form of public transportation. In Mono County, this is generally young people, seniors, disabled persons, or low-income persons. Table 21 shows population projections for young people and seniors. The total percentage of the population under 15 and 60 or older will remain relatively stable in 2000 and 2010 (approximately 33% to 34% of the population); in 2020, it will rise to 44% of the countywide population. It should be noted that the senior population is projected to rise from 13% of the countywide population in 2000 to 25% of the countywide population in 2020. The senior population often has mobility concerns that require specialized transportation.

TABLE 21
POPULATION PROJECTIONS, YOUNG PEOPLE AND SENIORS

	2000	2010	2020
Under 15 years old	20%	16%	19%
60 years or older	13%	18%	25%

Source: State Department of Finance (DOF) population projections, 1999. See www.dof.ca.gov .

Estimates prepared by the U.S. Census Bureau, Small Area Income and Poverty Estimates Program (see www.census.gov) show 997 persons (9.5% of the population) living in poverty in Mono County in 1995, approximately the same number (967 persons, 9.7% of the population) counted in the 1990 Census (see www.census.gov). Table 22 provides information on the number of persons receiving public assistance in Mono County. The number of aid recipients has fallen in recent years as a result of new federal and state requirements that require aid recipients to participate in work-related activities.

Transit issues and needs include the following:

- The **Mono County Transit Plan** is incorporated as part of the Mono County RTP (see Chapter I, Planning Process). That plan provides greater detail concerning transit needs, facilities and services in Mono County.
- The current principal method of transportation to and through Mono County is the highway system. Alternative methods of moving people and goods to and through the county are limited. There is no rail service. The existing airports, because of their high-altitude location and the often-severe weather conditions in the area, are limited in the amount and type of service that they can accommodate. There is a continuing interest in expanding air service to the Mammoth/Yosemite Airport; see the section on Aviation later in this chapter.
- There is a current need for increased transit services to reduce congestion and related air quality impacts, particularly in Mammoth Lakes and potentially in June Lake. Increased transit services between community areas are probably not cost effective at this time; limited service is now available and is used primarily by senior citizens. Future development may increase the need for an improved regional transit system, particularly if large-scale recreational development occurs.

TABLE 22
PUBLIC ASSISTANCE RECIPIENTS BY PROGRAM

	1997	1998	1999
CalWORKs (1999); AFDC (1997, 1998)			
Total	265	244	183
Adult	78	61	43
Children	187	183	140
Food Stamps	370	351	227
General Relief	17	4	4
Welfare to Work (1999); GAIN (1997)	26	NA	43

Notes: AFDC = Aid to Families with Dependent Children.
Food Stamps includes persons receiving public assistance and those not receiving public assistance.
GAIN = Greater Avenue for Independence. GAIN data are not available for 1998.

Source: Employment Development Department, Labor Market Information, Social & Economic Data, Table 1. See www.calmis.cahwnet.gov.

- Transit-dependent populations in Mono County include young people, seniors and low-income persons. Over the next 20 years, the population of young people is projected to remain relatively stable, while the senior population is projected to almost double, from 13% of the population to 25%. Estimates show 9.5% of the county's population living in poverty in 1995, approximately the same number as in 1990. Although low-income persons traditionally are transit dependent, social service providers indicate that they tend to be less so in Mono County where the need for a car is greater than in more urbanized areas. In Mono County, low-income persons tend to pool their resources to get a car as soon as they can.
- The Town of Mammoth Lakes has completed a Multi-modal Transportation Study Report and is in the process of updating its Circulation Element and drafting a Transit Plan. Those documents are being drafted with the goal of reducing automobile use while providing for the transportation needs of future land uses.
- The June Lake Multi-modal Transportation Plan and the Bodie Hills Multi-modal Plan both encourage the development of transit shuttle services in their respective areas.
- Inter-regional transit services are provided by Greyhound, which provides daily service between Reno and Los Angeles. The service is not conducive to use by local residents due to current scheduling and the lack of designated stations. There is a need to improve inter-regional transit services and to offer alternative services.

NON-MOTORIZED FACILITIES

Biking has become an increasingly popular activity in Mono County, with many areas in the county experiencing extensive use for mountain biking and touring. Several bike races occur in the summer months in and around the Mammoth Lakes area. Despite its increasing popularity, however, there are few facilities in the county specifically for bicyclists. Currently, the only bike lanes or bike paths in Mono County are a stretch of bike lane along Mammoth Creek that extends up to and crosses Meridian Boulevard connecting with a bike lane adjacent to the Trails Subdivision. The Trails Subdivision trail connects the Elementary and High Schools with Shady Rest Park, located north of Main Street. There is also a striped bikeway along the shoulder on a portion of Hwy. 203 within Mammoth, a short (0.3 mile) striped bikeway along Crowley Lake Drive in the vicinity of Aspen Springs and a recently completed bikeway along Crowley Lake Drive from South Landing Drive to the community center.

Aside from riding on the shoulders of the four-lane sections of U.S. Highway 395, much of the touring in the county occurs on roadways where the shoulder may or may not be wide enough to accommodate bicyclists safely. Much of the mountain biking occurs on numerous trails and roads on public lands. Mammoth Mountain Ski Area operates a mountain bike park in the summer months using existing trails and roads on Mammoth Mountain.

Policies in this RTP call for the development of bike lanes at the time rehabilitation projects occur on local highways and streets. This policy is being implemented in the current State Transportation Improvement Program (STIP) where funds have been allocated for the construction of bike lanes alongside rehabilitation projects on local roadways on several street segments in Crowley Lake, along Benton Crossing Road, on Eastside Lane in Antelope Valley and along Lake Mary Road in the Lakes Basin in Mammoth Lakes.

Trail systems for other non-motorized activities, such as horseback riding, cross-country skiing and hiking, are located on public lands throughout the county. Other than hiking trails, little attention has been given to pedestrian facilities in the county. Some communities have sidewalks, but no community has extensive pedestrian facilities. With increasing traffic levels, the need for additional safety devices, markings and traffic direction for pedestrians is increasing. The County is in the process of developing pedestrian planning principles to provide more walkable communities, particularly in Crowley Lake, June Lake, Lee Vining and Bridgeport. In addition, the current State Transportation Improvement Program (STIP) includes funding for projects to construct sidewalks along Hwy. 158 in June Lake Village and to replace sidewalks along U.S. 395 in Lee Vining.

In Mammoth Lakes, non-motorized facilities for the use of pedestrians, bicyclists, equestrians and cross-country skiers have been comprehensively planned. Because of the significant existing and future traffic congestion in Mammoth Lakes, non-motorized facilities can be more than recreational facilities. A comprehensive system of walking, bicycle and cross-country trails will reduce auto travel and provide important visual and activity amenities for visitors and community residents. The Town continues to implement its plans for non-motorized facilities by improving and linking additional portions of its trails systems.

Non-motorized issues and needs include the following:

- The County completed a Trails Plan, including a General Bikeway Plan, in 1994. That Plan is incorporated as part of the Mono County RTP and was adopted with the 1994 Update of the RTP. It provides comprehensive planning for non-motorized facilities in the unincorporated areas.

  The overall purpose of the Mono County Trails Plan is to establish trail systems that facilitate multi-modal travel and recreation within, around and between unincorporated communities in the county. The plan addresses regional routes that provide access to communities, major recreational areas and existing trail systems throughout the county, and community routes that provide access throughout communities and to surrounding recreational areas.

The Trails Plan is intended to expand upon and implement policies in the Mono County General Plan, associated Area Plans and the RTP, and to coordinate with the applicable plans of federal land management agencies. The Plan focuses primarily on the development of facilities for recreational users, both residents and visitors.

- The Mammoth Lakes Trail System Plan (1991) is incorporated as part of the Mono County RTP. It provides comprehensive planning for non-motorized facilities in the town of Mammoth Lakes.
- There is a growing need for additional trail systems throughout the county, both within and between community areas. There is the potential to link existing trail systems, which are predominantly on public lands, to newly developed trail systems on private and county lands in community areas. State planning law (Section 65302 (e) et seq. of the Government Code) requires every city and county to consider a trail system in its open space element. The law also requires every city and county to consider the feasibility of integrating its trail system with appropriate segments of the state system.
- Most bicycle travel in the region now occurs on streets and highways without special bike facilities. This will probably be true in the future as well. In some instances, some street systems may be fully adequate for safe and efficient bicycle travel signing and striping for bicycle use may be unnecessary. In other cases, signing and/or striping can serve as a means to alert motorists to the presence of bicyclists who may be using the roadway.

  In past RTPs and Circulation Elements, the Mono County LTC adopted the policy that the most important effort that could be undertaken to enhance bicycle travel would be improved maintenance of existing roads that are used regularly by bicyclists. This effort requires that increased attention be given to the shoulder portion of roadways where bicyclists are expected to ride. Caltrans put increased sweeping into its maintenance budget and has received good feedback.

  The consideration of bicycle needs in construction projects and in safety and operational improvements is also important. The county road system has been reviewed to determine the immediate needs of bicyclists in terms of increasing safety for riders and requests by users for bicycle lanes. Many rural highways are used by touring bicyclists and locals for recreational travel and travel between communities. The development and maintenance of paved roadway shoulders with a standard 4-inch edge line stripe would significantly improve the safety and capacity for bicyclists.
- There is an opportunity to create an Eastern Sierra Regional Bike Trails System that would serve the needs of the large population of mountain bikers in the Eastern Sierra. This proposed system would provide a regional non-wilderness trail system close to 300 miles long in Inyo and Mono counties. Ninety percent of the system would be on existing trails, old railroad alignments, wagon roads, abandoned roads and canals; 10% of the system would require new construction. Funding for the development of such a system is available from a variety of sources including TEA 21 programs, State Recreational Funds and the Rails to Trails Foundation. Such a trail would provide opportunities for scenic views, wildlife viewing, geography and geology lessons, and history and cultural interpretive sites. The trail could be promoted as a cultural tourism corridor/route and would be available from existing highways at numerous points providing day use opportunities.
- In January 2000, the Mono County LTC voted to support the following requests from the Sierra Cycling organization for bike route signing in Mono County on state highways and county routes:

  U.S. 395 north and south from Tom's Place to Hwy. 158.
  June Lake Loop (Hwy. 158) in both directions.

Hwy. 120 to Benton in both directions.
U.S. 395 north of June Lake Junction to Lee Vining in both directions.
Hwy. 203 from U.S. 395 to Mammoth Mountain Ski Area in both directions.
Upper Rock Creek Road from Tom's Place to Mosquito Flat in both directions.
Lower Rock Creek Road from Tom's Place to the Inyo County line in both directions.
Benton Crossing Road to Hwy. 120 in both directions.
Crowley Lake Drive to Sherwin Creek Road in both directions.
Owens River Road in both directions.

With the exception of Upper Rock Creek Road, all routes have been identified in the RTP and Mono County General Plan Circulation Element as Regional Bike Routes. Caltrans wants to ensure that bike route signage on state highways is coordinated with bike route signage on other county routes. Caltrans intends to install signs as soon as it verifies that routes proposed for bike route signage are appropriate for bicycle usage.

- There is a need for improved and expanded pedestrian facilities in community areas throughout the county, both to improve safety and to increase access to commercial core areas in communities. The community issues section of this document identifies those areas where improved pedestrian facilities are needed, such as the June Lake Village. The Walkable Communities planning process is developing planning principles, included in this RTP, to convert communities in the county to more walkable communities. The focus is on Crowley Lake, Lee Vining, June Lake and Bridgeport.

AVIATION

Three public airports are located in Mono County: Mammoth/Yosemite Airport, Lee Vining Airport and Bridgeport Airport (Bryant Field). Mammoth/Yosemite Airport, located 8 miles east of Mammoth Lakes, is an FAA-certified commercial airport offering charter services. In the past, limited commercial air service has been available to the Southern California area. The Mammoth/Yosemite Airport is owned and operated by the Town of Mammoth Lakes. The Town has recently updated the Master Plan for the Mammoth/Yosemite Airport and is in the process of developing the airport to support 757-sized commercial aircraft service out of Dallas and Chicago.

The Mammoth/Yosemite Airport provides an important link in the statewide aeronautics system. It is situated near Mammoth Pass, a relatively low-terrain trans-Sierra crossing. Because of rapid weather changes, this airport, along with the Bishop, Lee Vining and Bridgeport airports, provides an important safety valve for those flying the Owens Valley-Long Valley corridor. The airport has been identified as one that is subject to the Federal Aviation Regulations (FAR) Part 139, which sets standards for the operation and safety of airports with small commercial carriers. Under FAR Part 139, the Mammoth/Yosemite Airport is required to have procedure manuals and crash, fire and rescue equipment.

In 1987, the Mono County Airport Land Use Commission adopted an Airport Land Use Plan (ALUP) for the Mammoth/Yosemite Airport. That plan provides for major development and expansion of the airport terminal area including a hotel, major infrastructure improvements, aircraft-support facilities and a passenger terminal. The plan also establishes specific land use policies to protect the public welfare and the safety of aircraft operations.

Lee Vining Airport, located slightly southeast of the community of Lee Vining, is a general aviation facility. It is unattended and has no fuel available, but does have a pilot-activated lighting system and a navigational beacon. Bryant Field is located in the center of Bridgeport, adjacent to Bridgeport Reservoir. It is a general aviation facility with fuel, a pilot-activated lighting system and a navigational beacon. The Bridgeport and Lee Vining airports are owned and operated by the County.

Airport Land Use Plans were adopted for the Bridgeport and Lee Vining airport in 1994. These plans establish specific land use policies for the areas surrounding those airports. Due to the lack of development activity in the Lee Vining and Bridgeport areas, the amount of aviation activity at the two airports is expected to remain low. The Bryant and Lee Vining fields have very minor improvements scheduled over the next five years.

In addition to the airports, there are several helipads in the county. One is operated by the U.S. Marine Corps at its Mountain Warfare Training Center at Pickel Meadow. The U.S. Forest Service and BLM operate others, primarily for fire-fighting purposes. Helipads located at Mammoth Hospital in Mammoth and at Mono General Hospital and Bryant Field in Bridgeport are used for air ambulance services.

TABLE 23
MONO COUNTY AIRPORTS, OPERATIONAL DATA, 1998

Airport	Based Aircraft	Annual Operations	Functional Class[a]	Elevation/ Runway Length	Lights
Bryant Field	1	3,375	Utility	6468'/4239'	Low
Lee Vining	0	2,000	Utility	6802'/4050'	Low
Mammoth	40	23,000	BU-I	7128'/7000'	Medium

NOTES: a. Basic Utility Stage I (BU-I)—This type of utility serves 75% of the single-engine and small twin-engine airplanes used for personal and business purposes. Precision approach operations are not usually anticipated.

Source: **Mono County Public Works Department; Town of Mammoth Lakes.**

TABLE 24
MONO COUNTY AIRPORTS -- LANDING AND NAVIGATIONAL AIDS

Airport	LIRL	MIRL	VASI	REIL	UNICOM	FSS	Control Tower	AWOS	PAPI
Lee Vining	Yes	No	No	No	No	No	No	No	No
Bryant Field	No	Yes	No	No	No	No	No	No	No
Mammoth Lakes	No	Yes	No	No	Yes	No	No	Yes	Yes

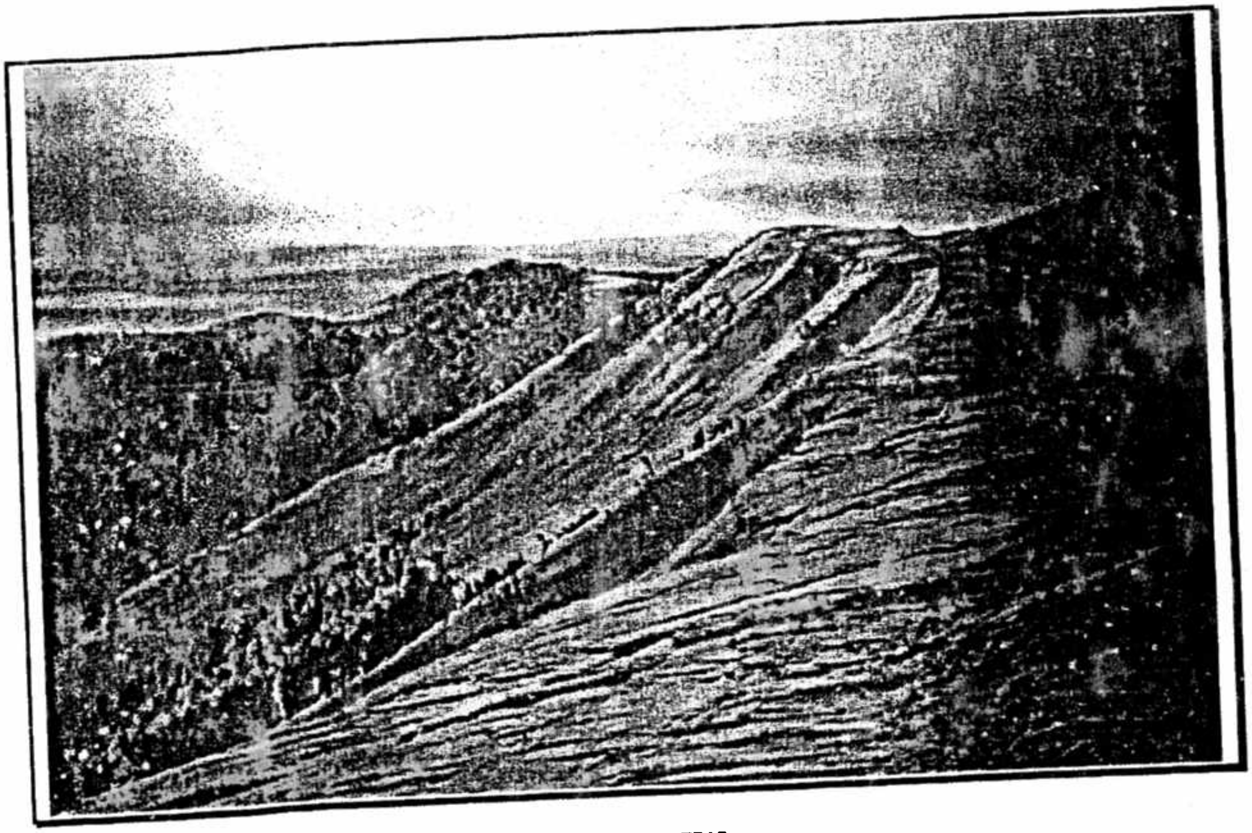
NOTES:
LIRL—Low-Intensity Runway Lights
MIRL—Medium-Intensity Runway Lights
VASI—Visual Approach Slope Indicator, an airport lighting facility.
REIL—Runway End Identifier Lights.
UNICOM—A non-governmental radio station that may provide airport information.
FSS—Flight Service Station, a communications facility.
AWOS—Automated Weather Observation System.
PAPI—Precision Approach Position Indicator.

Source: Mono County Public Works Department; Town of Mammoth Lakes.

Aviation issues and needs include the following:

- There are no transportation terminals in the county aside from the terminal at the Mammoth/Yosemite Airport. Use of that facility is discussed in the Mammoth/Yosemite Airport Land Use Plan (ALUP) and the Airport Master Plan. The three airports in the county are important for both residents and visitors. For visitors, the air services provide the only alternate mode of transportation into Mono County. For residents, the air service permits rapid communication with governmental, business and medical centers in the western part of the state and rapid emergency medical transportation when necessary.
- The Airport Land Use Commission (ALUC) governs Land use at all airports in the county. The Commission has adopted an Airport Land Use Plan for the Mammoth/Yosemite Airport and is in the process of completing ALUPs for the Bridgeport and Lee Vining airports.
- Only minor improvements are planned at the Bridgeport and Lee Vining airports. The timing and feasibility of improvements depend on the availability of funding for those improvements. Potential improvements include extending the runway at both airports and providing some basic services, such as a phone at the Lee Vining airport. Construction of a multi-agency helibase and support facility/terminal building is presently under way for Bryant Field in Bridgeport.
- Expansion of commercial airline service and general aviation operations is considered to be an integral element in alleviating surface transportation problems in the town of Mammoth Lakes. Continued improvement of the Mammoth/Yosemite Airport facilities and creation of revenue-generating airport businesses will be necessary before the airport can assume its full role in expanding air transportation services. A crosswind runway and improvements to the terminal facilities continue to be major concerns at the Mammoth/Yosemite Airport.
- The Town of Mammoth Lakes has formed a public/private partnership with Mammoth Mountain Ski Area (MMSA) to develop the airport to support 757-sized aircraft out of Dallas and Chicago. The Town's role is to develop the airport as needed; i.e., $15 million paving project to widen and lengthen the runway and taxiways, airline ramps, etc. MMSA is willing to subsidize commercial airline service into the airport and has a letter of commitment from American Airlines. MMSA is considering long-term subsidization of commercial airline service at a cost of approximately $12 million. The entire project is estimated to cost $35 million. The FAA, on a 90%-10% match, will probably fund approximately $25 million of the projected costs.

CHAPTER 8
VISUAL RESOURCES*



OVERVIEW

The rugged topography and young geology in the Eastern Sierra create dramatic landscapes. The snowcapped peaks of the Sierra Nevada and White Mountains, several of them over 14,000 feet in elevation, rise abruptly from base elevations of 5,500 to 7,500 feet in the valleys. The spectacular visual resources in the area are one of the primary attractions for visitors and residents. Scenic highways are an important part of the county's visual resources; for many visitors, the county's highways provide the best opportunity for viewing the scenery. Throughout much of the county, these highways traverse federally owned lands managed by the Forest Service or the BLM; management of lands within scenic highway corridors is determined in much of the county by the federal visual resource management systems. Hwy. 120 in Lee Vining Canyon was designated a National Scenic Byway in 1990; Forest Road 4S01 to Patriarch Grove was so designated in 1992.

The vegetation and wildlife of the region contribute to its high visual quality. Overall, the variety of vegetation and topographic features is high. Patches of pine forest and meadow, barren rock outcrops and avalanche slopes, chaparral and sagebrush add texture and color. Low ridges and isolated hills break the view and create contained views of distinctive landscapes. Wildlife is abundant in the area, and views of deer, hawks, eagles, rabbits and other animals greatly enhance the aesthetic experience both for those pursuing recreational activities in the more isolated

*Refer also to the section on "Plans and Policies" for cross-references to other documents that may provide additional site-specific visual resources information.

portions of the region, and for residents and visitors traveling local roads and highways. The water of streams, lakes, seeps and snow is an attractive visual element common in landscapes visible from regional public viewpoints.

Certain landscapes within the county, particularly in the valleys, have a high degree of scenic value. These landscapes have little capacity to absorb much development without significant visual impact. Preservation of these scenic resources is important to the quality of life for residents and visitors alike.

Mono County includes the Mono Basin National Forest Scenic Area (designated in 1984), a visual resource of national importance, managed as part of the Inyo National Forest. The Basin includes Mono Lake and a variety of dramatic landforms such as tufa towers, glacial moraines and young volcanic features. Dust storms arising from the exposed lakebed detract from the Mono Basin's scenic value.

The Inyo and Humboldt-Toiyabe national forests use the Visual Management System for the purpose of rating their visual resources. The Bureau of Land Management (BLM) has a similar rating scale (Visual Resource Management [VRM]) for the visual resources on BLM lands. Visual resources for the Inyo and Humboldt-Toiyabe national forests and the BLM are mapped in Figure 5 (see Appendix A).

COMMUNITY AREAS

The built environment in community areas is often in direct contrast to the surrounding natural environment. Atypical shapes, colors and materials of structures, roadways and above-ground power lines are easily discernible, often from great distances. During the day, sunlight reflects from metal and glass surfaces, while at night, lights within communities isolate those areas from the uninterrupted darkness of surrounding natural areas. There are few visually significant structures in Mono County. Most of the buildings that are visually significant are also historically significant. Further information about those resources is contained in the Cultural Resources section of this document.

SCENIC HIGHWAYS IN MONO COUNTY

Most of Mono County's scenic resources are visible from the highways and are experienced by visitors primarily from the highways. The county's scenic resources are an important component of its environmental and economic well-being; as a result, there is a need to preserve and improve the scenic qualities of the highways and the scenic resources visible from the highways.

Designation as a State Scenic Highway limits the type of development that can occur in the scenic highway corridor. State-designated Scenic Highways in Mono County include the following segments (see Figure 9):

- Route 89 between post mile 3.2 and the Alpine County line, post mile 7.6.
- U.S. Highway 395, from the Inyo County line to just south of the town of Walker, a distance of 101 miles.

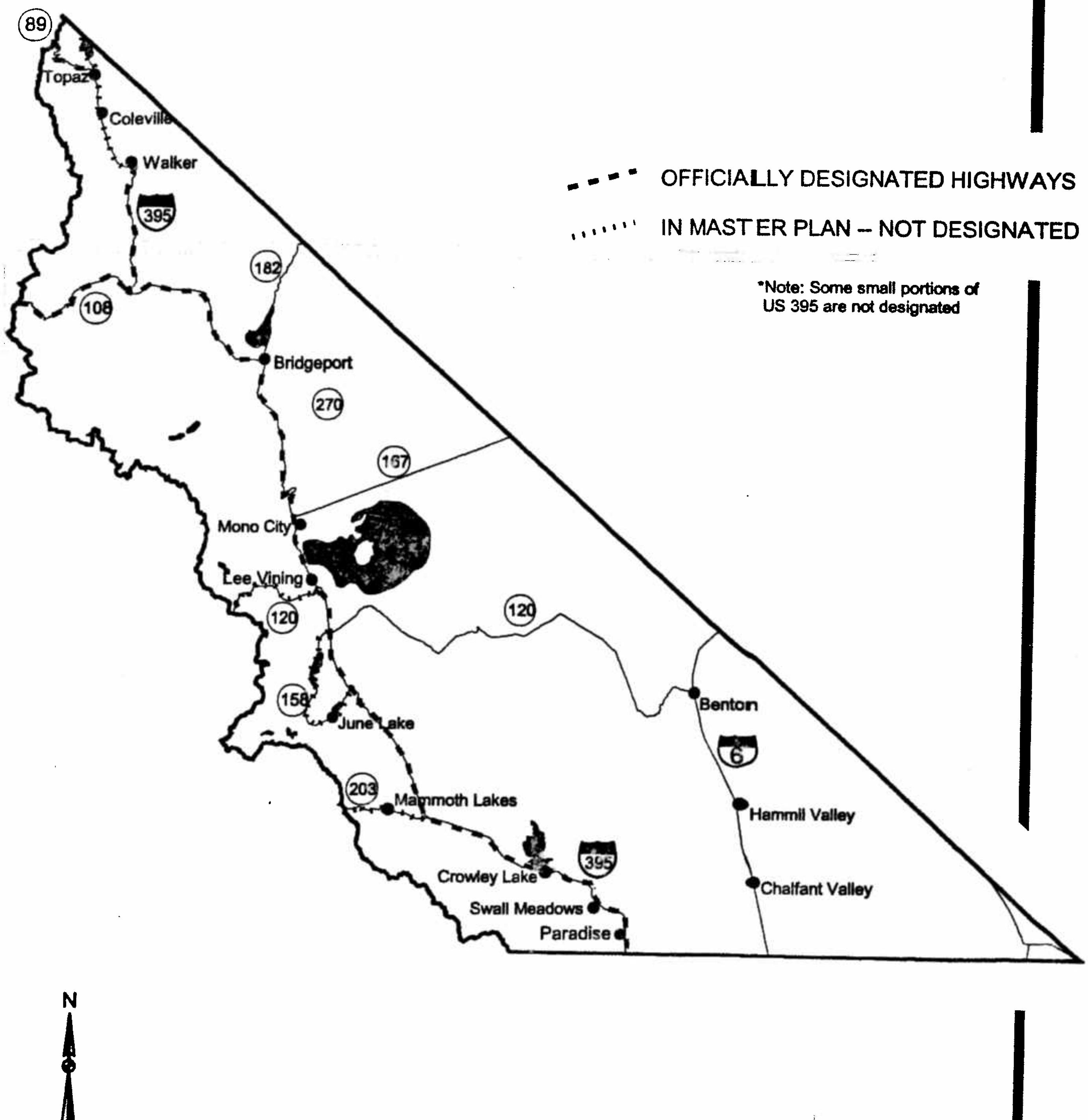
County-designated Scenic Highways are shown in Figure 10 and described in Table 25. County-designated Scenic Highways are subject to Mono County General Plan policies (Conservation/Open Space Element, Visual Resource policies) and to the requirements of the Scenic Combining District in the county's Land Development Regulations, both of which restrict the type of development that can occur in the scenic highway corridor.

Federally designated Scenic Byways in Mono County include the El Camino Sierra Scenic Byway project, which encompasses Hwy. 120 in Lee Vining Canyon and U.S. 395 from the Nevada state line in Mono County to southern Inyo County. Federal funds have been used to provide enhancement projects such as scenic byway kiosks, scenic vista points and rest areas along the El Camino Sierra Scenic Byway.

There is some interest in providing additional turnouts and scenic vista points along scenic routes throughout the county. Additionally, there is interest in preserving agricultural and open-space lands for their scenic values.

Caltrans and the County maintain several roadyards adjacent to U.S. 395 throughout the county. There is some interest in screening or relocating the existing facilities in order to reduce the visual impacts of those facilities.

FIGURE 9
DESIGNATED STATE SCENIC HIGHWAYS



Mono County GIS, 2001

FIGURE 10
DESIGNATED COUNTY SCENIC HIGHWAYS

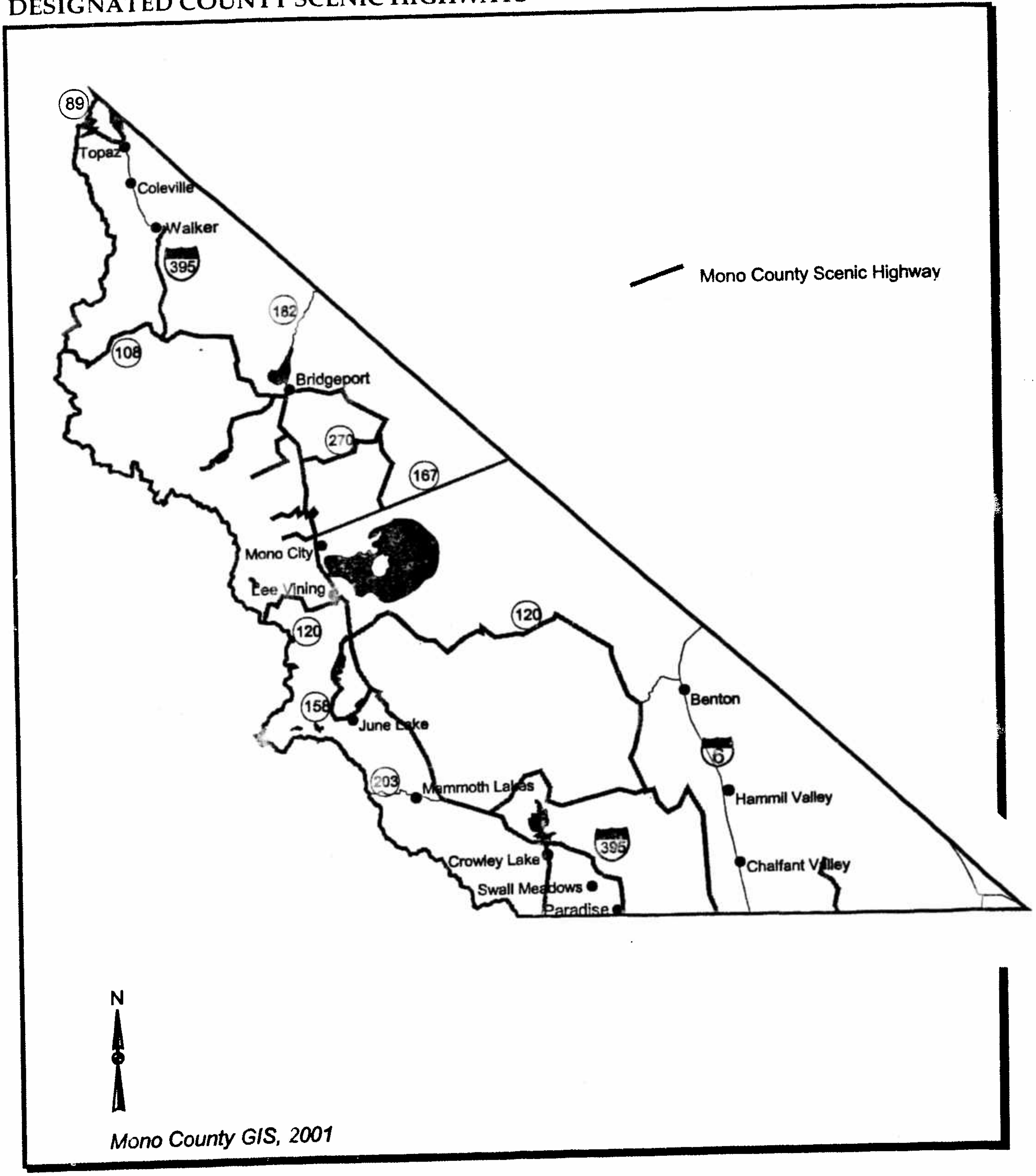


TABLE 25
MONO COUNTY SCENIC HIGHWAY SYSTEM

Route	From	To	Mileage	Scenic Corridor Attributes
US 395	Nevada St Line PM 120.5	Junc. SR 89 PM 117.0	3.5	Topaz Lake, State/County line
US 395	Inyo NF boundary PM 104.8	Junc. Emigrant St. N PM 76.8	28.0	West Walker River Canyon, Devil's Gate, Bridgeport Valley & Reservoir
US 395	S. of Evans Tract PM 74.5	N. of Lee Vining PM 52.0	22.5	Bridgeport Valley, Virginia Creek Canyon, Conway Summit, Mono Basin, Dana Plateau, Mt. Gibbs
US 395	Junc. SR 120 west PM 51.0	Inyo County Line PM 0.0	51.0	Mono Craters, June Mt., Inyo Craters, Devil's Punchbowl, Crestview, Mammoth Mt., Sherwin Bowl, Crowley Lake, Wheeler Crest
SR 89	Junc. US 395 PM 0.0	Alpine County line PM 7.6	7.6	Monitor Pass, Antelope Valley panorama, Lake Tahoe scenic route
SR 108	Tuolumne Co. line PM 0.0	Junc. US 395 PM 15.2	15.2	Sonora Pass, Leavitt Meadows
SR 120	Tuolumne Co. line PM 0.0	Junc. US 395 PM 13.4	13.4	Tioga Pass, Yosemite Park Route
SR 120	Junc. US 395 PM 13.4	0.5 mi sw junc. S 303 PM 54.4	41.4	Mono Lake, Mono Craters, Adobe Valley, White Mountains
SR 158	S. Junc. US 395 PM 0.0	N. Junc. US 395 PM 15.6	15.6	June Lake Loop
SR 167	Junc. US 395 PM 0.0	Nevada state line PM 21.3	21.3	Mono Basin and Mono Lake
SR 168	Inyo County line PM 0.0	Nevada State line PM 5.8	5.8	White Mountains
SR 182	Toiyabe NF boundary PM 4.5	Nevada state line PM 12.7	8.2	Bridgeport Valley, Bodie Hills, East Walker River, Sweetwater Mts.
SR 203	Junc. US 395 PM 9.0	Junc. Sierra Park Rd. PM 5.8	3.2	Crowley Lake, Little Round Valley, Sherwin Summit, Wheeler Ridge
SR 270	Junc. US 395 PM 0.0	3.8 miles SW of Bodie PM 9.5	9.5	Bodie State Historic Park route

TABLE 25 (continued)

Route	From	To	Mileage	Scenic Corridor Attributes
S. 203 Fish Slough Rd.	Junc. S. 204 PM 0.0	Inyo County line PM 13.0	13.0	Fish Slough, White Mts., Petroglyphs
S. 204 Chidago Cyn.	Junc. S. 303 PM 0.0	Junc. S. 203 PM 10.0	10.0	Chidago Canyon
S. 303 Benton Xing Rd.	Junc. US 395 PM 0.0	Junc. SR 120 PM 31.4	30.9	Crowley Lake, White Mountains
S. 410 Lundy Lake Rd.	Junc. US 395 PM 0.0	End PM 6.7	6.7	Lundy Lake
S. 412 Cottonwood Rd.	Junc. SR 167 PM 0.0	Bodie PM 11.0	11.0	Bodie State Historic Park route
S. 414 VA Lakes Rd.	Junc. US 395 PM 0.0	End PM 6.1	6.1	Virginia Lakes and Creek
S. 416	Junc. US 395 PM 0.0	End PM 9.4	9.4	Green Lakes and Creek
S. 418	Junc. SR 270 PM 0.0	Bodie PM 3.8	3.8	Bodie State Historic Park route
Rock Creek Rd.	Junc. US 395	Inyo County line	8.0	Rock Creek Canyon
S. 420 Twin Lakes Rd.	0.5 mi. s. Junc. 395 PM 0.5	End PM 13.7	13.7	Twin Lakes, Robinson Creek, Sawtooth
S. 423 Aurora Cyn. Rd.	1st BLM gate PM 2.0	Junc. S. 504 PM 7.7	5.7	Aurora Canyon
S. 504 Bodie/Masonic Rd.	Junc. S. 423 PM 0.0	Bodie PM 15.5	15.5	Bodie State Historic Park route
8092 Forest Service Rd.	Inyo County line PM 0.0	White Mt. Research Stn. PM 9.8	9.8	Bristlecone Pine Forest

Total Mileage--Mono County Scenic Highway System = 389.8

VISUAL RESOURCE PROTECTION

National Forest Visual Management System

The Visual Management System is applied to all management activities on National Forest lands. The system establishes visual quality objectives (VQOs) that are based on a combination of variety class and sensitivity level.

The variety class is determined by classifying the landscape into different degrees of variety:

Distinctive refers to features in the natural landscape, vegetative patterns, or rock formations that are outstanding or unique in their visual quality;

Common refers to areas with variety in form, but that are not outstanding or unique in visual quality; and

Minimal refers to areas with little change in form, texture or color. This class includes all areas not considered distinctive or common.

The sensitivity levels measure viewers' concerns for the visual quality of the forest. The three sensitivity levels include:

Level 1—Highest Sensitivity—includes all areas visible from primary travel routes, use areas and bodies of water, where at least 25% of the visitors have a major concern for the visual environment. It also includes secondary routes, where at least 75% of the users have a major concern for the environment.

Level 2—Average Sensitivity—includes all areas from primary and secondary travel routes, use areas and bodies of water where fewer than 25% and no more than 75% of the visitors have a major concern for the visual environment.

Level 3—Lowest Sensitivity—includes all areas seen from secondary travel routes, use areas and bodies of water where fewer than 25% of the visitors have a major concern for the visual environment. This level does not include any areas viewed from primary routes or others listed in Levels 1 and 2.

After National Forest lands have been inventoried according to variety class and sensitivity levels, the land is assigned visual quality objectives (VQOs). Each objective describes the level of acceptable alteration of the natural environment. The objectives are as follows:

Preservation (P). This VQO allows only ecological changes on the land. The only management impact allowed is very low visual impact recreation facilities.

Retention (R). This VQO allows management activities that repeat form, line and color already found in the natural landscape.

Partial Retention (PR). PR allows management activities to repeat the form, line and color of the natural landscape, and other changes can be made provided the visual impact is dominated by the natural landscape.

Modification (M). Under the Modification VQO, management activities may visually dominate the natural characteristics of the environment. The management activities must borrow from the natural characteristics of the environment.

Maximum Modification (MM). Under Maximum Modification, the management activities of vegetative and landform alterations may dominate the natural characteristics of the environment.

There are also two short-term goals for areas that do not meet the VQOs. Once the short-term goals are met, one of the five VQOs is assigned to the area. The short-term goals are Rehabilitation and Enhancement.

Rehabilitation (reh). This short-term goal is used to restore landscapes containing unacceptable visual impacts.

Enhancement (e). This short-term goal is used to increase the visual variety of the natural environment.

BLM Visual Resource Management System

A contrast rating system has been developed by the BLM to analyze potential visual impacts of development proposed for BLM lands. The purpose of this assessment process is to provide a means for determining visual impacts and for identifying measures to mitigate these impacts. The level of visual contrast created between a project and the existing landscape determines the extent of visual impact affected by activity on the landscape. This contrast is measured by comparing the project features with the major features in the existing landscape. The basic design elements of form, line, color and texture are used to make this comparison and to describe the visual contrast created by the project.

The four Visual Resource Management (VRM) classes that identify different degrees of modification allowed to the basic design elements of the landscape are: Class I-Very High; Class II-High; Class III-Moderate; and Class IV-Low.

Class I-Very High. Visual contrast is not permitted. No changes will be allowed to change the basic elements of line, form, color, or texture.

Class II-High. Visual contrast is permitted; management activity is seen, but it must not attract attention. Changes in any of the basic elements (form, line, color, texture) caused by the activity must not be visible in the characteristic landscape.

Class III-Moderate. Visual contrast caused by a management activity can be evident, but must remain subordinate to the characteristic landscape.

Class IV-Low. Visual contrast caused by a management activity can attract attention and represent a dominant feature in the landscape, however it must repeat the form, line, color and texture of the characteristic landscape.

These classes direct the type and extent of development activities permitted on BLM lands and determine the appropriate range of activities acceptable for each classified land area.

Scenic Highway Designation and Protection

Before a route can be designated as an official state scenic highway, it must be included in the State Department of Transportation's Master Plan of State Highways Eligible for Official Scenic Highway Designation. New routes can be added to the Master Plan only through legislative action. Any designated County Scenic Highway that is protected in general or specific plans or by local ordinances is similarly eligible for State approval as an officially designated County Scenic Highway. A number of routes within Mono County are described in the Master Plan of State Highways. These include Hwy. 89 (7.6 miles), Hwy. 108 (15.15 miles), Hwy. 120 (58.99

miles), Hwy. 158 (15.62 miles) and Hwy. 203 (9.0 miles) [See Figure 9].

The degree to which a scenic highway program is effective depends on the local jurisdiction enforcing its protection measures. In order to maintain the consistency and integrity of the scenic highway program, Caltrans, in conjunction with DTAC, requires a statement once every five years of compliance with the protection measures. If Caltrans determines that the local jurisdiction is in compliance, the scenic highway designation will be extended for another five years; if the local jurisdiction is not in compliance, Caltrans may revoke the designation after issuing a warning.

County roads and highways that are protected as scenic by local ordinances may be designated as official county scenic highways. The designation process is initiated through an application of the County Board of Supervisors to the District Director of Caltrans. If the county highway meets the minimum requirements for official state scenic highways, Caltrans may then authorize the route to be signed as an official county scenic highway. Officially designated county scenic highways appear in all publications and maps issued by the Department of Transportation.

Federal Scenic Byway Designation

Both the Forest Service and the BLM participate in the National Scenic Byways Program. This program designates highways that traverse scenic areas on public lands. These roads highlight an area's special scenic and recreation values and further serve to increase public awareness of those lands and resources. The Scenic Highway Program is not intended to rename highways identified with existing or potential state designated scenic highways; it is intended to highlight a variety of resources, management opportunities and activities, and to meet the increasing demand for driving for pleasure. The BLM state director as part of the Resource Management Plan approval process can designate BLM Scenic Byways for each BLM Resource Area. The chief of the USFS designates Forest Service Scenic Byways after nomination by individual forests and review by a national review committee. In Mono County there are two designated National Scenic Byways: Hwy. 120 in Lee Vining Canyon and Forest Road 4S01 from the Inyo County line to the Patriarch Grove of bristlecone pines.

County Protection of Visual Resources

County protection of visual resources focuses on community areas and private lands within scenic highway corridors. The County Zoning and Development Code (MCZDC) regulates several aspects of development in order to protect the aesthetic value of an area. The sign ordinance section of the MCZDC regulates sign type and placement, both within communities and along highways. The code provides for the establishment of Design Review Districts to provide for design review in community areas; regulates the placement of overhead utility lines; and provides for a scenic combining district that is intended to regulate the impacts of development in scenic areas outside communities, including in scenic highway corridors.

CHAPTER 9
OUTDOOR RECREATION*

Outdoor recreation is a major year-round attraction for visitors to Mono County. The recreation facilities in Mono County contribute substantially to the county's economy and quality of life.

EXISTING FACILITIES

National Forest Lands

The economic stability of all communities in the Eastern Sierra depends heavily on revenues from recreation, which is concentrated in the national forests. Mono County includes parts of two heavily used national forests: Inyo and Humboldt-Toiyabe. Recreation on the national forests occurs in developed and dispersed recreation sites. Facilities at developed recreation sites usually include water systems, restrooms and information and visitors centers. Dispersed recreational activities use trails, rivers and other undeveloped open space.

The Inyo National Forest includes the Mono Basin National Forest Scenic Area. Mono Lake in the Scenic Area is one of the major destinations of visitors to the county. As a tourist destination, Mono Lake contributes significantly to the county's economy. The recently completed Mono Basin National Forest Scenic Area Visitor Center is an additional attraction in the area.

Public use of the recreational facilities on the Inyo and Humboldt-Toiyabe national forests is tabulated as Recreational Visitor Days (RVD). One RVD is equal to 12 hours of recreation use in any combination of persons and hours; e.g., one person for 12 hours or three people for four hours.

There were approximately 2,339,100 RVDs at the Inyo National Forest's developed and dispersed recreation sites in Mono County in 1986. In 1986, the entire Inyo National Forest had 1.77% of all national forest recreation use in the United States (FERC, 1986). Recreation is considered the most significant resource in the Inyo and, according to the LRMP, the importance of recreation is expected to continue in the future.

Humboldt-Toiyabe National Forest has approximately 162 recreation special use permits and a number of resorts based on private lands. There are approximately 1,021 miles of trails for hiking, backpacking, horseback riding and off-road vehicle use. The most heavily used trails on the Humboldt-Toiyabe are in Mono County in the Bridgeport District. Humboldt-Toiyabe National Forest recreational facilities in Mono County received about 961,600 RVDs in 1987.

State Department of Parks and Recreation

The California Department of Parks and Recreation maintains and administers two units of the California State Park System within Mono County, Mono Lake Tufa State Reserve and Bodie State Historic Park. These units contain 17,000 and 495 acres, respectively. Each has nearly 200,000 visitors each year. The parks provide protection for cultural and natural features that are not available anywhere else in the State Park System, features that attract not only outdoor recreationists but also academics. Department personnel at each unit provide interpretation of the natural and cultural features of the units.

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*Refer also to the section on "Plans and Policies" for cross references to other documents that may provide additional site outdoor recreation information.

Mono County

Mono County owns or maintains five campgrounds, most of which are located in the Mono Basin area. Total camping unit days (the maximum number of people who can use the campgrounds from May to November) are currently 16,552. No use data is available for Mono County Parks. (Evans, 1989)

Mono County's recreation facilities include community parks, fishing areas, lakes, streams, campgrounds, trails and hunting grounds. Mono County's developed recreation facilities are listed in Table 27 and mapped in Figure 5 (see Appendix A). The county's two ski resorts are Mammoth Mountain Ski Area, located in the town of Mammoth Lakes, and June Mountain Ski Area, located in the community of June Lake. Use of these two ski areas is indicated on Table 28.

Town of Mammoth Lakes

The Town of Mammoth Lakes estimates the annual use of its park sport facilities as the number of players who use the facilities on a seasonal basis. For example, a softball field used one day by four teams with 20 players each would count as 80 player days (PDS) for that day. Whitmore Park's two softball fields receive about 14,930 PDs and Shady Rest Park's softball field receives about 2,500 PDs and its soccer field receives about 7,000 PDs. No other use of figures is available for parks in the town of Mammoth Lakes (Cahill, 1989). The Town of Mammoth Lakes' park facilities are listed in Table 27.

Future improvements include the consolidation of Community Center Park with Shady Rest facilities, including the construction of additional softball fields at the combined sites (Cahill, 1989).

Plans to Acquire or Improve Recreation Facilities

The Inyo National Forest Plan indicates a general goal of adding new facilities over the next 50 years. These facilities would include campgrounds, trails and interpretive sites (Inyo NF, 1986). Improvements will be made primarily on existing sites. Specific plans to improve facilities include campsite improvements at McGee Creek, Rock Creek Drainage and Lake George (Ruopp, 1988).

The Toiyabe National Forest Plan has a goal to acquire and improve 700 acres of land over a 10-year period (Larkin, 1988a). The Toiyabe Plan includes construction of 12 new campgrounds and reconstruction of existing sites to provide additional capacity for 5,150 PAOTs (persons at one time). PAOT is a measure used by both Inyo and Humboldt-Toiyabe national forests to assess their visitor needs. There are also plans to construct and reconstruct 100 miles of trail and 16 trailheads that would increase dispersed recreation opportunities.

The Town of Mammoth Lakes has plans to consolidate its Community Center Park with Shady Rest Park and to construct additional softball fields at the combined site (Cahill, 1989)

Wild and Scenic Rivers

Under the Wild and Scenic Rivers Act, the Congress directed all federal agencies to consider potential wild, scenic and recreational rivers when planning for the use and development of water and related land resources. Designation of Wild and Scenic River status protects rivers from unfavorable future development and promotes its use for recreational activity. A portion of the West Walker River has recently been included in the State Wild and Scenic River System.

TABLE 26
PUBLIC USE OF NATIONAL FOREST FACILITIES IN MONO COUNTY BY ACTIVITY

	Inyo NF RVDs[a] (1000s)	Toiyabe NF RVDs[a] (1000s)	Subtotal RVDs	% of Grand Total[b]
Camping, Picnicking, Swimming				
General Day Camping	175.8	185.1	360.9	11.15%
Automobile Camping	60.1	81.4	141.5	4.37%
Trailer Camping	62.3	82.6	144.9	4.47%
Tent Camping	14.8	44.7	159.5	4.92%
Picnicking	16.5	10.2	26.7	0.82%
Swimming and Water Play	78.6	1.4	80.0	2.47%
TOTAL	508.1	405.4	913.5	28.23%
Mechanized Travel and Viewing Scenery				
Viewing Scenery	48.0	115.3	163.3	5.06%
Viewing Activities (Spectators)	31.5	N/A	31.5	0.97%
Automobile Travel	617.4	110.0	27.4	22.47%
Motorcycle Travel	82.5	4.3	86.8	2.68%
Ice and Snow Travel Craft	14.7	3.6	18.3	0.56%
Specialized Landcraft Travel	2.1	N/A	2.1	0.06%
Train and Bus Touring	13.2	N/A	13.2	0.71%
Boat, Powered	14.9	4.4	19.3	0.59%
Bicycle	18.5	0.9	20.4	0.63%
Nature Study	12.4	1.8	14.2	0.41%
TOTAL	847.5	240.3	1087.8	33.61%
Hiking, Horseback Riding and Water Travel				
Hiking and Walking	85.1	88.7	173.8	5.37%
Horseback Riding	13.5	15.8	29.3	0.91%
Canoeing	2.2	0.4	2.6	0.08%
Sailing	2.0	0.4	2.4	0.07%
Other Water Craft	4.9	1.9	7.8	0.24%
Mountain Climbing	6.0	0.6	6.6	0.20%
TOTAL	114.5	107.8	222.3	6.86%
Winter Sports				
Ice Skating	10.2	N/A	10.2	0.32%
Sledding, tobogganing	1.6	N/A	1.6	.50%
Skiing, Downhill	465.2	N/A	465.2	14.38%
Snow Play	31.6	2.3	33.9	1.05%
Cross-Country Skiing	81.7	1.2	82.9	2.56%
TOTAL	590.3	3.5	593.8	18.34%
Resorts, Cabins and Organization Camps				
Organization Camping, Gen. Day	5.2	N/A	5.2	
Organization Camping, Night	14.2	N/A	14.2	
Resort & Comm. Pub. Service	45.2	35.0	80.2	
Resort Lodging	138.3	14.5	152.8	4.72%
Recreational Cabin Use	19.9	18.7	38.4	1.20%
TOTAL	222.7	68.2	290.9	8.99%

TABLE 26 (continued)

	Inyo NF RVDs[a] (1000s)	Toiyabe NF RVDs[a] (1000s)	Subtotal RVDs	% of Grand Total[b]
Hunting				
Big Game Hunting	6.9	16.0	22.9	0.71%
Small Game Hunting	2.6	1.9	4.5	0.14%
Upland Bird Hunting	0.5	2.7	3.2	0.10%
Waterfowl Hunting	1.1	3.2	4.3	0.13%
TOTAL	11.1	23.8	34.9	1.08%
Fishing				
Cold Water Fishing	740.0	86.6	160.6	04.96%
Ice Fishing	4.1	N/A	4.1	0.13%
TOTAL	78.1	86.6	164.7	5.09%
GRAND TOTAL	**INYO NF 2301.8**	**TOIYABE NF 934.3**		**100%**

NOTES:
a) Recreational Visitor Days: Twelve hours of recreation use in any combination of person and hours; e.g., one person for 12 hours or three people for four hours each.
b) Percentages may not add due to rounding.

SOURCES:
Toiyabe NF—Jim Nelson, Forest Supervisor, Toiyabe NF, 1986 RVD Figures for Mono County, February 16, 1989.
Inyo NF—Bob Wood, Winters Sports Specialist, Mammoth Ranger District, Inyo NF, Mono County Facilities RVD.

TABLE 27
PARK AND RECREATION FACILITIES—MONO COUNTY AND MAMMOTH LAKES

Walker Park: Park with Picnic Facilities Community Center Senior Center Restroom Facilities (Seasonal) Baseball Field Tennis Courts Basketball Courts	**Crowley Lake Park (Hilton Creek Park):** Park with Picnic Facilities Restrooms (seasonal) Tennis Courts Basketball Courts Community Center
Bridgeport Park: Park with Picnic Facilities Community Center Restroom Facilities (Seasonal) Museum (Seasonal) Tennis Courts Senior Center	**Benton Park (Ida Lynn Park):** Park with Picnic Facilities Restrooms (Seasonal) Baseball Field Basketball Courts
Bridgeport Park Baseball Field: Baseball Fields Restroom Concession Stand	**Benton Community Center:** Community Center Senior Center
Mono Lake Park: Park with Picnic Facilities Seasonal Restrooms Information Kiosk	**Chalfant Park:** Park With Picnic Facilities Baseball Field Basketball Courts Restrooms Community Building / Senior Center
Lee Vining Park (Gus Hess Park): Museum Park with Picnic Facilities Restrooms (Seasonal) Tennis Courts Baseball Field	**Whitmore Park:** Outdoor Pool Softball Fields (2)
June Lake Park: Park with Picnic Facilities Gull Lake (seasonal fishing) Boat Rentals (private, seasonal) Restroom (seasonal) Tennis Courts Community Center Library Women's Club	**Shady Rest Park:** Softball Field Soccer Field
	Community Center Park: Meeting Hall Tennis Courts (6) Play Equipment
	Mammoth Creek Park (Undeveloped): Unimproved Trails Restroom Play Equipment

TABLE 28
SKI AREA USE DATA IN MONO COUNTY

Mammoth Mt. Ski Area		June Mt. Ski Area	
Year	RVDs[a]	Year[b]	RVDs[a]
1980	878,600		
1981	699,500		
1982	955,500		
1983	724,800		
1984	786,100		
1985	905,400	1985	50,600
1986	951,500	1986	43,600
1987	483,400	1987	53,200
1988	726,800	1988	92,300

Note:
a) RVD=Recreation Visitor Day=12 visitor hours. For example, 1 person for 12 hours=1 visitor day or 12 people for 1 hour=1 visitor day, etc.
b) No use data are available for June Mountain prior to 1985.

Source:
Wood, 1989 (Mammoth Mountain), Ellsworth, 1989 (June Mountain) and Environmental Science Associates.

VISITOR INFORMATION

Visitor information will be integrated into the next update of the MEA.

RECREATION PROGRAMS

Inyo National Forest, Humboldt-Toiyabe National Forest and the Town of Mammoth Lakes are the primary public agencies currently providing recreation programs in Mono County. Both Inyo and Humboldt-Toiyabe national forests offer organized interpretive natural history programs that take place in developed and dispersed recreation areas. Table 29 lists National Forest Recreation Programs.

The Town of Mammoth Lakes offers a wide variety of programs through its department of Parks and Recreation. Three times a year the department publishes a catalog offering classes, activities and events that are open to all who wish to attend.

In 1986 (the latest data available), Inyo National Forest estimated a total of 37,300 Recreational Visitor Days (RVD) for its various recreational programming (Wood, 1989). That same year, Toiyabe National Forest, which does not maintain data exclusively isolating all of its recreational programming, estimated a total of 27,600 RVDs (Nelson, 1989). Of the approximately 50 classes, activities and events offered three times a year by the Town of Mammoth Lakes Department of Parks and Recreation, about 4,500 to 6,000 seasonal or permanent residents of Mono County attend or enroll in the programs (Cahill, 1989).

TABLE 29
NATIONAL FOREST RECREATION PROGRAMS

Inyo National Forest

Program	RVDs (Thousands)
Games and Play	0.9
Gathering Forest Products	1.1
Viewing Interpretive Exhibits	10.0
Viewing Interpretive Exhibits	6.7
Attending Talks and Programs	1.3
Walking, Guided	1.9
Walking, Unguided	2.7
Viewing Interpretive Signs	5.3
Listing to Audio Programs	0.1
General Information	7.4
TOTAL	37.3

Toiyabe National Forest

Program	RVDs (Thousands)[a]
Gathering Forest Products	27.3
General Information	0.3
TOTAL	27.6

NOTE:
a) Currently, Toiyabe NF does not maintain an extensive breakdown of its various public programs. Based on data from Nelson, 1989, it is likely total RVD for public programming would be equal to or greater than that of Inyo NF.

SOURCE:
Inyo NF Wood, 1989; Toiyabe NF Nelson, 1989, and Environmental Science Associates, Inc.

The State Park units, Bodie State Historic Park and Mono Lake Tufa State Reserve, offer interpretive programs that highlight the unique natural and cultural features of the parks.

Several nonprofit organizations provide public recreational programs in Mono County. The Mono Lake Committee works to increase public awareness about the natural history of Mono Lake. The group operates a visitor center in Lee Vining that offers interpretive displays, a research library, general information and a bookstore. The center is also the site for public lectures and slideshows. Committee volunteers host guided walks and campfire programs at the lake. The average number of visitors to the center in the past several years has been approximately 40,000. The Mono Lake Foundation also sponsors educational programs and canoe tours on Mono Lake. Additional information and programs about Mono Lake and the Mono Basin are also available at the Mono Basin National Forest Scenic Area Visitor Center.

The Bridgeport, Southern Mono County and Mono Basin historical societies provide interpretive historical programs to residents and visitors of Mono County. Additional information regarding these historical societies may be found in the section of this document on Cultural Resources.

The Mammoth Education Foundation offers various adult education courses, including recreational classes such as sports, art, music and various other hobby-related topics. Three terms (fall, winter, spring), with eight to 10 courses, lasting nine weeks, attract approximately 150 to 200 people per term, or 450 to 600 people a year. Cerro Coso Community College also sponsors week-long Elder Hostel Programs offered as three separate events in the summer, providing people aged 60 and over with food, lodging and interpretive natural history field trips. The three programs are open to 40 people each and attract seniors from throughout the United States and abroad (Swift, 1989).

Four Chambers of Commerce are currently active in Mono County, representing the communities of Bridgeport, Lee Vining, June Lake and Mammoth Lakes. The Mono Lake Committee Information Center serves as the information center for the Lee Vining Chamber of Commerce; the Lee Vining Chamber distributes information and sponsors the annual Mark Twain Days celebration in October. The June Lake Chamber of Commerce operates a seasonal information center at June Lake (Tenant, 1989). The Bridgeport Chamber of Commerce functions as an ad hoc group whose primary function is organizing the annual Bridgeport parade. A Chamber in Mammoth Lakes promotes various local events.

Many private organizations and businesses offer residents and visitors extensive recreational programs. Located on private and public lands, these groups are primarily oriented toward providing visitors with hunting, horseback riding, fishing, lodging and winter-sports facilities and services. Table 30 lists developed recreation sites and facilities, both public and private.

TABLE 30
DEVELOPED RECREATION FACILITIES, MONO COUNTY

Map #[a]	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
1	Topaz Lake	Walker River Irrigation District	2,295	Trout fishing, boating, water skiing, duck and goose hunting	Boat rentals, boat launching, motel, cafe, store and gasoline	Phone & power
2	Topaz	Private/ Private		Trout fishing, deer, upland game and waterfowl hunting	Motels, store, restaurant gasoline and trailer parks	Phone & power
3	Coleville	Private/ Private		Trout fishing, deer, upland game and waterfowl hunting	Motels, store, restaurant, gasoline and bar	Phone & power
4	Walker	Private/ Private		Trout fishing, deer, upland game and waterfowl hunting	Motels, store, restaurant, gasoline and trailer parks	Phone & Power
5	Walker River Canyon—Shingle Mill Flats Campground	Sierra Pacific Power/Mono County	80	Camping, fishing, deer hunting	Campsites	None
6	Bootleg	Forest Service (Toiyabe)/FS		Camping, fishing deer hunting	Campsites	None
7	Chris Flats Campground	Forest Service (Toiyabe)/FS	15	Camping, fishing, deer hunting	15 Campsites	None
8	Sonora Bridge Campground	Forest Service (Toiyabe)/FS	6	Camping, fishing, deer hunting	23 Campsites	None

TABLE 30 (continued)

Map #[a]	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
9	Leavitt Meadows Campground	Forest Service (Toiyabe)/FS and Private	12	Camping, trout fishing, deer hunting, access to Sierra Crest Trail and back country lakes	19 Campsites, lodge, store, bar, gasoline and pack station	None
10	Obsidian	Forest Service (Toiyabe)/FS		Camping	Campsites	None
11	Opal-Obsidian Recreation Area	Forest Service (Toiyabe)/FS	11	Camping, fishing, deer hunting, back country access	14 Campsites	None
12	Fales Hot Springs	Private/ Private		Deer hunting, mineral hot springs baths	Motel, restaurant, bar and gasoline	Phone & power
13	Swauger Creek Campground	Forest Service (Toiyabe)/FS	36	Camping, fishing, deer hunting	10 Campsites	None
14	Huntoon-Yaney Campground	Forest Service (Toiyabe)/FS	10	Camping, fishing, deer hunting	18 Campsites	None
15	Bridgeport Ranger Station	Forest Service (Toiyabe)/FS	40	Visitors Center, permits, District Office	Nature Trail	Phone & Power
16	Bridgeport	Private/ Private		Fishing, boating, waterfowl, hunting, ice skating	Trap & rifle range, County Seat, stores, motels, sporting goods, cafes, bars, gasoline, trailer rentals	Phone & power
17	Bridgeport Lake	Walker River Irrigation District/ WRID and Private	2,990	Fishing, boating, waterfowl, hunting, ice skating	Boat launching facilities, marina, boat rentals, motel, trailer park, store	Phone & power

TABLE 30 (continued)

Map #a	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
18	Buckeye Campground	Forest Service (Toiyabe)/FS	50	Camping, fishing, deer hunting	11 Campsites	None
19	Buckeye Pack Station	Private/ Private		General back country pack trips, fishing, deer hunting	None	None
20	Doc & Al's	Forest Service (Toiyabe)/FS			Lodge	None
21	Robinson Creek Honeymoon Flats Campground	Forest Service (Toiyabe)/FS	240	Camping, fishing, deer hunting	135 Campsites	None
22	Paha	Forest Service (Toiyabe)/FS		Camping	Campsites	None
23	Sawmill	Forest Service (Toiyabe)/FS		Camping	Campsites	None
24	Lower Twin Lakes	Forest Service (Toiyabe), Private/ FS, Private		Boating, fishing, summer home sites	Lodging, stores, restaurant, bar, boat launching, boat and motor rental	Phone & power
25	Upper Twin Lakes	Private/ Private		Boating, fishing, summer home sites	200 Campsites, boat launching, pack station, lodging, stores, restaurant, boat launching, boat and motor rental, private campground and vacation trailer spaces, access to backcountry	Phone & power
26	Mono Village	Forest Service (Toiyabe)/FS		Camping	Campsites	None
27	Lower Green Creek Camp. South Green Creek Camp.	Forest Service (Toiyabe)/FS	4 5	Camping, fishing, deer hunting	8 Campsites 11 Campsites	None

TABLE 30 (continued)

Map #a	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
28	Upper Green Creek Camp	Forest Service (Toiyabe)/FS	4	Camping, fishing, deer hunting	11 Campsites	None
29	Green Lakes Resort	Forest Service (Toiyabe)/ Private		Fishing, hunting, packing into high country and Yosemite backcountry, summer home sites.	Limited lodging, pack station	None
30	Masonic-Bodie Hills	BLM / BLM		Ghost towns, upland game and deer hunting, Indian artifacts and petroglyphs	None	None
31	Bodie State Park	State of California/ CA. Parks & Rec.		Ghost town, historic monument	None	None
32	Virginia Creek Campgrounds	Forest Service (Toiyabe)/FS	80	Camping, fishing	30 Campsites	None
33	Virginia Lakes Campgrounds	Forest Service (Toiyabe)/FS	16	Camping, fishing, hunting	58 Campsites	None
34	Virginia Lakes Resort	Forest Service (Toiyabe)/ Private		Resort	Lodging, cafe, store and boat rentals	None
35	Virginia Lakes (Trumbull, Big & Little Virginia, Red & Blue Lakes)	Forest Service (Toiyabe)/ FS & Private		Fishing, deer hunting, camping, pack station and summer home sites	None	None
36	Summer Meadows	Forest Service (Toiyabe)/FS	3	Camping, hunting, fishing	9 Campsites	None

TABLE 30 (continued)

Map #[a]	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
37	Barney Lake	Forest Service (Toiyabe)/FS	2	Camping, hunting, fishing	8 Campsites	None
38	Blue Lake (Virginia Lakes Area)	Forest Service (Toiyabe)/FS	4	Camping, hunting, fishing	6 Campsites	None
39	South Robinson Creek	Forest Service (Toiyabe)/FS	10	Camping, hunting, fishing	15 Campsites	None
40	Lundy Lake & Resort	Mono County		Trout fishing	51 Campsites, cabins, store, gasoline	None
41	Mill Creek Campground	So. Cal. Edison/ Mono County	40	Camping	Campsites	None
42	Black Point	Forest Service (Inyo)/FS		Interpretation Nature study	Parking lot	None
43	Old Marina	State of Calif./ CA Parks & Rec		Interpretation Nature Study	Parking lot	None
44	South Tufa	Forest Service (Inyo)/FS		Day use, picnic, interpretive trail, guided activities, swimming and hiking	Restrooms, picnic tables and parking lot	None
45	Navy Beach	Forest Service (Inyo)/FS		Swimming, hiking	Parking Lot	None
46	Mono Lake		41,600	Scenic value, tufa towers, fresh water springs, islands	None	None
47	Upper Lee Vining	Mono County/ Mono County		Fishing, hiking	56 Campsites	None

TABLE 30 (continued)

Map #[a]	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
48	Lee Vining	Private/ Private		Trout fishing, deer hunting, upland game and waterfowl hunting	Trap Range, motels, store, restaurant, trailer parks and LPG service	Phone, power & airfield
49	Lower Lee Vining	Mono County/ Mono County		Fishing, hiking, camping	60 Campsites	None
50	Tioga Pass Resort	Private/ Private		Trout fishing, hiking and hunting	Cabins, store and gasoline	
51	Panum Crater	Forest Service (Inyo)/FS		Hiking	Parking lot, trail, guided activities	None
52	Junction Campground	Forest Service (Inyo)/FS	5	Camping	16 Campsites	None
53	Tioga Lake Campground	Forest Service (Inyo)/FS	3	Camping, picnicking	13 Tables	None
54	Sawmill Campground	Forest Service (Inyo)/FS	2	Camping	3 Campsites	None
55	Saddlebag Lake	Forest Service (Inyo)/FS		Boating, fishing	Boat rental	None
56	Saddlebag Campground	Forest Service (Inyo)/FS	5	Camping	20 Campsites	None
57	Ellery Lake Campground	Forest Service (Inyo)/FS	2	Camping	12 Campsites	None
58	Lee Vining Creek Campground	Forest Service (Inyo)/FS	2	Camping	15 Campsites	None
59	Camp Azusa Group Camp	SCE/SCE		Group Camping	Campsites	None
60	Big Bend Campground	Forest Service (Inyo)/FS	2	Camping	24 Campsites	None

TABLE 30 (continued)

Map #[a]	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
61	Aspen Grove Campground	SCE/SCE		Camping	57 Campsites	None
62	Mono Mill Site	Forest Service (Inyo)/FS		Historic Site	None	None
63	Mono Craters	Forest Service (Inyo)/FS		Unusual volcanic formations of high scenic value	None	None
64	June Lake	Private/ Private	-	Trout fishing, boating, swimming and skiing	Beach, park, community building, motels, lodges, cabins, boat launching, sporting goods stores, restaurants, gasoline, trailer parks and LPG service	Phone, power and propane
65	June Lake Campground	Forest Service (Inyo)/FS	3	Camping, fishing boating	22 Campsites	None
66	Gull Lake	Forest Service (Inyo)/FS and Private		Trout fishing, boating	Motels, lodges, cabins, boat rental, boat launching and sporting goods	Phone power and propane
67	Gull Lake Campground	Forest Service (Inyo)/FS	2	Camping	17 Campsites	None
68	Reversed Peak	Forest Service (Inyo)/FS	3	Camping	18 Campsites	None
69	Grant Lake	Forest Service (Inyo)/Private		Fishing, boating	Tackle, boat rental, launch ramp and restaurant	None
70	Oh! Ridge Campground	Forest Service (Inyo)/FS		Swimming, camping	144 Campsites	None

TABLE 30 (continued)

Map #[a]	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
71	June Lake Marina	Forest Service (Inyo)/Private		Boat Rental	Launch Ramp	None
72	Pine Cliff Trailer Park	Forest Service (Inyo)/Private		Camping	200 Campsites, store, gas, showers and laundry	None
73	Gull Lake Marina	Forest Service (Inyo)/Private		Boat Rental, tackle	None	
74	Big Rock Resort	Forest Service (Inyo)/Private		Boat Rental, tackle	Cabins	
75	June Mountain Ski Facility	Forest Service (Inyo)/Private		Skiing	6 Chairlifts, lodge, parking facilities, ski rental, sport shop cafe and bar	Phone & power
76	Silver Lake	Forest Service (Inyo)/ Private	-	Trout fishing, boating, hiking, horseback riding, back country camping and hunting	Cabins, trailer park, store, gasoline, boat rental and boat launching	None
77	Silver Lake	Forest Service (Inyo)/Private	10	Camping	65 Campsites	None
78	Silver Lake Campground	Forest Service (Inyo)/FS		Trout fishing, boating	Boat rental and boat launching	None
79	Hartley Campgrounds	Forest Service (Inyo)/FS	35	Camping	35 Campsites	None
80	Convict Lake	Forest Lake/ Private	-	Boating, trout fishing, horseback riding and back country camping	Lodge, cabins, gasoline, boat rental, restaurant and pack station	Phone & power

TABLE 30 (continued)

Map #[a]	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
81	Convict Lake & Creek Campground	Forest Service (Inyo)/FS		Camping, picnicking, boat launching ramp	96 Campsites, picnic sites, parking	None
82	Hot Creek Ranch	Private/ Private	700	Fishing	Lodge, cabins	
83	Hot Creek State Fish Hatchery	State of Calif./ DFG		Fish hatchery	None	
84	Hot Creek Geologic Interpretive Area	Forest Service (Inyo)/FS		Viewing geologic features & geothermal activity	Rest rooms, picnic tables, parking ~~lot~~	
85	Mammoth Creek Campground	Forest Service (Inyo)/FS		Camping	10 Campsites	None
86	Sherwin Creek Campground	Forest Service (Inyo)/Private		Camping	89 Campsites	None
87	Pine Glen Campground (For the Handicapped)	Forest Service (Inyo)/FS		Camping	21 Campsites for families & groups	None
88	Old Mammoth City	Forest Service (Inyo)/FS		Remains of original town site and old mines	Guided tours	None
89	Indian Caves on Sherwin Creek	Forest Service (Inyo)/FS		Indian Caves	Guided tours	None
90	Town of Mammoth Lakes	Private/ Private		Trout fishing, deer hunting, upland game and waterfowl hunting, skiing and boating	Park, tennis courts, lodges, hotels, motels, cabins, trailer parks, restaurants, stores, sporting goods, drug store and gasoline	Phone, power, water, propane and airport

TABLE 30 (continued)

Map #[a]	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
91	Mammoth Lakes Basin (Twin Lakes, Mamie, Mary, George & Horseshoe)	Forest Service (Inyo)/Private		Trout fishing, boating, swimming, hunting, horseback riding and back country camping	Lodges, cabins, store, boat rentals and pack station	None
92	Twin Lakes Campground	Forest Service (Inyo)/FS		Camping	108 Campsites	None
93	East Lake Mary Campground	Forest Service (Inyo)/FS		Camping	12 Campsites	None
94	West Lake Mary Campground	Forest Service (Inyo)/FS		Camping	51 Campsites	None
95	Coldwater Campground	Forest Service (Inyo)/FS		Camping	91 Campsites	None
96	Lake George Campground	Forest Service (Inyo)/FS		Camping	30 Campsites	None
97	Earthquake Fault	Forest Service (Inyo)/FS		Self-guided tour	Parking, rest-rooms	None
98	Mammoth Mountain Ski Facility	Forest Service (Inyo)/Private		Skiing, ice skating, snow play, tennis courts and volleyball	26 Chairlifts, T-bars, Gondola, parking, ski rental, sport shop, cafe and bar, lodge	Phone, power
99	Agnew Meadows Campground	Forest Service (Inyo)/FS		Camping	35 Campsites	None
100	Agnew Meadows Pack Station	Private/ Private		Backcountry camping, horseback riding	None	None
101	Upper Soda Springs Campground	Forest Service (Inyo)/FS		Camping	30 Campsites	None

TABLE 30 (continued)

Map #[a]	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
102	Pumice Flat Campground	Forest Service (Inyo)/FS		Camping	30 Campsites	None
103	Minaret Falls, Minaret Vista Campgrounds	Forest Service (Inyo)/FS		Camping	20 Campsites, parking, restrooms	None
104	Devil's Postpile National Monument	National Park Service/NPS		Fishing, hunting, camping, rock formation of high scenic value, soda springs	Camping facilities, store, parking and camping	
105	Devil's Postpile Campground	National Park Service/NPS		Camping	40 Campsites	None
106	Red's Meadow Campground	Forest Service (Inyo)/FS		Camping	70 Campsites	None
107	Red's Meadow Pack Station & Store	Forest Service (Inyo)/Private		Fishing, hunting, horseback riding and back country camping	Bathhouse, store, pack station	
108	Lower Deadman Creek Cmpgrd.	Forest Service (Inyo)/FS		Camping	40 Campsites	None
109	Glass Creek Campground	Forest Service (Inyo)/FS		Camping	50 Campsites	None
110	Big Springs Campground	Forest Service (Inyo)/FS		Camping	40 Campsites	None
111	Crestview	Private/ Private		Fishing, deer and upland waterfowl hunting	Lodge, store, cafe, bar, cabins and gasoline	Phone & power

TABLE 30 (continued)

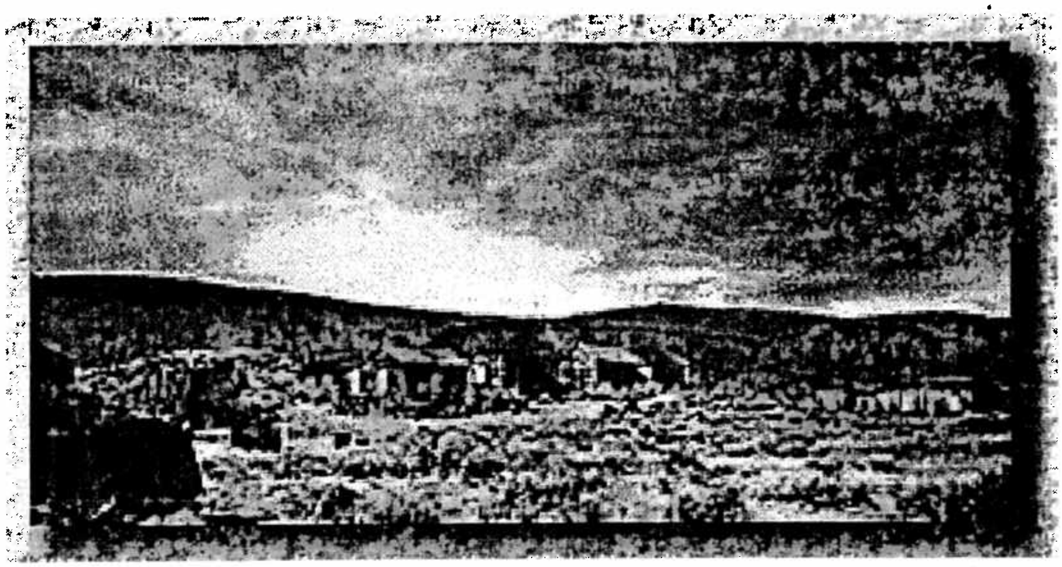
Map #[a]	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
112	Inyo Craters & Lakes	Forest Service (Inyo)/FS		Unusual volcanic formations of high scenic beauty	None	None
113	Benton Station & Original Benton Townsite	Private/ Private		Historic Benton, upland game, deer hunting, Indian artifacts, petroglyphs and old mines	Motels, restaurants, gasoline and store	Phone, power, propane and airport
114	Paradise Camp	Private/ Private		Fishing, hunting	Fishing, hunting, cabins, restaurant and gasoline	
115	Tom's Place	Private/ Private		Fishing, hunting	Lodge, store, post office, bar, restaurant, garage, gas, trailer park and cabins	Phone, power & propane
116	Tufa Campground	Forest Service (Inyo)/FS	20	Camping	34 Campsites	None
117	Holiday Campground	Forest Service (Inyo)/FS	25	Overflow camping	33 Campsites	None
118	Rock Creek Campground	Forest Service (Inyo)/FS	40	Camping	86 Campsites	None
119	Iris Meadow Campground	Forest Service (Inyo)/FS	12	Camping	14 Campsites	None
120	Big Meadow Campground	Forest Service (Inyo)/FS	24	Camping	None	None
121	Last Fork Campground	Forest Service (Inyo)/FS	40	Camping	133 Campsites	None
122	Pine Grove Campground	Forest Service (Inyo)/FS	10	Camping	13 Campsites	

TABLE 30 (continued)

Map #[a]	Name	Owner/ Operator	Area (Acres)	Activities	Facilities	Services
123	Crowley Lake	BLM/City of Los Angeles		Trout fishing, boating, waterfowl, hunting and water skiing	Trailer park, store, boat rental and boat launching	
124	Whitmore Hot Springs			Camping	Swimming pool	None
125	Hilton Creek	Private/ Private		Trout fishing, boating, waterfowl hunting, horseback riding and backcountry camping	Lodge, motels, store, gasoline and pack station	Phone, power and propane
126	McGee Creek - Long Valley	Forest Service (Inyo)/FS		Fishing, hunting, back country camping	5 Campsites	None
127	McGee Creek Campground (Upper)	Forest Service (Inyo)/FS	5	Camping	5 Campsites (walk-in only)	None
128	McGee Creek Campground	Forest Service (Inyo)/FS	3	Observation area	Display	None
129	Patriarch Sierra Lookout	Forest Service (Inyo)/FS	5			

CHAPTER 10
CULTURAL RESOURCES*

Cultural resources in Mono County encompass a wide variety of elements that provide an understanding of the county's natural and cultural heritage, including: archaeological sites; historic sites, structures and objects; and natural areas, features and landscapes.



Bodie State Historic Park.

OVERVIEW

In Mono County, it is especially important to recognize the connections between natural and cultural resources. Natural resources are an integral part of Mono County's cultural environment. Not only do they provide the raw materials for the development of cultural artifacts, but also in many cases they are cultural resources themselves. In Mono County, an altered landscape may be the only indication of past activity at a site; buildings, structures and objects are extremely ephemeral in comparison with the landscape. In the context of cultural resources, natural resources are important both for their contributions to the development of an area's cultural heritage and for their own unique role in that heritage.

Through a well-developed program of resource management, cultural resources can be preserved, managed and studied for the benefit of future generations of Mono County residents and visitors. A major constraint to the development of a comprehensive cultural resource plan for Mono County is the fact that the majority of the land in the county is publicly owned and under federal management. These lands are subject to federal laws and policies concerning cultural resource management. Although the Forest Service and the Bureau of Land

* Refer also to the section on "Plans and Policies" for cross references to other documents that may provide additional site-specific transportation information.

Management are required to coordinate their management plans with the planning processes of state and local governments and other federal agencies, final authority on federal lands rests with the agency that manages the land (NFMA, 6a).

The careful management of cultural resources can contribute substantially to the unique character of an area and to its economic and social well-being. The conservation of cultural resources is a matter of local public concern that demands strong policies. Notable structures and places are rooted in local communities, and relatively few are of state or national significance. In addition, most of the tools to accomplish preservation must either be developed or applied locally. The following section describes each of the cultural resources found in the county and the relevant federal, state and local legislation affecting the management of those resources.

PREHISTORIC RESOURCES

Current research indicates that eastern California and western Nevada have been occupied for at least the past 10,000 years. The most recent prehistoric residents and users of the Mono County area include Owens Valley Paiute, Northern Paiute, Miwok and Washoe. Descendents of these people still live in the Great Basin area and on the western slope of the Sierra Nevada.

By the late 19th century, the Eastern Sierra was inhabited by at least three distinct Paiute groups: Owens Valley Paiute, Kuzedika Paiute (Northern Paiute living in Mono Basin) and Walker Lake Paiute (Northern Paiute). Smaller groups may also have resided in Long Valley and in Bridgeport Valley. Owens Valley and Northern Paiute tribes spoke dialects and languages of common origin, classified in the Numic language family of the Northern Utaztekan linguistic stock. As recently as 300-500 years ago, eastern Sierra Paiute groups emigrated westward across the crest of the Sierra. By the late 19th century, the upper western Sierra slopes west of Owens and Long Valleys were inhabited by Numic-speaking western Sierra Mono populations.

Various historical sources suggest a population of between 1000-2000 Paiute in Owens Valley before 1860. Adjacent Paiute populations were substantially smaller (approximately 500 [SNEP, Vol. II, Ch. 9]), although seasonally sizable settlements may have developed throughout the region. "These populations were much lower than those of tribes on the western slope. Population densities were estimated as 0-5 people per 100 km^2 for the Northern Paiute, and 10-25 people per 100 km^2 for the Washoe and Owens Valley Paiute (Kroeber, 1939)" (SNEP, Vol. II, Ch. 9).

The Owens Valley Paiute developed a village-oriented cultural system, living in independent districts made up of either a single, large village or a group of smaller allied villages. Districts represented formal, communal organizations, with rights to seed gathering, hunting and fishing within their territories. Owens Paiute districts near to or in Mono County were located at Bishop, Round Valley and Benton Hot Springs.

Paiute groups to the north, east and south of the Owens Valley Paiute were organized around the nuclear family. Each "kin clique" was isolated for much of the year and determined its own schedule of seasonal activities and movements in order to deal with widely dispersed and seasonally limited resources. During the winter, individual kin cliques gathered in multiple-family villages. Communal events such as game drives and festivals were used as times to engage in a wide range of social, political and economic transactions.

Abundant evidence exists of significant trans-Sierra trade and commerce between Owens Valley Paiute and western Sierra Mono, and between Kuzedika Paiute and Sierra Miwok in Yosemite Valley. A long prehistory of obsidian procurement and export in the eastern Sierra is well documented by specialized trade-oriented tool production at local quarries and stone-working camps, and by the presence of obsidian from sources in the area at sites throughout central and southern California. Other trade items included foods, paints, baskets, beads and animal skin blankets.

Traditional Paiute subsistence activities focused on the seasonal distribution of plants and animals used for food and raw materials. During spring, roots and greens were gathered from riparian areas. By late spring and early summer, a wide variety of food plants were ready for harvest, including seeds from rushes and from chia and ricegrass, as well as a wide variety of berries and fruits. Throughout spring and summer small game and fish augmented the Paiute diet.

During summer a major effort was made to secure winter food supplies. Seeds were collected from several species of grass. In July, short-term camps were established to gather Pandora moth larvae in infested areas of the Jeffrey pine forest south of Mono Lake. During middle and late summer, brine-fly larvae were gathered in large quantities on the shores of Mono and Owens lakes, and pronghorn drives were sometimes conducted in the lowlands.

Fall activities focused on the gathering of pinon pine nuts and the harvest of irrigated crops of yellow nut-grass tubers by the Owens Valley Paiutes. Communal jackrabbit drives were also held in the fall; major game, such as deer and mountain sheep, was hunted throughout most of the year. Food stores accumulated during the summer and fall supplied most of the food in winter, a season in which there was much socializing, planning and craftwork.

Material remains at prehistoric archaeological locations include artifacts, structural remains and, occasionally, organic refuse. A variety of flaked stone tools are often found, including projectile points, bifaces, blanks or roughouts, unifaces, cores, drills and casual flake tools. Ground stone tools found at many archaeological sites in the region include milling slabs, handstones, mortars and pestles. Some prehistoric sites in the area also include pottery shards, fragments of ceramic vessels used for cooking and storage, and traditionally referred to as Owens Valley Brown Ware.

Prehistoric structural remains in the region include rock rings, hearths, hunting blinds, stone and brush game-drive corrals and drift fences, and non-rock-lined house depressions and storage pits. Numerous pictographs and petroglyphs have also been found in the region.

TABLE 31
CHARACTERISTICS OF MONO COUNTY INDIAN TRIBES

Characteristics	Mono Lake Paiute	Owens Valley Paiute
Social Structure	Kin cliques with nuclear families and related individuals. Each kin clique had pinon-gathering territory.	Districts composed of a single village or group of smaller villages. Kin clique subordinate to district. Districts had territory that included gathering, hunting, fishing land. Communal irrigation system for crops. Elected head irrigator.
Political Relationsh	Close ties with Owens Valley Paiutes. with Miwoks of Yosemite Valley.	Close ties with Mono Lake Paiutes.
Permanence	Migrated seasonally to follow food supply. Semi-permanent winter camps.	Lived permanently at villages. Short- term residence at temporary camps near seasonal food.
Shelter	Summer—open huts of brush over willow pole framework. Winter—dome-shaped hut with tules or straw; upright shelters of interwoven willow] Sweathouses of earth and plank.	Huts and shelters built from rocks, earth, willow poles, tule, thatch, straw. Winter cookhouses and sweathouses.
Food	Pinon nuts. 60 kinds of plants: leaves, berries, roots, tubers, seeds. Insects: dried pupae of brine fly and moth caterpillars. Rabbits, small rodents, deer, mountain sheep, birds, fish, waterfowl.	Same as Mono Lake Paiute. Used irrigation to increase yield. Built and maintained communal diversion dams and ditches.
Hunting	Bows and cane or willow arrows. Arrow points of chipped stone, usually obsidian. Spears. Slings with buckskin straps.	Bows. Long cane arrows. Short greasewood arrows. Duck arrows with sinew. Arrow points of stone, usually obsidian, sometimes dipped in poison.
Pottery/ Basketry	Pottery vessels. Baskets, coiled and twined. Food baskets, storage containers, burden-carrying baskets, winnowing trays, women's caps, water bottles, cradle boards, carrying nets.	Same as Mono Lake Paiute.
Tools	Primitive stone wedges driven by stone. Metates, manos and bedrock mortars for grinding food. Awls of bone or plant spines for basketry and sewing.	Same as Mono Lake Paiute.

TABLE 31 (continued)

Characteristics	Mono Lake Paiute	Owens Valley Paiute
Clothing	Women wore animal hide skirts. Men wore nothing or hide breech cloth. Rabbit skin capes. Moccasins; sagebrush socks for winter. Basketry caps for burden basket with forehead pack strap.	Women wore knee length skin skirts, sometimes painted with vertical red stripes, hung with deer hooves or dew claws. Men wore buckskin breech clothes and short- sleeved buckskin shirts. Rabbit skin capes. Moccasins; sagebrush socks for winter.
Musical Instruments	Elderberry wood flutes, 8"-9" with four holes. Double headed drums with stretched and laced animal skin.	Same as Mono Lake Paiute.
SOURCE: Inyo and Mono County, 1981.		

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> In the last century, the Paiute people were displaced and their irrigation systems taken over by non-Indians. A land exchange among LADWP, the Paiutes and the Department of the Interior was approved by Congress in 1937. Although the legislation provided that a "fair and equal trade" be made, that is, the land should be of equal value, plus water rights, only 1,500 acres of LADWP land was exchanged for trust land [area unspecified], and with no accompanying water rights. The subsequent history is complex, with the DWP ultimately claiming that the Owens Valley tribes have no water rights. The affected tribes—Lone Pine, Fort Independence, Big Pine, Bishop and Benton—formed the Owens Valley Indian Water Commission and engaged California Indian Legal Services to represent their interests. A federal fact-finding team found that the exchange did not meet the legislative requirement for equity; therefore the tribes have a valid claim. A water-rights negotiating team had not been appointed as of 1995. The controversy could also affect the Los Angeles-Owens Valley Water Agreement (SNEP, Vol. II, Ch. 10).

HISTORICAL RESOURCES

The recent history of the Eastern Sierra is characterized by three phases: an initial period of exploration and settlement, largely in response to mining activities; a subsequent period of broadening physical and economic ties to distant population centers (e.g., via improved roadways, the Los Angeles aqueduct hydroelectric power generation and transmission); and a more recent period during which federal land management activities and recreational land uses have become major economic forces.

Since Mono County was isolated from the established migration routes used by most travelers in the mid-19th century, few of the early travelers to California visited the area. Early explorers who are thought to have passed through Mono County include Joseph Walker and John C. Fremont. Walker is thought to have traveled from Walker Lake up the East Walker River to its headwaters and on to Yosemite in 1833. Fremont is thought to have camped on the shores of Topaz Lake during his explorations of the Great Basin in 1844.

The first documented exploration of the area was Lt. Tredwell Moore's punitive expedition against Chief Tenaya and a band of Yosemite Miwok in 1852. Moore pursued the Indians through Yosemite, over Mono Pass and down Bloody Canyon to Mono Basin, where he failed to find Chief Tenaya but he did find gold. Back in Mariposa, Moore displayed the gold to prospectors, stimulating Leroy Vining and some companions to cross the Sierra and begin mining in Mono Basin.

In 1857, the discovery of gold at the Dogtown Placers generated considerable excitement in the western Sierra foothills where placer profits had been declining steadily. The next discovery of gold was at Monoville in 1859. The boom at Monoville "marked the beginning of an intensive exploitation of [Mono] basin's minerals, soils, timber and rangeland that lasted nearly to the end of the century" (Fletcher, xvi). During the first few years after gold was discovered, prospectors crossed the Sierra in the spring, worked the mines in the Eastern Sierra in the summer and recrossed the Sierra in the fall. By 1861, however, the population of miners in the region had grown large enough that the new county of Mono was established.

Mining activity occurred in the hills and mountains of the county, while farming and ranching settlements were established in the basins near water supplies. The mining population tended to be fairly mobile, moving from one boom site to another, in contrast to the permanent residents of valley towns. Bridgeport, Antelope Valley, Benton and Mono Basin all had early settlements. These settlements served as supply centers for the mining camps, providing food, lumber, cordwood and transportation services.

Mining occurred at a number of locations throughout the county—in the Benton area, at Mammoth, in Lundy Canyon, in the Masonic Area and in the Sweetwater Mountains—but the most successful area was Bodie, which in the course of its history produced gold and silver valued at $34 million. The town's location in a high and barren valley created a constant demand for supplies and lumber from surrounding areas; Bodie became a catalyst for development, stimulating growth in mining, lumbering and agriculture. Bodie itself is noted for technological developments in mining and hydroelectric power, its rich ethnic mix, the role of labor unions in its history and the violence epitomized by the legend of the "Bad Man from Bodie."

During the early part of the 20th century, stockraising eclipsed mining as the leading industry in the county; large herds of dairy cattle and sheep were driven from the surrounding lower valleys to summer pasturage in the high country basins. In the 1920s, a fledgling tourist industry began at Mammoth Lakes, June Lake and Mono Lake as summer camping in the mountains became increasingly popular and increasingly possible after the completion of El Camino Sierra (now U.S. 395), linking Southern California to Lake Tahoe. During this period, the U.S. Forest Service implemented a policy of open-ended leases for private cabins in an effort to promote forest use. By 1905, portions of the county had been established as National Forest Reserves and limits had been placed on the use of resources within those areas.

The early years of the 20th century also saw the arrival of the Los Angeles Department of Water and Power, which came to Mono County looking for additional sources of water to supplement its supplies from the Owens River. During the first three decades of the 20th century, "ranchers, farmers, local irrigation and electric power companies waged a complicated battle to hold onto or to obtain water rights " (Fletcher, 94). By the 1930s, Los Angeles had succeeded in purchasing land and water rights along the five principal tributaries of Mono Lake—Walker, Parker, Rush, Lee Vining and Mill creeks—and littoral rights along the shore of Mono Lake. The DWP began to divert water from Mono Basin in 1941.

DWP's water diversion program contributed to the disintegration of much of the historical ranching and farming activity in the central and southern portions of Mono County. Diversions also affected some historical recreational events and tourism. For example, the lowering of Mono

Lake's water level significantly affected recreational activity at the lake. Between the 1930s and 1960s, Mark Twain Days was a very popular annual event in Lee Vining, drawing thousands of visitors from throughout the Eastern Sierra and Southern California. The event featured recreational activities in Mono Lake, including speedboat and swimming races. These activities are no longer practiced due to increased salinity and loss of boating access.

As a way of appeasing local communities for the loss of other economic activities, the Department actively promoted the recreational attractions of the Eastern Sierra, particularly fishing and camping. In recent decades, recreation and tourism have become an increasingly important part of the local economy and alpine skiing has become the backbone of the county's tourist economy. Mammoth Mountain Ski Area, begun with one rope tow in 1938, has been expanding dramatically since it opened its first chairlift in 1955 and is now the largest single employer in the county.

The transitory nature of much of the county's boom and bust history has left relatively few physical remains. Many of the early mining and ranching buildings were torn down long ago or collapsed due to the extreme weather in the area. Ghost towns now exist at Bodie, Dogtown, Bennettville, Monoville, Lundy, Mammoth, Mill City, Masonic and Mono Mills. Bodie remains the best-preserved authentic ghost town in the West. In many cases, however, there are no structural remains to indicate former activity; all that remains are changes in the land that may not be especially apparent to a casual observer who thinks that what he is seeing is natural. Past activity is evident in some areas, such as the Jeffrey pine forest where many stumps remain as evidence of past and continued logging activity. Historic structures are also scattered throughout the county, although no comprehensive inventory of historical structures has yet been conducted.

LEGISLATION PERTAINING TO CULTURAL RESOURCES

Federal, state and local governments have developed laws and regulations designed to protect cultural resources under their jurisdiction or that may be affected by the actions they undertake. In response to these laws, lead agencies have the responsibility to: 1) inventory cultural resources within their jurisdictions; 2) assess the scientific and ethnic/social significance of identified resources; 3) identify potential direct and indirect impacts of an undertaking on these resources; and 4) develop appropriate measures to avoid or otherwise mitigate adverse effects.

The National Environmental Policy Act (NEPA)

NEPA states explicitly that it is a national policy to "preserve important historic, cultural and natural aspects of our national heritage, and maintain, wherever possible, an environment that supports diversity and variety of individual choice." NEPA requires that any major federal actions significantly affecting the quality of the human environment be preceded by a detailed analysis of the impacts of the proposed action with the findings reported in an Environmental Impact Statement (EIS).

California Environmental Quality Act (CEQA)

CEQA provides protection for both material and nonmaterial resources and, like NEPA, recognizes the importance of the cultural context of these resources. CEQA requires counties to identify and mitigate the environmental effects of a project on all cultural properties that may be regarded as significant in California history and to report their findings in an Environmental Impact Report (EIR). Appendix K of the CEQA Guidelines addresses impact assessments and mitigation measures for cultural resources.

LEGISLATION PERTAINING SPECIFICALLY TO ARCHAEOLOGICAL RESOURCES

The Archaeological Resources Protection Act (ARPA)

The intent of ARPA is to ensure the preservation and protection of archaeological resources on public and Indian lands. ARPA places primary emphasis on a federal permitting process that controls the disturbance and investigation of archaeological sites on these lands. ARPA also mandates consultation with local Indian tribes prior to the initiation of research on Indian lands or involving Indian archaeological resources.

LEGISLATION PERTAINING SPECIFICALLY TO HISTORICAL RESOURCES

Historic preservation programs encompass the full range of archaeological, historical and Native American resources, with an emphasis on material remains (often referred to as "historic properties"). In historic preservation, the primary concern is the cultural environment, which may also include the natural environment in whole or in part. Over the past 20 years, a well-defined set of procedures has been established for the protection of significant historic properties. The system of cultural resource laws, regulations and compliance procedures is generally referred to as the historic preservation system.

National Historic Preservation Act (NHPA

The goal of this act is to "preserve for public use historic sites, buildings and objects of national significance." The Act created the National Register of Historic Places and the Advisory Council on Historic Preservation. Implementing statutes supporting the Act require that federal agencies inventory properties under their control and nominate eligible sites to the National Register. The Advisory Council also has the authority to conduct environmental impact analyses.

State Historic Preservation Office

The California Office of Historic Preservation is under the direction of the State Historic Preservation Officer (SHPO). The SHPO and state clearinghouse data repositories serve as a conduit for the inventory and assessment of cultural resources eligible for the National Register. The SHPO may also comment on environmental documents and take the lead in the development of regional preservation programs and compliance guidelines.

County Historic Preservation Legislation

Many counties have adopted historic preservation ordinances establishing policies for preserving and protecting cultural resources. These ordinances establish a County Heritage Board, Historic Preservation Commission, or Cultural Resources Commission that researches and records county historical resources and makes historic landmark designations. The Board or Commission also advises the County Board of Supervisors on the preservation and protection of cultural resources.

LEGISLATION PERTAINING SPECIFICALLY TO NATIVE AMERICAN RESOURCES

Unlike the historic preservation system, legislation relating to Native American resources has not yet been integrated. Several types of federal mandates are relevant to the participation of contemporary Native American tribes in cultural resource preservation programs, including references in historic preservation and environmental laws, in legislation addressing religious freedom, in the special trust relationship between the U.S. government and federally recognized tribes, and in numerous historic treaties.

American Indian Religious Freedom Act

The American Indian Religious Freedom Act protects a wide range of sites, materials and cultural activities. The Act protects access to sacred sites, the use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rights. Agencies are required by law to ensure that their actions do not restrict or otherwise infringe upon the customs, ceremonies and traditions of Native American religions.

Treaties

Treaties have had relevance to environmental impact assessments in two ways: 1) they define tribal territories in whole or in part, and the contemporary "spheres of influence" of tribal groups over ancestral resources; and 2) they sometimes provide the basis for litigation over the alleged "illegal taking" of land.

California Native American Historical, Cultural and Sacred Sites Act
This Act prohibits interference with Native American religions by public agencies or contracted private parties on public lands and prohibits the disturbance of Native American cemeteries or sacred sites by the same parties. The Act also established the Native American Heritage Commission, which includes at least five members nominated by California Indian tribes. The Commission's activities relate to the inventory, treatment and preservation of Native American burial sites and other sacred areas, and to religious freedom issues arising out of access to religious and spiritual areas and resources.

California State Senate Bill 297
This bill provides protection for American Indian burials and empowers the Native American Heritage Commission to catalog existing burials and to resolve disputes relating to the treatment and disposition of Indian burials and grave goods. SB 297 has been incorporated into the CEQA Appendix K Guidelines for assessing cultural resource impacts.

CULTURAL RESOURCE MANAGEMENT IN THE COUNTY

Since Mono County has retained its rural character, the potential to find cultural resources intact is high. Agencies at the federal, state and local levels have recognized this potential. Federal and state agencies address cultural resources in their plans and have made commitments to identify and preserve cultural resources within their boundaries.

Inyo National Forest
The Inyo National Forest Land and Resource Management Plan estimates that the Forest includes more than 35,000 prehistoric and historic cultural properties. This represents an average density of one site per 59 acres, in contrast to one site per 245 acres on the Tahoe National Forest just to the north.

As of October 1983, approximately 5% of the Forest had been inventoried and evaluated for cultural resources, mostly in preparation for timber sales in the Jeffrey pine forest south of Mono Lake. In the surveyed areas, approximately 1,500 prehistoric and 200 historic cultural properties have been identified. Ten of these properties in Mono County were determined to be eligible for nomination to the National Register of Historic Places.

Forest management strategies to protect cultural properties consist of a program of "arrested decay," monitoring and law enforcement to prevent vandalism, public education and resource interpretation, nomination of cultural and historic sites to the National Register and working with local Native American groups to protect traditional secular and religious sites.

Toiyabe National Forest
The Toiyabe National Forest Land and Resource Management Plan estimates that approximately 41,000 cultural sites remain unrecorded on the forest. Only about 2.8% of the forest has been surveyed for cultural resources. Within the surveyed area, 1,500 cultural sites have been identified.

Prehistoric features found include isolated artifacts, lithic scatters, quarries, rock art, seasonal camps and residential sites. Historic resources that have been identified include dumps, building foundations, rock and wooden structures, artifacts related to early settlement of the Victorian Frontier and to early mining, ranching and timber industries.

Cultural resource management strategies on the Toiyabe National Forest include the completion of a Cultural Resource Overview by 1988 that will inventory areas identified as having high to medium potential to yield cultural resources, a paraprofessional cultural resource training program, and setting goals for nomination of properties to the National Register.

Bureau of Land Management
A comprehensive cultural overview of BLM lands in Mono County was conducted in 1979.

Coleville Planning Unit (Antelope Valley): The Coleville inventory recorded an overall site density of 3.85 sites per square mile. This surprisingly low average density is due to the extremely rugged and inaccessible terrain. Features found included 13 lithic scatters, three milling sites, two historic areas and 10 single artifacts.

Bodie Planning Unit (Bridgeport Valley, Bodie Hills, Mono Basin): The Bodie Inventory recorded 492 sites at a density of 4.5 sites per square mile in the Lower Desert Scrub plant community; 14 sites per square mile in the Upper Desert plant community; and 13 sites per square mile in the Pinon-Juniper woodlands. Vegetation and elevation account for the varying densities within the Bodie area. Based on the above densities, the BLM estimates that there are at least 5,000 cultural resource sites in the Bodie Planning Unit. Finds in this area included 150 lithic scatters, 22 temporary camps, 13 milling stations, 10 rock alignment-hunting blinds, three shelter/cave sites, one quarry site and 64 historic sites.

Benton Planning Unit (Adobe Valley, Tri-Valley, Long Valley): The Benton Inventory recorded densities of 7.3 sites per square mile in the Sagebrush community; 32.4 sites per square mile in the Pinon woodlands; and 2.5 sites per square mile in the Desert Scrub plant community. Based on these densities, the BLM estimates that there are at least 4,000 cultural resource sites in the Benton Planning Unit. Finds in this area included 44 temporary camps, 38 lithic scatters, two quarry sites, 11 rock ring sites and two historic sites.

State of California
There are three California State Historical Landmarks in Mono County:

No. 341 **Bodie (Bodie State Historic Park, Hwy. 270)**
Gold was discovered here in 1859 and the town became a thriving metropolis. Bodie is one of the west's best-known "ghost towns."

No. 792 **Dogtown (U.S. 395, P.M. 69.5, 7 miles south of Bridgeport)**
Site of the first major gold rush to the eastern slope of the Sierra Nevada, Dogtown derived its name from a popular miner's term for camps with huts or hovels. All that remains are ruins lying close to the cliff bordering Dogtown Creek.

No. 995-1 **Trail of the John C. Fremont 1844 Expedition (Big Bend-Mountain Gate Area, Toiyabe National Forest, Bridgeport)**
While exploring and mapping the western United States, Lt. John C. Fremont's expedition passed through northern Mono County in January 1844. They then passed over the Sierra and traveled to Sutter's Fort in the Sacramento Valley. After resting, they traveled south through the San Joaquin Valley and then east along the Old Spanish Trail to Utah.

Bodie is also a California State Historic Park and a National Historic Landmark. Twenty-two Points of Historical Interest have been designated in Mono County. These sites of local or regional interest are listed in Table 32.

TABLE 32
CALIFORNIA POINTS OF HISTORICAL INTEREST

Mno-001	Paiute Historical Excavations
Mno-002	Mono Mills and adjacent railroad
Mno-003	Old Mammoth City
Mno-004	Lundy/Lundy Lake/Lundy Canyon
Mno-005	Deadman's Summit
Mno-006	Adaline Carson Stilts Gravesite
Mno-007	"Big Hot" Springs
Mno-008	Townsite of Mono Lake and Mono Lake itself
Mno-009	Fales' Hot Springs
Mno-010	Lee Vining and Tioga Canyon
Mno-011	Bodie Toll House
Mno-012	Buckeye Hot Springs
Mno-013	Mono Canals
Mno-014	Carson and Colorado Railroad
Mno-015	Monoville and Mono Diggings
Mno-016	Sherwin's Grade Toll Road
Mno-017	Wells Fargo's Benton Stage Station
Mno-018	Town of Coleville
Mno-019	Indian Petroglyphs
Mno-020	Dynamo Pond and Power Station
Mno-021	Bodie and Benton Railroad
Mno-022	Grave of Kit Carson's Daughter

Source: State Office of Historic Preservation

Mono County

In addition to the state designated sites, Mono County has two sites on the National Register of Historic Places, Bodie and the Masonic Courthouse. Bodie is also included in the Federal Historic American Buildings Survey (HABS).

Community organizations in the county also contribute to the preservation of cultural resources. The Mono County Library has a large collection of historic books, documents and newspapers, and the Friends of the Library members collect oral histories of pioneers. The county historical societies work to increase public awareness of the county's history and to provide interpretive services to residents and visitors.

The Bridgeport Historical Society operates the Bridgeport Museum, which includes a collection of prize-winning Paiute baskets (Reveal, 1988). The Society is working to place the Crags Resort at Twin Lakes and the county courthouse, plus several buildings in downtown Bridgeport, on the National Register (Manning, 1988). Preservation of the historic jailhouse is also a priority (Reveal, 1988).

Southern Mono Historical Society operates the Mammoth Museum in an early 1900s log cabin adjacent to Mammoth Creek. The Forest Service owns the site and the cabin. The Society also worked with the Town's Parks and Recreation Department and the Forest Service to protect and preserve the site of the Mammoth Consolidated Mine and to establish an interpretive program at the site. This 1920s-30s mining camp, although dilapidated, is virtually intact. The site includes a sawmill, mining tunnels, the superintendent's house, bunkhouses and a cookhouse.

The Mono Basin Historical Society was organized to address cultural resources in central Mono County. The group has relocated the old Mono Lake Schoolhouse from DWP land into Lee Vining to serve as the Mono Basin Historical Museum and is working to gather material for the museum. The group is also performing a historic site survey that involves gathering photographic documentation of all the historic sites in Mono Basin.

The group Friends of Bodie, organized in 1986, is dedicated to the preservation of Bodie. A chapter of the Sierra State Parks Foundation, the Friends of Bodie is a volunteer, nonprofit organization that helps interpret Bodie to the public.

CHAPTER 11
CLIMATE AND AIR QUALITY*

The air quality of a region is determined by the quantities and kinds of pollutants emitted and by the concentrations of these pollutants that accumulate under the influences of local meteorology and topography.

CLIMATE, METEOROLOGY AND TOPOGRAPHY

Mono County is located on the eastern slope of the Sierra Nevada, an area of harsh winters and temperate summers. Winter storms carry moisture over the Sierra crest, alternating with weak high-pressure systems that bring brief periods of clear weather. In summer, the Pacific High, a high-pressure zone centered off the coast of California, dominates the regional weather pattern, creating prolonged periods of fair weather, occasionally broken by thunderstorms.

TEMPERATURE

Temperatures throughout the county vary considerably depending on the location. Generally, lower elevations have higher average temperatures. Temperature also varies considerably during the day; in the summer, temperatures may vary 40-50 degrees during the day, and during the winter they may vary 20-30 degrees in one day. Average daytime summertime temperatures in the county are typically between 60° and 65° Fahrenheit (F). In winter, average temperatures drop to the mid-teens (in degrees F). However, daytime summer temperatures in the Tri-Valley area may exceed 100° F, while winter temperatures in Bridgeport may reach -20° F.

WIND

Summer wind patterns are determined primarily by local topography, with upslope flows of warm valley air during the day and downslope drainage of cool air at night. Summer storm winds associated with thundershowers blow from the south or southeast. Winter wind patterns are determined primarily by storm systems moving over the Sierra Nevada and through the passes. Certain areas of the county regularly experience episodes of strong winds (in excess of 40 mph).

PRECIPITATION

Precipitation in Mono County varies greatly on a seasonal and annual basis. In much of the county, the majority of precipitation occurs in the winter months as snow. Precipitation amounts throughout the county vary greatly depending on elevation and distance from the Sierra crest that creates strong orographic and rain shadow effects. Precipitation along the crest of the Sierra is typically close to 30 inches per year. Further east in the county, an annual average between 5 and 10 inches is more common, although in some areas precipitation is higher. For example, the lower elevation of the Sierra Crest near Mammoth Mountain allows more rain to reach the eastern slopes of the Sierra Nevada. Up to 25 inches of precipitation, measured as rain, falls near the headwaters of Hot Creek in Long Valley. Rain can be intense during summer thunderstorms, but 65% to 75% of the annual precipitation falls as snow.

INVERSIONS

Inversions, atmospheric conditions where warmer air overlies cooler air found at ground level, influence air quality by restricting pollutants emitted within this cooler layer from dispersing

*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific information on climate and air quality.

vertically into the warmer layer. In Mono County, inversions have particular importance because together with topography, which limits the horizontal dispersion of pollutants, they act to create the potential for high pollutant concentrations in the county's basins and valleys, the places where development is located. Morning mixing heights in Mono County are typically about 1,000 feet above the surface (Holzworth, 1972).[4]

Inversions and their corresponding mixing heights lift during the day as the sun warms the cooler surface layer. The extent of lifting during the day is highly seasonal. In winter, afternoon mixing heights are typically about 3,300 feet, less than one-half of the heights typical for other seasons (Holzworth, 1972).

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> High-elevation towns of modest population can still generate very high levels of fine particles in winter smoke, with levels higher than are typically seen even in the largest urban areas of California. Rather surprisingly, there is a rough equality between the mass of fine particles seen in winter urbanized areas and seen near downwind of massive forest fires. Both of these can greatly exceed state and even federal 24-hour particulate mass (PM-10) standards (SNEP, Vol. I, Ch. 9, p. 136).
>
> The typical winter smoke in towns like Truckee, largely from, at most, a few thousand domestic wood fires, in a strong winter inversion with poor ventilation, generates a shallow layer of smoke trapped in a valley that, for Truckee, probably did not cover even a few square miles. The latter conditions are common for about one-third to one-half of all winter days in towns from Quincy to Mammoth Lakes (SNEP, Vol. I, Ch. 9, p. 140). There are areas within the Sierra Nevada for which air quality is improving. ... Urbanized enclaves in the mountains (... Mammoth Lakes) are showing some progress, partly through improvement in vehicles, partly through controls on woodstoves and other sources (SNEP, Vol. I, Ch. 9, p. 141). Smoke originating from residential areas within the Sierra Nevada can be reduced by burn and no-burn days, highly efficient woodstoves and changes in fuel from local pine to dried fruitwoods. Even more beneficial is an increasing transition from woodstoves of all kinds to natural gas, when available (SNEP, Vol. I, Ch. 9, p. 142).
>
> Urbanized enclaves ... can generate local air pollution that mimics and even surpasses that present in major urban areas of California, but on a much more local spatial scale. Summer levels for standard gaseous pollutants may be significant, while winter urban smoke in small Sierran towns can result in the highest winter particulate mass loading of any site in California, higher even than in the South Coast Air Basin, Bay Area and San Joaquin Valley. Mass loading at these winter sites may not, however, be directly comparable to those at other warmer, drier sites at times, since measurements have shown that about one-third of the mass can be driven off easily by modestly elevated temperatures. One suspects that trapped water of combustion is retained in very cold climates. The question of other pollutants, such as polyaromatic hydrocarbons (PAHs), is much more important to questions of potential health impacts of wood smoke. The impacts of smoke on local winter visibility are on occasions extreme (SNEP, Vol. II, Ch. 48, p. 1229).

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[4]The mixing height is the height from the ground to the base of the inversion. The volume of the well-mixed layer of air below the inversion determines the extent to which pollutants emitted near ground level can be diluted.

WILDFIRES AND FIRE SUPPRESSION ACTIVITIES

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section. For additional information on fire suppression activities, see the section "Fire Hazards" in Chapter 19, Natural Hazards.

> In terms of air pollution sources within the Sierra Nevada, degradation of air quality is one of the difficult questions raised by the potentially increased use of prescribed fire in controlling the high levels of fuel in present Sierra Nevada forests. There is good documentation on degradation of air quality in massive, uncontrolled fires, but other than local data and visual smoke, smoke from prescribed fires is low enough that it is difficult to detect in the rangewide fine particulate mass records since 1988. While smoke from prescribed fires is usually much smaller than smoke from wildfires, it can, under exceptionally unfavorable conditions, also approximate similar levels (SNEP, Vol. II, Ch. 48, p. 1227).
>
> Large wildfires produce severe short-term impacts on air quality, but because they are rare, average smoke dose to individuals is generally limited. Prescribed or controlled burns are more common, but the amount of materials burned is more modest and the measures to limit human smoke impacts are generally quite effective, leading to very low contributions to PM10 particulate loading in inhabited areas. Thus it would appear that prescribed fires are usually performed in such a way as not to cause a significant threat to regional air quality as measured by fine particulate mass. The obvious exception is for some local visibility reduction, but this must be compared to improved air quality by decreasing the impacts of major wildfires. Given that fire is a natural part of the Sierra Nevada ecosystem, ... the beneficial effects on the Sierra Nevada ecosystem of increased fire use should not result in widespread violations of state and/or federal fine particulate health standards (SNEP, Vol. II, Ch. 48, p. 1250)....
>
> The maximum smoke impacts of major wildfires are generally less in magnitude and far less in frequency, than smoke impacts in urbanized enclaves such as Mammoth Lakes.... The situation is even more favorable for controlled burns designed to limit fuel loading for the major wildfires. First, a great deal of the smoke in the Sierra Nevada during the summer comes from the Central Valley. This smoke is more extensive than that developed by most controlled burns, partially through careful planning of burn periods and burning procedures. Thus, it is our opinion that limits on controlled burning could be relaxed significantly without danger to public health and with major benefits to public welfare including increased human safety as a result of reduced wildfire events (SNEP, Vol. II, Ch. 48, p. 1229).

MONO LAKE

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> The influence on local air pollution from the artificially desiccated beds of Mono and Owens lakes is severe, causing in most years the highest respirable dust loading in the entire United States, although for relatively few days per year. The recent Water Resources Control Board ruling on Mono Lake used this air quality information as a component in setting the lake level to a value that should make such events a thing of the past (SNEP, Vol. II, Ch. 48, p. 1229).
>
> Serious PM10 problems exist at Mono and Owens (Dry) lakes at the Sierra Nevada's eastern base. These areas are two of the three "non-attainment areas" for PM10 formally designated

by the U.S. EPA within the Sierra Nevada region; the third is the community of Mammoth Lakes in Mono County, which is impacted by wood smoke (SNEP, Vol. II, Ch. 48, p. 1253-1255).

All significant dust storms from the playas of Mono and Owens lakes are dependent on one major factor external to the Sierra Nevada--sustained winds caused by synoptic (large-scale) weather systems affecting the region. A few dust events, generally minor and short-lived and especially at Owens Lake, can be caused by mesoscale (regional) atmospheric circulation (upslope-downslope winds and convective storms) caused or enhanced by the steeply-sloping topography of the Sierra Nevada itself (Cahill et al., 1994) (SNEP, Vol. II, Ch. 48, p. 1253-1255).

As much as 65 km^2 of playa has been exposed along the shore of Mono Lake (directly east of Yosemite National Park) since water diversions by the Los Angeles Department of Water and Power (LADWP) began in 1940. When no dust is observed (in recent years, more than 90% of all days), the air in the Mono Basin is among the "cleanest" in California. But when the lake was near its historical low, average dust concentrations on the remaining days exceeded the then-existing California standard for particulate matter by a factor of six (Kusko and Cahill, 1984). Mono dust storms can violate the California airborne sulfate standard and may contain sufficient arsenic to elevate cancer risk in humans (Cahill and Gill, 1988). The occurrence and significance of dust storms from Mono Lake's northeastern playa has been a major factor in the legal and environmental battle over LADWP's water rights and protection of the Mono Lake ecosystem (SNEP, Vol. II, Ch. 48, p. 1253-1255).

The health effects of PM10 in general are becoming well known and chronic or acute exposures to Owens and Mono Lake dust storms are bound to be deleterious to humans. However, there is little specific data on human health effects of mineral dust, even less known about the effects of saline, alkaline particles from lake beds and only anecdotal data at best on specific health effects of Mono-Owens aerosols. The effects of this dust on ecosystems are also not well known, though we can make inferences from other studies. Prolonged deposition of alkaline dust causes chemical, physical and biological changes in soil profiles and eventually changes vegetation communities and ecosystem structure; there is anecdotal evidence that such changes have started to occur in the Mono Basin (Cahill and Gill, 1988). Alkaline, saline dust coating needles or leaves limits plant germination, growth, respiration, transpiration and photosynthesis; blocks the stomata; exacerbates secondary stresses such as drought, insects and pathogens; modulates the uptake of toxic metals and other air pollutants; and may cause visible injury and even cell death to needles, leaves and bark (Farmer, 1993). No detailed monitoring for these problems has been undertaken in the Inyo National Forest, but dry deposition of PM10 from Mono and Owens Lakes is known to occur on its slopes. Since the most damaging effects of dust take place on arctic-alpine vegetation (Farmer, 1993), it may well have some of the aforementioned effects on high-altitude ecosystems of the Sierra Nevada (SNEP, Vol. II, Ch. 48, p. 1253-1255).

Ruling D-1631 of the State Water Resources Control Board in 1994 provided that water exports from the Mono Basin must be restricted in a manner to "result in the water level of Mono Lake rising to a level of 6,391 feet in approximately 20 years." When this occurs, blowing dust from the Mono Lake playa will be significantly reduced and will be unlikely to have a serious environmental impact (SNEP, Vol. II, Ch. 48, p. 1253-1255).

GEOTHERMAL RESOURCE DEVELOPMENT

The pollutants of concern for this type of development are PM_{10}, H_2S and isobutane. Ambient standards exist for both PM_{10} and H_2S. Isobutane can be emitted in substantial amounts and, as a slightly reactive organic compound, can be under certain conditions a precursor for O_3

generation. The GBUAPCD monitored PM_{10} and H_2S levels from January 1987 through December 1987 in Mono-Long Valley to determine baseline concentrations upon which to evaluate the air quality effects of full-scale geothermal resource development (GBUAPCD, 1988). The monitored levels of PM_{10} and H_2S primarily reflected natural sources, which, for H_2S, included natural vents and springs. The maximum levels that were measured were well below the applicable ambient standards which led the GBUAPCD to conclude that at that time geothermal impacts from all sources on air quality for populated areas in Mono-Long Valley are negligible, except for the PM_{10} generated by movement over unpaved roads and by temporary construction-related activities (GBUAPCD, 1988). Recent monitoring of H_2S (1992) shows that ambient H_2S concentrations have increased since 1987 and that the level may now approach or exceed the State's nuisance standard of 30 ppb in the area near Casa Diablo Hot Springs.

EXISTING AIR QUALITY

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> ...because of its difficult topography, severe weather, relative lack of mineral resources and low population density, the Sierra Nevada still retains at many times and most places some of the best air quality in the state and nation. Yet at other times, air pollutants transported into the range, or generated within the range itself, can result in such severe degradation of air quality that at some times and some places, air quality may be as bad or worse than any place in the state or the nation. For example, the highest dust levels seen anywhere in California were near Mono Lake in 1993. Winter smoke levels at Mammoth Lakes resulted in fine particle masses 1.7 times the worst seen all year in downtown Los Angeles (SNEP, Vol. II, Ch. 48, p. 1228).

National Non-Attainment Areas

As of 1999, the Mono Basin and Mammoth Lakes were designated as non-attainment areas for the national particulate matter (PM_{10}) standard, although the California Air Resources Board recommended that those areas be designated as attainment areas (see www.arb.ca.gov, National Area Designations Map—PM10). Particulate matter (PM_{10}) in the Mono Basin results from dust from the exposed lakebed of Mono Lake. PM_{10} in Mammoth Lakes is primarily a problem in winter, resulting from wood burning and resuspended road cinders.

PM_{10} concentrations in the Mono Basin have been declining in recent years, as the level of Mono Lake rises and less lakebed is exposed [see www.arb.ca.gov, PM10 Air Quality Data Summaries (1993-1997)]. PM_{10} concentrations in Mammoth Lakes have remained relatively stable in recent years (ibid).

State Non-Attainment Areas

As of 1999, Mono County was designated as a non-attainment transitional area for the state ozone standard, indicating that the county is close to attaining the standard for that pollutant. Ozone data collected by the State Air Resources Board in Mammoth Lakes indicate that ozone concentrations have decreased in Mammoth in recent years and the area has not exceeded state or federal standards in recent years [see www.arb.ca.gov, Ozone Data Summary (1995-1998)]. In the past, the State Air Resources Board concluded that ozone exceedence in the Great Basin Air Basin (Alpine, Inyo and Mono counties) was caused by transport from the San Joaquin Valley Air Basin; the Great Basin Unified Air Pollution Control District adopted an Ozone Attainment Plan for Mono County, which identified the county as an ozone transport area.

As of 1999, the county was also designated a non-attainment area for the state PM_{10} standard (see www.arb.ca.gov , State Area Designations Map—PM10).

Transportation Related Air Quality Mitigation
Transportation related air quality impacts in Mono County occur only in Mammoth Lakes (PM_{10} emissions resulting primarily from resuspended road cinders). As a result, the Air Quality Management Plan for the Great Basin Unified Air Pollution Control District (GBUAPCD) does not include any transportation-related requirements other than for the town of Mammoth Lakes.

In compliance with GBUAPCD requirements, the Town has adopted an Air Quality Management Plan prepared by the GBUAPCD, including Particulate Emissions Regulations (Chapter 8.30 of the Municipal Code). These regulations set a peak level of VMTs (vehicle miles traveled) at 106,600 per day and direct that the Town review development projects in order to reduce potential VMTs. Methods to reduce VMTs include circulation improvements, pedestrian system improvements and transit improvements. The Plan also requires the Public Works Director to undertake a street-sweeping program to reduce particulate emissions caused by road dust and cinders on town roadways.

The most current VMT count for Mammoth Lakes shows 70,105 VMT on a peak day in 1995. Town staff has utilized a linear growth rate to project a figure of 73,935 VMT for a peak day in 2000. The latest projection for VMTs at buildout is 109,400 per day, slightly higher than the limit of 106,600 per day set by the Particulate Emissions Regulations. The higher projection will require the Town to increase its transit ridership on peak days; the Town's draft Transit Plan is working toward that goal.

The Town has completed a Mammoth Multi-modal Transportation Plan Study Report which emphasizes restricting automobile parking spaces in favor of expanding the existing transit system and direct ski lift access facilities and incorporating transit and pedestrian facilities into existing and future developments, in order to reduce vehicle trips and improve air quality. Utilizing the recommendations in the Multi-modal Study Report, the Town has completed a Draft Transit Plan. Once that Plan is adopted, it will be incorporated into the RTP.

SENSITIVE RECEPTORS
Land uses such as schools, hospitals and convalescent homes are considered relatively sensitive to poor air quality because the young, the old and the infirm are more susceptible to respiratory infections and other air-quality-related health problems than the general public. Agricultural crops, especially broad-leaved produce crops and cultivated flowers, are also sensitive to air pollutants such as ozone, nitrogen oxides and sulfur dioxide.

Residential districts are sensitive to air pollutants because people, including the young and old, are at home for extended periods so exposure periods are long. Industrial and commercial districts are less sensitive to poor air quality because exposure periods are shorter and workers in these districts are, in general, the healthiest segment of the public.

Wilderness Areas, National Parks and State Parks are also sensitive to air pollutants. Noticeable air pollution and the corresponding reduction in visibility detract from the recreational experience. Humboldt-Toiyabe National Forest includes Carson-Iceberg Wilderness Area to the north and part of Hoover Wilderness Area to the south. Inyo National Forest contains John Muir, Ansel Adams and the remaining parts of the Hoover wilderness areas. While no national parks are located in Mono County, Yosemite National Park lies just to the west and Kings Canyon National Park lies just to the south. Both could be adversely affected by pollutant emissions originating in Mono County. Nearby Class I PSD areas where no deterioration of air quality would be allowed are Yosemite and Kings Canyon national parks and Hoover Wilderness Area.

The remaining wilderness areas are too small to be designated as Class I PSD areas.[5] State Park units in the county that are sensitive to air quality impacts include Bodie State Historic Park and Mono Lake Tufa State Reserve.

[5]Attainment areas where no deterioration of air quality is allowed are designated Class I--Prevention of Significant Deterioration (PSD) areas.

CHAPTER 12
GEOLOGY AND SOILS*

TOPOGRAPHY

Mono County is characterized by rugged terrain with steep mountains, alluvial fans and glacial moraines. Elevations in Mono County along the Sierra Crest are greater than 13,000 feet near Mt. Lyell, Mt. Dana and Red Slate Mountain. White Mountain Peak, in southeastern Mono County, is 14,246 feet in elevation. Valley floors are 6,000 to 7,000 feet in elevation in most of the county, but along the border between Inyo and Mono counties the elevation drops to about 4,500 feet.

GEOLOGY

Mono County lies on the border of two major physiographic provinces--the Sierra Nevada and the Basin and Range. The Sierra Nevada is a great block of granitic rocks, with older overlying sedimentary and metamorphic material that has been uplifted on its eastern side and tilted westward. The Basin and Range Province consists of north-south trending, block-faulted ranges separated by sediment-filled basins. These structures extend westward from Utah to the Sierra Nevada. The most prominent range of the Basin and Range in California is the White Mountains in southeastern Mono County. The White Mountains, like the Sierra Nevada, consist of granitic rocks with older sedimentary and metamorphic rocks. Geologic maps are shown in Figure 15 (see Appendix A).

Abundant volcanic rocks have been superimposed on the basic block-faulted structure. Basalts located at several locations, including Old Mammoth Mine, parts of the Benton Range, along the Owens River Gorge and on McGee Mountain, are all about 3 million years old. These basalts do not appear to be related to younger volcanic activity in the Long Valley Caldera/Inyo-Mono Craters System (Bailey et al., 1976).

Volcanic rocks that can be related to the Long Valley magma chamber first appeared about 1 million years ago at Glass Mountain. The most prominent volcanic event has been the eruption of the Bishop Tuff and subsequent collapse of the Long Valley Caldera, 700,000 years ago. The Bishop Tuff is widespread in Mono and Inyo counties and has been found as far east as Nebraska in wind-carried ash deposits. Volcanic activity has continued to the present time at Long Valley Caldera and the Inyo-Mono Craters. During the past 2,000 years volcanic eruptions have occurred at an average rate of one every 100 years (Rinehart and Smith, 1982). Major volcanic rocks associated with activity in the Long Valley Caldera System are listed in Table 33.

Other young rocks include glacial moraines and outwash produced during up to six periods of glacial advance (Bateman and Wahrhaftig, 1966). Lake deposits, formed during times when many of the valleys contained lakes, are also present. Sediments washed from the mountains form alluvial fans and valley fill.

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*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific information on geology and soils.

TABLE 33
VOLCANIC ROCKS ASSOCIATED WITH ACTIVITY IN THE LONG VALLEY CALDERA SYSTEM

Rock Type and Location	Age
Glass Mountain rhyolites[a]	0.9 to 1.9 million years
Devils Postpile basalts [a]	0.6 to 0.9 million years
Bishop Tuff [a]	0.7 million years
Early Rhyolites: tuffs, domes and flows within Long Valley Caldera [a]	0.73 to 0.63 million years
Moat Rhyolites[a]	
North flank of resurgent dome	about 0.5 million years
Southeast moat	about 0.3 million years
West moat	about 0.1 million years
Rim Rhyodacites: Mammoth Mountain, Deadman Creek, near Glass Mountain[a]	0.18 ± 0.09 million years
West moat basalts in Long Valley Caldera [a]	0.2 to 0.06 million years
Basalt cinder cones near June Lake[a]	20,000 to 75,000 years
Black Point basalt [a]	13,000 ± 500 years
Rhyolite dome north of Deadman Creek[b]	about 6,000 years
Obsidian dome in south-central Mono Craters [c]	2,700 ± 800 years
Obsidian dome at Wilson Butte[c]	2,500 ± 400 years
Obsidian flow on northeast margin of Mono Craters [c]	2,300 ± 400 years
Obsidian flow on northeast margin of Mono Craters [c]	1,900 ± 300 years
Obsidian flow near northwest end of Mono Craters [c]	1,480 ± 300 years
Rhyolite ashes and flows near Wilson Butte [b]	1,350 to 1,200 years
Rhyolite domes near Glass Creek[b]	unknown, but between 650 and 1,200 years
Inyo Domes [c]	1,000 ± 250 years
Panum Crater[c]	740 ± 40 years
Explosion pit at Inyo Crater Lake[c]	580 ± 60 years
Explosion pit at Mammoth Mountain[c]	580 ± 150 years
Dome in northern Mono Craters [c]	500 ± 200 years
Lava flow at Negit Island[c]	440 ± 300 years

Sources:
a) Bailey et al., 1979; b) Miller, 1985; c) Rinehart and Smith, 1982.

GEOLOGIC STRUCTURE AND FAULTING

The seismic and volcanic activity along the eastern side of the Sierra Nevada is related to the continued uplift of the mountains along the range-front faults of the Sierra Nevada and to complex tectonic processes occurring in the Basin and Range. As a result, Mono County has abundant faults, both ancient and recent. In Mono County the range-front fault system is inconspicuous north of Mono Basin, although Bridgeport Valley is a deep, alluvium-filled basin. The southwest side of Mono Basin lies along the eastern escarpment and the basin itself contains several thousand feet of valley fill (Bateman and Wahrhaftig, 1966). The Mono Craters, located south of Mono Lake, are associated with a ring fracture zone along the range front fault zone. Long Valley Caldera forms a prominent re-entrant into Sierra Nevada across the range front fault system (Bailey et al., 1976). A recent study indicates that over the last 12 years, the Mono Craters-Long Valley area has been one of the most seismically active areas in the state (McNutt et al., Feb. 1991).

Long Valley Caldera has been the focus of intense study because of the volcanic and seismic activity and its potential as a geothermal energy source. It is a collapse feature formed when the Bishop Tuff was produced during a major eruption about 700,000 years ago. There are thick layers of volcanic ash as well as rhyolite and basalt flows within the caldera. Subsequent to formation of the caldera, a resurgent dome formed. This dome is the site of renewed uplift, apparently caused by the emplacement of magma beneath Long Valley Caldera (Rundle et al., 1985). Most of the uplift occurred during the period between the Mammoth Lake earthquakes in May 1980 and the earthquake swarm of January 1983 (Lenker et al., 1986). The cross-section of Long Valley Caldera in Figure 11 shows the faulting as well as the materials in and around the caldera.

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> Long Valley and Mono Craters have been the site of volcanic activity for millions of years. Bailey (1989) presents a geologic map of the region that shows extent, ages and descriptions of volcanic rocks in the area. He includes a comprehensive treatment of the formation of the caldera, which resulted from massive eruptions more than 700,000 years ago. Earthquake activity in the Long Valley region began to increase in 1978 and peaked in 1980. This activity was interpreted to be the result of magma movement beneath Long Valley caldera. Miller et al. (1982) show potential hazard zones in the region, taking into account common wind directions and topographic barriers (SNEP, Vol. II, Ch. 18, p. 550-551).
>
> A comprehensive response plan for volcanic hazards in the Long Valley caldera and Mono Craters area was prepared by Hill et al. (1991) of the USGS in cooperation with the California Division of Mines and Geology. In their report, Hill et al. (1991) state that recurring earthquake swarms in the caldera emphasize that this geologically youthful volcanic system is capable of further volcanic activity. Specific response actions under their plan are keyed to a five-level status ranking of activity level. The activity levels are eruption likely within hours to days and intense, strong, moderate or weak unrest. The USGS continuously monitors volcanic activity in Long Valley caldera and vicinity by means of a seismic network and deformation monitoring networks (dilatometers [strainmeters], tiltmeters and magnetometers).
>
> If activity levels indicate that an eruption is likely, the response plan states that an eruption will most likely produce small to moderate volumes of silicic lava similar to the eruptions that occurred 650 years ago at the north end of Mono Craters and 550 years ago at the Inyo Domes. In this case, we may expect to see:

- -- phreatic eruptions as the magma interacts with the shallow groundwater producing steam blasts that can throw large rocks several hundred meters from the vent (the "eruption" could stop at this point as it did with the phreatic blasts that formed the Inyo Craters);
- -- an explosive magmatic phase during which hot pumice and ash would be ejected thousands of feet into the air producing thick pumice accumulations near the vent, extensive deposits of fine ash hundreds of kilometers downwind, and destructive pyroclastic flows that may reach distances as great as 5 to 10 km (3 to 6 mi) from the vent;
- -- a final phase that involves the slow extrusion of lava to form steep-sided flows and domes.

Like the eruptions 550 and 650 years ago, eruptions may occur from several separate vents in succession with the vents spread over a distance of 5 to 10 km (3 to 6 mi). Individual eruptions may be separated in time by days or perhaps weeks. Larger, more destructive eruptions following the same basic pattern are possible, but less likely. Also possible, but less likely, is a small to moderate eruption of basaltic lava similar to the eruptions that produced the Red Cones several thousand years ago. This lava could travel at speeds ranging from a few meters per hour to several kilometers per hour. The resulting lava flows may extend 10 km (6 mi) or more from the vents depending on the vigor and duration of the eruption.

Miller et al. (1982) include a hazard zone for the unlikely event of an eruption as large as that which took place 700,000 year ago. Devastation within 120 km (75 mi) would be severe to total. Pyroclastic flows would move at speeds of several hundreds of kilometers per hour. Deposits of ash 15 cm (6 in) thick would fall as far away as 500 km (300 mi) with appreciable thickness deposited all across North America. Such an event has not taken place anywhere on the earth in historic times (SNEP, Vol. II, Ch. 18, p. 550-551).

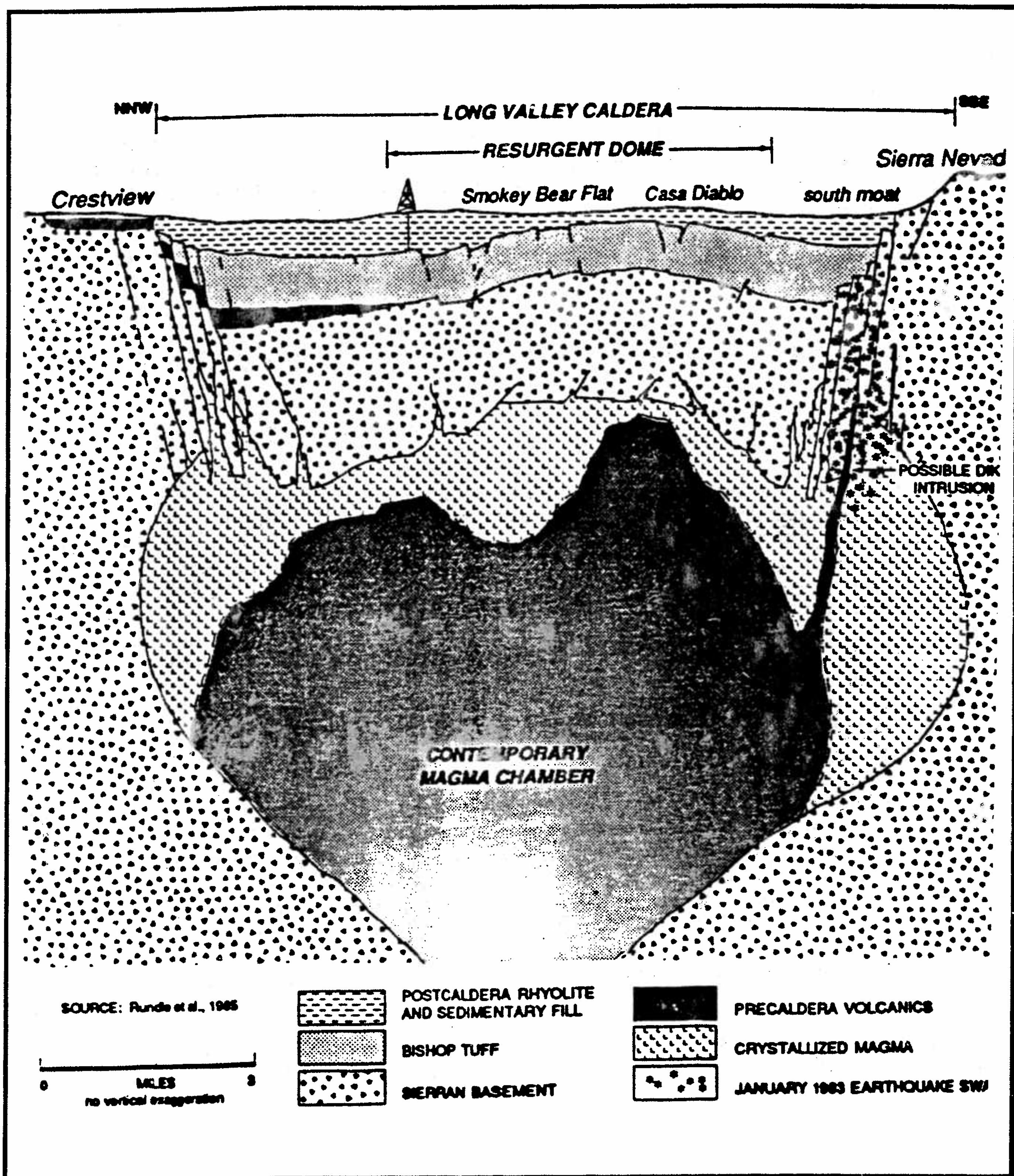
UNIQUE GEOLOGIC FEATURES

The tectonic and volcanic activity in Mono County has resulted in an abundance of unique geologic features. Some of the more spectacular features have been protected by inclusion in designated areas such as the Mono Basin National Forest Scenic Area. Other unique features, mostly on federal land, include Black Point, Panum Crater, Mono Craters, Inyo Craters, Obsidian Dome, Negit Island, Paoha Island and Glass Mountain; ash deposits of the Bishop Tuff in the volcanic tableland, ash deposits exposed in stream cuts along Wilson and Lee Vining creeks, and at Deadman Summit on U.S. Highway 395; glacial erosion and moraines, especially around Twin Lakes, June Lake, Convict Lake and McGee Canyon; and spring deposits and activity at Travertine Hot Springs, Casa Diablo, Hot Bubbling Pool, Hot Creek Gorge and other hot springs northwest of Lake Crowley.

MINERAL RESOURCES--MINING

Gold and silver mining attracted the earliest settlers in Mono County, but today mining plays a relatively minor role in the economic life of the county. Historic mining is discussed in the Cultural Resources section of this document. During the year 1984, the most recent year for which figures are available from the U.S. Bureau of Mines, pumice was the most valuable mineral commodity mined in Mono County. Clays, gold, silver, talc, sand and gravel were also produced (U.S. Bureau of Mines, 1985). California Division of Mines and Geology information from 1986 indicates that production of pumice, clays, sand, gravel and talc continued, but that no gold or silver was produced in that year (CDMG, 1987).

FIGURE 11
CROSS-SECTION OF THE LONG VALLEY CALDERA



There were 12 gold districts in Mono County: West Walker, Patterson, Masonic, Bodie, Keith, Jordan, Homer, Tioga, Mammoth, Chicago, Clover Patch and White Mountains. Significant mining activity has occurred in the Masonic, Bodie, Clover Patch and White Mountains Districts (Clark, 1970). The main mining districts of the eastern Sierra Nevada were at West Walker River, Bodie, Green Creek, Virginia Creek, Lundy Canyon, Tioga Pass, Mammoth Creek, Pine Creek, Bishop Creek and Independence Creek (SNEP, Vol. II, Ch. 30, p. 863).

By 1983, gold was mined only at the May Lundy Mine in the Homer District and at the Log Cabin Mine in the Tioga District (Silva et al., 1983).

GENERAL MINING RESOURCE ASSESSMENT

A preliminary mineral resource assessment of California, done under the auspices of the U.S. Geological Survey, shows broad areas that may have particular mineral deposits (Albers and Fraticelli, 1984). Figure 17 (in Appendix A) shows these general assessment areas in Mono County, as well as known deposits and resource areas identified by the California Division of Mines and Geology (CDMG). The White Mountains southeast of Chalfant Valley are considered a major limestone source area (CDMG, 1984a). Barite deposits are known to exist in the White Mountains near the Mono/Inyo County line and along the Mono/Fresno County line near Red Slate Mountain. They are irregular and thin, which would likely limit their usefulness as a resource (CDMG, 1985d). Three isolated titanium occurrences are known in Mono County, but none has been mined (CDMG, 1984e). Mono Lake is listed as a potential source of salt (CDMG, 1985e), sodium carbonate (CDMG, 1985d) and sodium sulfate (1985e), but its location in the Mono Basin National Forest Scenic Area would make exploitation of mineral resources unlikely.

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> Much of the area between Lake Tahoe and Bridgeport is permissive for gold, tungsten, mercury, manganese or uranium in skarn deposits in roof pendants and in hot-spring, vein and other deposits in Cenozoic volcanic rocks, but known deposits are sparse (Dellinger, 1989). South of Bridgeport, the batholithic terrane contains numerous roof pendants; collectively, these bodies have numerous deposits of and are considered to be geologically permissive for, tungsten and molybdenum in skarn deposits, gold in quartz veins, iron in epigenetic magnetite deposits, or chromium in podiform chromite deposits that occur in roof pendants of oceanic affinity along the west edge of the batholith. Batholithic rocks along the central east edge of the Sierra Nevada, from Mono Lake to Independence, contain numerous roof pendants and are considered to be geologically permissive for deposits for tungsten and gold. Deposits of tungsten, gold or molybdenum occur locally, but known deposits are sparse or absent in most of this area (SNEP, Vol. II, Ch. 18, p. 532).

Mining projects on federal land in Mono County would be required to meet National Environmental Policy Act (NEPA) provisions for environmental review with the BLM or U.S. Forest Service as lead agency. In addition, the BLM and Forest Service have Mineral Resources Policies that reflect the provisions of the Mining and Mineral Policies Act of 1970, the Federal Land Policy and Management Act of 1976 and the National Materials and Minerals Policy, Research and Development Act of 1980. Under these laws, the federal land management agencies are responsible for making public lands available for and encouraging orderly and efficient development of mineral resources under principles of environmental protection and multiple-use management. BLM and Forest Service policies must be consistent with state and local plans.

STATE AND LOCAL MINING REQUIREMENTS

California's Surface Mining and Reclamation Act of 1975 (SMARA) establishes a statewide policy for conservation and development of mineral lands in California, as well as requirements for permit and reclamation plan approval prior to conducting surface mining operations in the state. Mono County is the lead agency for implementation of SMARA. Under SMARA, there is no distinction between exploration and actual mining. Activities below the threshold defined in the act are exempt from regulation; those exceeding the threshold are regulated.

Mono County issues Mining Operations Permits for mining operations on lands over which the county lacks full land use authority (in compliance with Chapter 7.10, "Mining Operations," of the Mono County Code), or a use permit for lands on which the County has full land use authority (in compliance with Chapter 15, "Resource Extraction," of the Mono County Land Development Regulations). Mono County also approves Reclamation Plans for mining projects in compliance with SMARA regulations and the County's Reclamation Ordinance (Chapter 35 of the Mono County Land Development Regulations.

Under the provisions of SMARA, "the State Geologist shall classify areas of the State threatened by land use incompatible with, or that would preclude, mining. Such areas will be classified into Mineral Resource Zones (MRZs) . . ." (CDMG, 1979). Classification studies have been initiated in seven metropolitan areas and in non-urban areas in the Sierra foothills (U.S. Bureau of Mines, 1985). No land in Mono County has been classified under MRZ studies (Dupra, 1988).

Because mining activities can impact such a wide range of resources, each operator must be prepared for a complex permitting/approval process involving many agencies. Permits that may be required for mining in California are summarized in <u>California Exploration and Mine Permitting</u> (Deem and Hellman, 1984). The <u>California Permit Handbook</u> (Governor's Office of Planning and Research, 1984) describes permits issued by state agencies.

SOILS

The National Resource Conservation Service (NRCS) is presently mapping the soils in Mono County according to Land-Capability Classification System, but the results are not available for publication.[6] Descriptive soil maps that do not provide the Land-Capability Classification have

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[6]The NRCS uses a classification system or interpretive grouping of soils to assess agricultural uses of land. In the Land-Capability Classification, the arable soils are grouped according to their potential and limitations for sustained production of common cultivated crops. Nonarable soils are grouped according to their potential and limitations for the production of permanent vegetation and according to their risks of soil damage if mismanaged (Soil Conservation Service, 1961). The Land-Capability Classes are:

<u>Lands Suited to Cultivation</u>
Class I - Soils in Class I have few limitations that restrict their use. They are suited to a wide range of plants and may be used safely for cultivated crops, pasture, range, woodland, and wildlife. The soils are nearly level and the erosion hazard is low. They are deep, well drained, easily worked, and hold water well. In addition, they are fairly rich in nutrients or respond well to the application of fertilizer.

<u>Classes II through IV</u> - These soils have limitations that reduce or restrict the choice of plants and/or require conservation practices. The restrictions are more severe and management requirements more intense as the number of the classification increases.

been done by the NRCS for the Bridgeport and Coleville areas (SCS, 1967), by the Inyo National Forest for the June Lake area and by the BLM for lands in the Benton-Owens Valley area (BLM, undated). The information on these published maps does not include estimates of erodibility, permeability or most other characteristics useful for resource management or siting criteria.

SOIL EROSION

Four types of erosion, listed below, have been identified by the Soil Conservation Service (1982--now the NRCS) as occurring in Mono County. Water quality and air quality effects of erosion are discussed in other sections of this document.

1. Streambed erosion occurs mainly during heavy spring runoff. Road crossings, concentrations of animals and eroding irrigation ditches contribute to problems of streambank erosion.

2. Sheet and rill erosion presently occurs primarily on flood-irrigated fields and on ski slopes at Mammoth and June Mountain ski areas.

3. Urban/roadside/construction erosion is a problem in urbanized areas and in areas where construction of new projects is under way. That tends to occur near existing communities.

4. Wind erosion causes damage to agricultural crops, can be a health hazard, makes travel dangerous and detracts from recreational use. Major areas of concern are Mono Lake, where falling lake levels expose expanses of fine-grained salts and other lake deposits and cultivated fields, where plowed soil provides abundant source material.

The Mono Lake Committee believes that a significant source of soil erosion along Mono County waterways has been the DWP's management of the aqueduct system. In the Mono Basin, lowered lake levels and the resultant desiccation of streamside vegetation, followed by release of flood flows, have caused incision of Mono Basin streams. This has led to the erosion of stream channels along the lower reaches of Rush, Lee Vining, Mill and Wilson creeks and to the destruction of county road crossings. Along the Upper Owens River, artificially fluctuating flows have led to streambank instability and, in some cases, serious erosion problems.

Soil erosion areas are shown in Figure 18 (see Appendix A).

SOIL PERMEABILITY

The permeability of soils in Mono County is being studied as part of the NRCS survey, but those data have not been published. Until such studies are available, a general assessment of geologic materials can be used to indicate which soils in Mono County are likely to be highly permeable.

Land Limited in Use—generally not suited to cultivation

Classes V and VI - These soils have limitations impractical to remove that limit their use largely to pasture, range, woodland or wildlife food and cover.

Class VII - Soils in Class VII have very severe limitations that make then generally unsuited to cultivation and restrict their use largely grazing, woodland or wildlife.

Class VIII - Soils and landforms in Class VIII have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, water supply or aesthetic purposes.

Any siting study for a particular project would require detailed analysis of the soils. Permeability is an important criterion for siting facilities where hazardous waste is handled or disposed.

The State Water Resources Control Board (SWRCB) enforces Title 23, Subchapter 15, of the California Administrative Code, which specifies that Class I Waste Management Units for hazardous waste "shall be immediately underlain by natural geologic materials which have a permeability of not more than 1×10^{-7} cm/sec and which are of sufficient thickness to prevent vertical movement of fluid, including waste and leachate, from waste management units to waters of the state as long as wastes in such units pose a threat to water quality. Class I units shall not be located where areas of primary (porous) or secondary (rock opening) permeability greater than 1×10^{-7} cm/sec could impair the competence of natural geologic materials to act as a barrier to vertical fluid movement." Permeability in that range is typical of unfractured igneous and metamorphic rocks, unweathered marine clays and some glacial deposits (Freeze and Cherry, 1979).

Quaternary pyroclastic material (mapped as Qv on the geologic maps in Figure 15, Appendix A) includes pumice, ash and other volcanic ejecta, such as the widespread Bishop Tuff, which is usually very porous. Unless it is very fine, has been welded by the weight of overlying material while it was still hot, or altered so that secondary minerals fill the pore spaces, it is likely to have very high permeability.

Alluvial material (Qal) shed from the mountains characteristically contains abundant sand and gravel, which is highly permeable, with lenses of finer, less permeable material. Fluid penetrating alluvium tends to move mostly vertically until it encounters a less permeable clay layer. It then flows parallel to the clay lens, causing highly unpredictable flow patterns. Other highly permeable soils would include dune sands (Qs), fractured and faulted bedrock and young soil derived from granitic rocks. Of these three types, only dune sand is shown on the geologic map (Figure 15 in Appendix A).

CHAPTER 13
HYDROLOGY*

INTRODUCTION[7]

The water resources of Mono County contribute substantially to the county's economy and quality of life. Mono County's rivers, streams, lakes and aquifers supply water for domestic and agricultural use; provide recreation; support rich and diverse fish and wildlife populations; and are an important aesthetic component of the county's landscape. Unfortunately, many of the county's water resources have been seriously degraded by development and much of the county's water is exported out of the county for use in other parts of California and Nevada.

The impacts of water development in Mono County have been significant. Many streams have been damaged by water diversions and dam construction; some have been completely dewatered, destroying fisheries, vegetation and wildlife. Currently the entire ecosystem of Mono Lake is imperiled by the diversion of its tributary streams. Export of water from Mono County has also limited the availability of water needed to satisfy local domestic and agricultural needs.

A growing recognition of the need to mitigate these past harms, combined with lingering threats of new development, have signaled a need for more local participation in County water resource planning. This section identifies major water issues in Mono County. Figure 19 (in Appendix A) shows surface water resources and Table 34 presents a summary of major surface water features.

MAJOR HYDROLOGIC BASINS
Geographically, Mono County can be divided into three distinct hydrologic basins. In the following paragraphs, each basin is described in terms of its geography and hydrology and principal land and water uses are identified. The major water problems in each basin are also discussed.

WALKER RIVER BASIN
The northern portion of Mono County lies within the Walker River Basin. This is the drainage basin of the East and West Walker Rivers and their tributaries. The total acreage in this basin is approximately 2.7 million acres, 2.1 million acres of which are in Nevada (Nevada Division of Water Resources [NDWR], undated). The East and West Walker rivers remain separate as they flow through Mono County and then converge 25 miles across the state border in Nevada, forming the main stem of the Walker River, which flows for another 40 miles before terminating in Walker Lake near Hawthorne, Nevada (Lahontan RWQCB).

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*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific hydrologic information.

[7]This introduction and the section providing an overview of the hydrologic basins were taken from a report written for Mono County by Peter Holton.

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recreation[e]	Water Quality Problems[f]
1	Topaz Lake	W. Walker				I,P			F,B,C	
2	Slinkard Creek	W. Walker		75%	?	I	Y	Lahontan Cutthroat trout	F	gr, c
3	Coyote Creek	W. Walker Desert Creek								
4	West Walker River	Walker	200,000	33%	86%	I,P			F,W,C	
5	Desert Creek	W. Walker		?	100%					
6	Little Deep Creek	W. Walker, Deep Creek								
7	Deep Creek	W. Walker		?	70%					
8	Cottonwood Creek	W. Walker	16,000	88%	46%	I				x
9	Mill Canyon Creek	W. Walker								
10	Lost Cannon Creek	W. Walker Mill Canyon								er
11	Silver Creek	W. Walker, W.F.		?	13%	E,P, D,Y		Lahontan cutthroat trout		

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recre-ation[e]	Water Quality Problems [f]
12	Wolf Creek	W. Walker				Y		Lahontan cutthroat		
13	Cloudburst Creek	W. Walker		?	16%	I				
14	Hot Creek (Fales)	W. Walker Little Walker								
15	Kirman (Carmen) Lake	W. Walker, Little Walker				Y			F	
16	Junction Reservoir	W. Walker, Mud Creek					Y		F	
17	Millie Lake	W. Walker, Poore Creek							F	
18	Leavitt Creek	W. Walker					Y		F	
19	Secret Lake	W. Walker, Poore Creek							F	
20	Poore Lake	W. Walker, Poore Creek					Y		F	
21	Roosevelt Lake	W. Walker W.F.					Y		F	

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recreation[e]	Water Quality Problems[f]
22	Lane Lake	W. Walker							F	
23	Sardine Creek	W. Walker Leavitt Creek							F	
24	Red Top Lake	W. Walker							F	
25	Kennedy Canyon Creek	W. Walker, W. F.							F	
26	Hidden Lake	W. Walker							F	
27	Fremont Lake	W. Walker, W.F.							F	
28	Chain of Lakes	W. Walker							F	
29	Lower Long Lake	W. Walker W. F.							F	
30	Upper Long Lake	W. Walker, W.F.							F	
31	Little Walker River	W. Walker				P				
32	Molybdenite Creek	W. Walker, Little Walker								
33	Butts Lake	W. Walker								
34	Bench Creek	W. Walker								

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recre-ation[e]	Water Quality Problems[f]
35	Sweetwater Creek	W. Walker								
36	Ferris Creek	E. Walker, Sweetwater Creek								
37	Fryingpan Creek	E. Walker								
38	Swauger Creek	W. Walker, Buckeye Creek		?	67%				F,C	
39	Long Valley Creek	E. Walker, Swauger Creek								er
40	Bridgeport Reservoir	E. Walker	42,500			I		Y	F,B	
41	By-Day Creek	E. Walker, Buckeye Creek					Y	Lahontan cutthroat trout		es
42	Huntoon Creek	E. Walker. Long Valley Creek								
43	Upper Buckeye Creek	E. Walker, Robinson Creek		?	70%	I			F	
44	E. Walker	Walker	10,000	6%	48%	I,P			W	

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Diversions Length[b]	Diversions Use[b]	Critical Habitat[c]	Special Status Species[d]	Recreation[e]	Water Quality Problems[f]
45	Eagle Creek	E. Walker, Buckeye Creek								
46	Kirkwood Creek	W. Walker								
47	Twin Lakes	E. Walker, Robinson Creek	59,000						F,B,C	
48	Robinson Creek	E. Walker	43,470	?	98%	I			F,C	
49	Tamarack Creek	E. Walker, Robinson Creek								
50	Cattle Canyon Creek	E. Walker, Robinson Creek		?	13%	I				
51	Horse Canyon Lake	E. Walker, Robinson Creek							F	
52	Horse Canyon Creek	E. Walker, Robinson Creek								
53	Barney Lake	E. Walker, Robinson Creek							F	

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recre-ation[e]	Water Quality Problems [f]
54	Clearwater Creek	E. Walker Virginia Creek								x, fi,er
55	Summers Creek	W. Walker Green Creek			68%					
56	Dynamo Pond	E. Walker, Green Creek				L			F	
57	Green Creek	E. Walker	40,000	100%.	46%	P,L			F	
58	Dog Creek	E. Walker Virginia Creek								
59	Virginia Creek	E. Walker		1%	98%	I			F,C	x, fi
60	Dunderburg Creek	E. Walker, Virginia Creek								
61	Trumbull Lake	E. Walker, Virginia Creek							F	
62	Upper Virginia lake	E. Walker Virginia Creek							F,C	

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recreation[e]	Water Quality Problems[f]
63	Lower Virginia Lake	E Walker Virginia Creek							F,C	
64	Rough Creek	E. Walker			66%					er
65	Bodie Creek	Walker (Nevada)								er, fi, x
66	Mill Creek	Mono Lake	22,000	100%	100%	E	Y	Lahontan cutthroat trout	F,C	gr
67	Lundy Lake	Mono Lake, Mill Creek							F	
68	Mono Lake	Mono Lake		100,000*		X	Y	Mono Lake brine shrimp, CA Gull	B,S	x
69	Tioga Lake	Mono Lake Lee Vining, S.F.							F,S	
70	Ellery Lake	Mono Lake, Lee Vining Creek							F	
71	Saddlebag Creek	Mono Lake, Lee Vining Creek							F	

*See section on Mono Basin Hydrology for a discussion of diversions in the Mono Basin.

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recre-ation[e]	Water Quality Problems[f]
72	Saddlebag Lake	Mono Lake, Lee Vining N.F.							F, B, C	
73	Lee Vining Creek.	Mono Lake, Lee Vining Creek				W			F	
74	Mine Creek	Mono Lake								
75	Warren Creek	Mono Lake, Lee Vining Creek								
76	Slate Creek	Mono Lake					P		F	
77	Lee Vining Creek	Mono Lake	49,000*	82%	70%	E,X,D ,P			W	F,H,C,h
78	Gibbs Creek	Mono Lake	2,000	47%	24%					
79	Walker Lake	Mono Lake, Walker Creek							F	
80	Walker Creek	Mono Lake, Rush Creek	5,000*	92%	100%	X				

*See section on Mono Basin Hydrology for a discussion of diversions in the Mono Basin.

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recreation[e]	Water Quality Problems[f]
81	Parker Creek	Mono Lake, Rush Creek	8,000*	Y		X				
82	Grant Lake	Mono Lake, Rush Creek	47,500						F,B,C	
83	Parker Lake	Mono Lake, Parker Creek							F	
84	Crest Creek	Mono Lake, Rush Creek								
85	Marie Creek	Mono Lake, Rush Creek								
86	Carson Lake	Mono Lake, Rush Creek								
87	Rush Creek	Mono Lake	60,000*	81%	93%	E,X,	Y		F	
88	June Lake	Mono Lake Reversed Creek				D			F, B, S, C	M-LV
89	Silver Lake	Mono Lake Rush Creek							F	

*See section on Mono Basin Hydrology for a discussion of diversions in the Mono Basin.

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recreation[e]	Water Quality Problems[f]
90	Gull Lake	Mono Lake Reversed Creek							F	
91	Reverse Creek	Mono Lake Rush Creek		?	?	D			F	
92	Fern Lake	Mono Lake Fern Creek							F	
93	Agnew Lake	Mono Lake Rush Creek								
94	Adobe Lake	Owens, Dexter Creek							F	
95	Adobe Creek	Owens, Adobe Lake								
96	Taylor Canyon Creek	Owens, Adobe Creek								
97	Dexter Creek	Owens Adobe Lake								
98	Montgomery Creek	Owens							X	
99	Marble Creek	Owens				P	Y	Owens speckled dace		gr, x
100	Indian Creek	Owens								

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Diversions Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recreation[e]	Water Quality Problems[f]
101	River Springs	Owens, N.F.							F	gr, x
102	Owens River	Owens	400,000	100%	99%	E,X	Y	Owens tui chub	F	
103	Deadman Creek	Owens		?	35%				F,C	
104	Glass Creek	Owens Deadman's Creek	1,700	1%	15%		Y	Paiute cutthroat trout	F	
105	Inyo Crater Lakes	Owens								
106	Wilfred Canyon Ck	Owens	70	5%	44%				F	
107	O'Harrel Canyon Ck	Owens					Y	Paiute cutthroat trout		
108	Hot Creek, Little	Owens Hot Creek					Y	Owens speckled dace		gr,x
109	Alkali Lake, Big	Owens					Y	Owens speckled dace	F,S	
110	Hot Creek Headsprings	Owens Hot Creek					Y	Owens tui chub	F	fi, x

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recreation[e]	Water Quality Problems [f]
111	Hot Creek	Owens	40,000				Y	Owens speckled dace, Owens tui chub	F	gr, s , x
112	Sherwin Creek	Owens, Mammoth Creek		1%	59%				F, C	
113	Casa Diablo Springs	Owens, Mammoth Creek								
114	Casa Diablo Geyser	Owens, Mammoth Creek	250							
115	Colton Springs	Owens, Mammoth Creek	180							
116	Hot Bubbling Pool	Owens, Mammoth Creek								
117	Hot Creek Hatchery Spring A, B & Spring C,D	Owens					Y	Owens Tui Chub		
118	Hot Creek Gorge Spring	Owens								
119	Hot Creek Hatchery Springs H1,2,3	Owens					Y			

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recreation[e]	Water Quality Problems[f]
120	Convict Creek	Owens, Crowley Lake					Y		F	
121	Laurel Creek	Owens, Mammoth Creek								
122	Convict Lake	Owens Convict Creek							F, B, C	
123	Lake Mary	Owens, Mammoth Creek				D			F	
124	Lake George	Owens Mammoth Creek							F	
125	Lake Mamie	Owens, Mammoth Creek							F	
126	Horseshoe Lake	Owens, Mammoth Creek							F	
127	Twin Lakes (Mammoth)	Owens, Mammoth Creek								
128	Sherwin Lakes	Owens, Sherwin Creek								

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recreation[e]	Water Quality Problems[f]
129	Mammoth Creek	Owens, Hot Creek	16,000	23%	72%		Y		F	c,f,s
130	Crowley Lake	Owens				X	Y		F, B, S	al
131	McGee Creek	Owens Crowley lake	40,000	39%	82%		Y		F, H, C	t
132	Hilton Creek	Owens Crowley Lake		Less than 1%	36%				F, B	
133	Baldwin Creek	Owens McGee Creek								
134	Stanford Creek	Owens Hilton Creek					Y	Owens tui chub		
135	Crooked Creek	Owens Crowley Lake					Y	Owens tui chub		
136	Rock Creek	Owens	23,000	100%	96%	X, P	?	Penste-mon papillatus may be present	F, H, C	t
137	Birch Creek	Owens White Mountains	7,000	42%	78%					

TABLE 34 (continued)

Map #	Streams & Lakes	Drainage	Capacity or Flow[a]	Diversions Flow[b]	Length[b]	Use[b]	Critical Habitat[c]	Special Status Species[d]	Recreation[e]	Water Quality Problems[f]
138	Willow Creek	Owens White Mountains		?	59%					
139	Lone Tree Creek	Owens								
140	Milner Creek	Owens	7,000	100%	81%	E				x
141	Fish Slough	Owens	5,440				Y	Owens pupfish Owens tui chub Owens speckled dace		
142	Cottonwood Creek	Fish Lake Valley, NV				E	Y	Paiute cutthroat trout		

TABLE 34 (continued)

NOTES:

a) Capacity in acre-feet; flow in acre-feet/year. Flow is an annual average value. Very few of the streams are gauged, so flow is not available for most. Source: CDFG data in Bishop; LADWP records; FERC, 1986.

b) Flow is the percentage of the total stream flow diverted. Length is the percentage of the stream length which is affected by the diversion(s) as recorded in CDFG data in Bishop office. Use codes are: P=potential hydroelectric; E=existing hydroelectric; D=domestic; I=irrigation; L=livestock pond; X=export by LADWP

c) Y means yes. Critical habitats include all CDFG "special waters." Source: CDFG data in Bishop.

d) Special status species are listed in Table 50. Source: CDFG, 1988.

e) B=Boating; F=Fishing; S=Swimming: W=under study for wild and scenic designation; C=camping.

f) al=algae; c=chemicals, er=erosion; f=fecal contamination; fi=water quality compromises fishery; gr=grazing conflicts; s=sedimentation; t=turbidity; x=not suitable for domestic use. Sources: Inyo and Toiyabe resource records; BLM Bishop RA inventory; Burkham, 1978; Setmier, 1984.

g) PLES I EIS/SEIR, published by BLM and GBUAPCD, June 1989.

East Walker River
The East Walker watershed has a drainage area of 523 square miles. Its major tributaries are Virginia, Robinson, Swauger, Buckeye and Green creeks. These tributaries, which are very steep, drop within a few miles from elevations exceeding 10,000 feet to an elevation of 6,800 feet in the Bridgeport Valley. In the Bridgeport Valley there are numerous diversion dams and ditches on the East Walker and its tributary streams. These structures permit diversion of water from the East Walker for the irrigation of 20,300 acres of pasture and alfalfa land in the Bridgeport Valley.

Bridgeport Reservoir lies immediately downstream of the town of Bridgeport. It floods five miles of the East Walker River and has a storage capacity of 42,500 acre-feet (Simon, 1986). Bridgeport Reservoir's primary purpose is the storage of irrigation waters. It also offers excellent recreational fishing opportunities.

Although it is located in Mono County, Bridgeport Reservoir is owned and operated by the Walker River Irrigation District (WRID), a federal agency. The WRID is the largest water user in the Walker River Basin and the District provides water for the irrigation of approximately 40,000 acres of land in Mason Valley near Yerington, Nevada. The WRID is under no legal requirement to maintain a minimum water level in Bridgeport Reservoir and sometimes in dry years the district draws down the level in Bridgeport Reservoir to a point where the lake becomes extremely shallow. These low lake levels threaten the reservoir's fishery by increasing the reservoir's turbidity and lowering its dissolved oxygen levels.

Below Bridgeport Reservoir, the East Walker flows six miles through a scenic canyon before crossing the state border into Nevada. The uses of the river in this canyon are primarily recreational, as this stretch of river supports a productive fishery. The WRID is not legally required to maintain minimum instream flows in this section of the East Walker below Bridgeport Reservoir. Although the district usually releases sufficient amounts of water to maintain the river's fishery, it has at times restricted releases and damaged the downstream fishery.

Other water projects in the East Walker watershed are of relatively minor importance. A small dam on Green Creek forms Dynamo Pond, which is used for livestock watering. This pond is also the site of a proposed small hydroelectric facility. There is one out-of-basin water transfer that exports six cubic feet per second (cfs) of water for irrigation use from Virginia Creek to the Conway Ranch in Mono Basin (Simon, 1986).

Municipal users of water in the East Walker River drainage are supplied primarily by groundwater. The Bridgeport Public Utility District supplies water for domestic uses to the Town of Bridgeport with water from its two wells. Other residents in the drainage use private wells and surface springs.

The groundwater basin in the Bridgeport Valley is the only significant source of groundwater in the California portion of this watershed. The rest of the watershed's groundwater basins are in mountain areas. They are small and of little developable value (California Department of Water Resources [CDWR], 1964). The estimated underground storage capacity of the Bridgeport Valley aquifer is continually recharged by the Walker River and its tributaries and by agricultural runoff from irrigated lands and there is enough groundwater in this basin to satisfy any foreseeable domestic needs (McJunkin, 1987). Groundwater is generally not used for agricultural irrigation in this drainage basin because of the high costs of pumping and the availability of adequate surface water supplies (Lahontan RWQCB, 1975).

West Walker River

The West Walker River watershed has a drainage area of 410 square miles. The West Walker River and its main tributaries (Little West Walker, West Fork West Walker River and Leavitt Creek) flow freely from the crest of the Sierra Nevada to the town of Walker at the head of Antelope Valley. Near Walker, much of the river is diverted into several canals to provide irrigation water for pasture land and alfalfa production in the Antelope Valley. Eleven miles of the West Walker River are affected by these diversions, which at times during the irrigation season reduce the river's flow to a point where the free movement of fish is restricted. Additionally, many fish are carried into the diversion ditches in the Antelope Valley and lost in the fields (Lahontan RWQCB, 1975).

Several miles upstream of the California-Nevada state line, the river is diverted into a three-mile canal that leads to Topaz Lake. Topaz Lake, which straddles the California/Nevada border, is a reservoir owned and operated by the WRID. It functions primarily as a storage reservoir for irrigation water for farms in Nevada; however, it is also a popular fishing and boating site. Water released from Topaz Lake passes through a two-and-one-half-mile outlet tunnel and canal that connect back into the West Walker River.

The West Walker provides more than 60% of the available water in the entire Walker River system. Enough water is diverted from the river to irrigate 17,000 acres of agricultural land in California and 19,500 acres of land in Nevada (Lahontan RWQCB, 1975). Within the watershed, Slinkard, Lost Cannon, Deep and Molybdenite creeks and the Little Walker River are also diverted for agricultural use. Silver Creek has been tapped for domestic use by the U.S. Marine Corps Mountain Warfare Training Center (Simon, 1986).

The groundwater basin in Antelope Valley is the only significant source of groundwater in the West Walker Basin in California. According to the Lahontan Regional Water Quality Control Board, the remaining groundwater basins in the West Walker watershed are small and of little developable value (Lahontan RWQCB, 1975). A possible exception exists in Slinkard Valley, where extensive deep alluvium has been found. The estimated underground storage capacities of aquifers in the Antelope and Slinkard Valleys are 160,000 and 72,000 acre-feet, respectively, at depths between 10 and 100 feet (CDWR, June 1964).

The West Walker from its source near Yosemite to the Topaz Lake diversion has been designated a state and federal Wild and Scenic River. Wild and Scenic designation of the West Walker River protects this stream from unfavorable future development and promote its use for recreational activity.

Walker Basin Water Rights

Because the Walker River flows across a state border, water rights within the entire basin are federally adjudicated. This means that the rights of water users within the basin are determined by the federal government and not through the water rights processes of each individual state. Interstate water rights in the Walker River Basin were first allocated in 1919 under Decree 731 of the Federal District Court for Nevada (Rickey Land Company vs. Miller and Lux, 218 U.S. 258 [1910]). The amount of water to be allocated and the priority for each use were fixed in this decree (NDWR, undated).

Subsequently, the allocations under Decree 731 were shown to be unworkable because the decree did not include all right holders in the basin and the amount allocated to the Walker River Indian Reservation was not accepted as being in the best interest of the Indians (Lahontan RWQCB, 1975). In 1924, the United States initiated a new action to redetermine water rights within the basin. This complex process was finally concluded in June 1939 with the issuance of Decree C-125 of the Federal District Court for Nevada (United States vs. Walker River Irrigation District et al., Equity No. C-125, D. Nevada, 1936). This decree split the allocation of water between the two states, giving California rights to 35% of the flow and Nevada rights to 65%. In addition, it granted a priority water right of 2,100 acre-feet to the Walker River Indian Reservation. The decree also established entitlements and priorities for the individual water rights of all valid right holders in the basin (CDWR, April 1964).

To date, the C-125 water right determinations are still in effect. A court-appointed Board of Water Commissioners and a Federal Water Master, who oversees the daily allocations of water within the basin, administer the decree. The Federal District Court in Reno maintains a role as overseer of the Commission and the Water Master and hears requests for water right transfers or new water right applications.

Unfortunately, C-125 has resulted in an overallocation of entitlements. In a normal year only 85% of the water right entitlements can be satisfied after the spring high flows have receded (Weisshaupt, 1987). When the flow of the system becomes insufficient to serve all of the adjudicated rights, the Water Master compares the total amount of water available to a table of water rights and the priority of rights that can be served is determined. This creates hardships for many existing low-priority right holders who are often unable to receive their entitlements.

Future Development

Since the waters of the Walker River are already overallocated, prospects for future agricultural development are rather limited. However, much of the land currently irrigated is done so with inefficient flood irrigation methods. Many farmers in Mono County are installing sprinkler systems that allow them to make better use of their limited water supplies. The increased efficiency of these irrigation techniques may allow farmers to bring more land into production without increasing their overall use of water (Burt, 1987).

Another factor limiting the availability of agricultural water supplies in the Walker River Basin is the lack of extensive storage facilities. Topaz Lake and Bridgeport Reservoir are the only major storage facilities in this watershed and these reservoirs store water to be used in Nevada. There have been several previous proposals to construct a storage facility at Leavitt Meadows or Pickel Meadow in the West Walker Basin; however, these sites have subsequently proved unsuitable for development (Weisshaupt, 1987).

MONO BASIN

Mono Basin is located in the center of Mono County between the Walker and Owens basins. Mono Basin, with a total drainage area of 695 square miles, is the smallest of the major hydrologic basins in the county. Most of Mono Basin lies in Mono County; however, a portion of the basin lies in Mineral County, Nevada (Stoddard, 1971).

The five major streams in the Mono Basin are Rush, Walker, Parker, Lee Vining and Mill creeks. All of these streams drain into Mono Lake and none flows out. Mono Basin is a terminal basin. The streams feeding Mono Lake pick up salts and minerals as they flow from their headwaters into the lake. Since the lake has no outlet, these constituents become concentrated in its water. Therefore, Mono Lake is highly saline and alkaline and incapable of supporting fish life. The lake does, however, support thriving populations of brine shrimp and brine flies and these small animals support an exceptionally diverse and productive bird population.

Annual runoff in the Mono Basin averages 196,000 acre-feet. Between 1941 and the early 1980s, the Los Angeles Department of Water and Power (LADWP) diverted water from four of the basin's five major streams. LADWP's Mono Basin water collection system used small diversion dams on Lee Vining, Walker and Parker creeks to divert water into a conduit leading to Grant Lake on Rush Creek. Grant Lake Reservoir, which is owned by LADWP, was formed by a 93-foot earthfill dam and has a maximum storage capacity of 47,500 acre-feet (CDWR, 1960). Below Grant Lake, LADWP's exports pass through a conduit to the 11.3-mile-long Mono Craters Tunnel that carries water out of the Mono Basin and delivers it into the upper reaches of the Owens River.

The diversion and export of water from the Mono Basin into the Owens Basin had significant impacts on the environment of the Mono Basin. Large sections of Walker, Parker, Rush and Lee Vining creeks were dewatered, seriously depleting the once abundant fishery in these streams and destroying significant amounts of riparian habitat. Mill Creek is the only major stream in the Mono Basin that was not diverted out of the basin. However, this stream has been diverted for hydroelectric generation and irrigation of farmlands along the northern edge of the Mono Lake.

According to the California Department of Fish and Game, 88% of the stream mileage in the Basin was impacted by water diversions; 37.2 of the stream mileage was affected by diversions of 50% or greater of the undiverted flow and 20% of the total stream mileage was dewatered by existing diversions (Wong and Shumway, 1985). Diversion of water resulted in the loss of approximately 60% of the total length of the riparian corridors along Mono Lake's major tributaries (Wong and Shumway, 1985). This represents a total loss of 34 miles out of 58 stream miles in the watershed.

DWP's diversions severely affected the ecosystem of Mono Lake. Since 1941, the lake's level dropped over 40 vertical feet and its volume shrunk over 2 million acre-feet, endangering the Mono Lake brine shrimp (*Artemia monica*). Shrinking water levels caused landbridges to form between the mainland and the islands, allowing coyotes and other predators access to California gull nesting sites. Historical Pacific Flyway counts indicate that Mono Lake and its associated spring-fed wetlands once hosted hundreds of thousands of ducks and geese during fall migrations; presently only about 10,000 waterfowl utilize Mono Lake. Toxic alkali dust rising from the exposed lakebed on windy days obscures scenic vistas and threatens human health. Mono Basin air quality has violated state and federal air quality standards for particulate matter. Once renowned trout fisheries have been devastated by years of water diversions.

In the 1980s and 1990s, a series of court orders required LADWP to stop water diversions from the Mono Basin and to implement stream and waterfowl habitat restoration plans for the Mono Basin. The management level for the lake has been set at 6,392 feet; it is expected to take 20 years or more for the lake to reach that level. Extensive information on the natural and political history of Mono Lake and the Mono Basin is available at www.monolake.org.

Due to its unique natural features, Mono Lake has received several special recognitions. In 1981, it was designated as the Mono Lake Tufa State Reserve (a State Park Unit); in 1984, it was designated as the Mono Basin National Forest Scenic Area. In 1991, the lake was designated as an International Reserve in the Western Hemisphere Shorebird Reserve Network (WHSRN). Mono Lake was designated a WHSRN Reserve for the large numbers of migratory shorebirds, particularly Wilson's phalaropes, which use the lake as an essential stopover on their migratory journeys. As a result of these designations, Mono Lake has become an important recreational/tourist destination.

The hydroelectric power resources of the Mono Basin have been extensively developed by the Southern California Edison Company (SCE), which operates hydroelectric plants on Rush, Lee Vining and Mill creeks. These hydroelectric facilities use small storage reservoirs in the upper reaches of these streams and from these reservoirs, water is diverted into penstocks and released back into the streams below powerhouses, near the floor of the basin. Losses of fish and wildlife habitat in these streams due to hydroelectric diversions have been significant. Equally significant, aesthetic impacts have been caused by these diversions due to the containment of water that would otherwise round down these steep cascading streams (Felando, 1987).

Most of the hydroelectric potential in the Mono Basin has already been developed. Three small hydro projects have been proposed in the basin in recent years on Wilson Creek, Lee Vining

Creek and Lee Vining Creek's Warren Fork. The small hydro project on Wilson Creek (the "Paoha" project) was recently approved by the Federal Energy Regulatory Commission (FERC). The proposed "Leggett" project on Lee Vining Creek was recently denied by FERC; it is possible that the project proponent may appeal FERC's decision. One small hydro project at the Conway Ranch is also currently being pursued. This project would use water from an existing diversion of water from Virginia Creek in the Walker Basin.

The major residential areas in the Mono Basin are June Lake, located southeast of Mono Lake along the June Lake Loop and Lee Vining, located along the western edge of Mono Lake. The June Lake Public Utility District (JLPUD) supplies water for domestic uses to 396 customers in June Lake (Mono Local Agency Formation Commisssion [LAFCO], 1987). The district obtains its water from Twin Springs Creek and June Lake. The JLPUD currently has sufficient supplies to satisfy the needs of its customers; however, it has not yet identified a supplementary long-range source of water that will most probably be needed to satisfy future growth (Mono LAFCO, 1987). The "Down Canyon" portion of the June Lake area is served by a variety of public, semi-public and private water providers, most of whom also use surface water supplies. Some of these systems have difficulty providing adequate service due to limited water supply, faulty distribution facilities and/or low water quality. The Forest Service has identified a need to develop a plan for the water supply systems in that area (USFS, 1982).

In Lee Vining, domestic water is provided to customers by the Lee Vining Public Utility District (LVPUD), which obtains its water supply from springs in Lee Vining Canyon. In emergencies, the district also has the ability to tap into the LADWP aqueduct system. The capacity of the District's system has not yet been quantified; since Lee Vining has experienced very little growth in the past 30 years, water supply capacity problems have yet to emerge (Mono LAFCO, 1987). However, recent changes in state law have forced the Lee Vining PUD to develop additional water sources in order to meet state requirements for water quality.

There is a large underground aquifer in the Mono Basin. This aquifer encircles Mono Lake and underlies an area of about 195 square miles exclusive of the area occupied by the existing lake. The groundwater aquifer is known to extend to a depth of 950 feet below the ground surface. The groundwater storage capacity of the aquifer, extending from 20 feet to 220 feet below the ground surface, is estimated to be about 3,400,000 acre-feet (CDWR, 1964). However, a portion of this storage is lower in elevation than the surface of Mono Lake. Should the groundwater levels drop below the lake level, the saline waters of the lake might seep into the fresh water aquifer and contaminate it (CDWR, 1960).

OWENS RIVER BASIN

The Owens River Basin begins just south of the Mono Basin. It occupies the southern portion of Mono County and extends into Inyo County. The basin's western boundary follows the county line running along the crest of the Sierra Nevada. The eastern boundary is formed by the White Mountains. The Owens River originates south of Deadman Summit at Big Springs on Deadman Creek; Glass Creek, with headwaters below the San Joaquin Ridge, is a feeder stream of the Owens River. The LADWP's Mono Craters Tunnel terminates approximately 2-1/2 miles downstream of Big Springs on the Arcularius Ranch. LADWP's diversions from Mono Basin are released into the Owens River Basin here. South of Big Springs, the Owens River flows across Long Valley and empties into Long Valley Reservoir (Crowley Lake). This 183,000-acre-foot reservoir, the largest in Mono County, is used to provide storage for LADWP's Mono County water diversions (CDWR, 1960). Crowley Lake is also fed by several tributaries of the Owens River. These streams include Hilton Creek, McGee Creek, Convict Creek, Hot Creek (including Mammoth Creek) and Deadman Creek. These streams flow directly out of the Sierra Nevada and into Long Valley. Another stream, Rock Creek, is artificially diverted by LADWP into Crowley Lake.

In addition to its storage functions, Crowley Reservoir is a valuable recreational resource. It is a popular fishing lake and is often used by water skiers, wind surfers, sailors and other recreational boaters. In order to provide greater water storage and ensure adequate water supply in drought years, the Department of Water and Power has proposed to increase the height of Crowley Reservoir by 20 feet. The proposed enlargement would increase the reservoir's storage capacity by approximately 130,000 acre-feet, increasing the reservoir's ultimate storage capacity to about 314,000 acre-feet. This represents a 71% increase over the current storage capacity of 1,893,465 acre-feet. LADWP believes that the enlarged reservoir would increase its runoff control in wet years and provide greater recreation opportunities due to the larger reservoir size (Vorster and Fishbain, 1987).

LADWP proposes to fill the larger reservoir with "surplus" water from the Upper Owens River watershed. The Department has stated that enlargement of Crowley would not cause them to increase diversion from Mono Basin (Bucholtz, 1987). However, this claim has not been substantiated through the preparation of a specific management plan for the reservoir or an environmental impact report.

Enlargement of Crowley Lake could have a number of potential adverse environmental impacts as well as some benefits. Adverse impacts would include inundation of wetlands and valuable bird and wildlife habitat and increased seismic hazards (Felando, 1987). Project benefits could include increased drought protection for LADWP and increased water area and shoreline length for the existing recreational uses. Moreover, if the reservoir is managed prudently, the increased available storage capacity may allow LADWP to reduce its Mono Basin water diversions in dry years. The impact of these reduced diversions could be offset by greater diversions in wet years with storage of these increased wet-year diversions provided by a larger reservoir. The management of an enlarged Crowley Reservoir and its interrelationship with LADWP's Mono Basin exports is discussed in a recent study conducted by Peter Vorster and Larry Fishbain of Philip Williams and Associates (1987).

OWENS RIVER GORGE

The Owens River Gorge, a high gradient, steep-walled section of the Owens River, is located below Crowley Lake. Historically, releases from Crowley Lake have been diverted into hydroelectric conduits in this gorge and used to generate electricity at three power plants in the gorge. The gorge has been almost entirely dewatered by these diversions and its once abundant fishery has been decimated (CDWR, 1981). Below the gorge, LADWP exports water through a series of reservoirs, canals and the Owens River in Inyo County. This exported water is eventually diverted into the Los Angeles Aqueduct and transported to Southern California.

Currently, flows in the Gorge and LADWP's water rights in the Gorge are the subject of litigation between Mono County and the people of California and LADWP and the State Water Resources Control Board. State Fish and Game Code §5937 states that, in order to protect fisheries, streams below dams cannot be dewatered. LADWP's compliance with this statute and the validity of its current water rights, is the heart of the litigation. The same Fish and Game Code Section has been used successfully to rewater streams in the Mono Basin. All parties involved in the Owens Gorge litigation have agreed to work out a settlement; they are still in the process of negotiating an interim flow agreement prior to negotiating a permanent flow agreement.

MAMMOTH LAKES BASIN

The county's largest – and only – incorporated community, Mammoth Lakes, is located along Mammoth Creek in the Mammoth Lakes Basin. Runoff from the surrounding mountains drains into numerous lakes in the Mammoth Lakes Basin. The lakes drain into Mammoth Creek, which flows through the community of Mammoth Lakes. Near Hot Creek Hatchery, it joins Hot Creek, which flows across Long Valley into the Owens River upstream of Crowley Lake. As it flows through Long Valley, Hot Creek is influenced by the valley's natural geothermal springs.

The primary consumptive uses of water in the Mammoth Lakes area are domestic. These needs are serviced by the Mammoth Community Water District (MCWD). The district derives its water supplies primarily from surface water sources within the Mammoth Lakes Basin. It employs Lake Mary in Mammoth Lakes Basin as a storage reservoir. MCWD also operates several groundwater wells to supplement its surface supplies during dry years and heavy use periods.

A significant amount of development has occurred in the Mammoth Lakes area in recent years and the Mammoth Lakes population continues to grow. This development, along with consecutive drought years, has put a strain on the water supplies of the MCWD. The severity of this problem became particularly apparent during the summers of 1987, 1988, 1990 and 1991 when, due to extreme low water conditions, MCWD had to impose mandatory water use restrictions.

In response to this problem, MCWD has been aggressively attempting to secure additional water supplies. The main thrust of its efforts has been to augment its existing surface water supplies in the Mammoth Lakes Basin with groundwater obtained from new wells. Groundwater availability in the Mammoth Lakes area is highly variable due to the abundance of faults and the heterogeneous rocks and soils in the area. Moreover, the groundwater is sometimes tainted by the presence of contaminating minerals (Kuykendall, 1987). The MCWD has been reasonably successful in its current groundwater explorations, as it recently drilled several new wells that will be tied into its distribution system. In addition to groundwater exploration, the MCWD is investigating the possibility of obtaining additional surface water rights and storage capacity.

The Long Valley Groundwater Basin occupies an area of about 102 square miles and is known to extend to a depth of 32 feet below ground surface (CDWR, 1964). The estimated total groundwater storage capacity of the basin is about 160,000 acre-feet. It is believed that subsurface outflow occurs from the Long Valley Groundwater Basin into Owens Valley (CDWR, 1960).

BENTON, HAMMIL AND CHALFANT VALLEYS

The Benton, Hammil and Chalfant valleys form a northern extension of the Owens Valley. The three valleys form a single watershed that is tributary to the Owens River (Williams, 1979). The valleys are bounded on the east by the White Mountains and on the west by the southeast sloping lava flows of the Volcanic Tablelands and the Benton Range.

Runoff from the White Mountains, the Volcanic Tablelands and the Benton Range flows into these valleys and ultimately drains into the Owens Valley, in Inyo County. Streams originating in the White Mountains contribute most of the runoff in this watershed. The streams draining the slopes on the western side of this watershed generally do not contribute much water to the area. All of these drainages are ephemeral, except for the reach immediately downstream of Benton Hot Springs, which contains a small, year-round, seepage flow. An ephemeral wash drains the length of the watershed from Benton to Laws in Inyo County. This wash is the main stem of the drainage system and, during periods of heavy precipitation, it conveys floodwaters downstream (Williams, 1979). Most of the runoff in this basin is either captured as surface water and used for irrigation on local farms, or it drains into the valley's deep alluvium and is captured as groundwater.

Most agricultural and domestic water supplies in these valleys are derived from underground aquifers (Williams, 1979). Groundwater movement generally follows the surface topography and there is a net movement of groundwater from north to south from the Benton Valley through the Hammil Valley into the Chalfant Valley. Some of the unrecovered groundwater in these valleys flows underground to the Owens Valley.

The primary crop is alfalfa, although carrots, some potatoes and garlic are also in production. Many of the farmers in these valleys use a mixture of surface water and groundwater to irrigate their crops. Their surface water supplies are obtained from small streams that drain the White Mountains and from natural springs. Despite the fact that many of the areas farmers use some surface water supplies, virtually all of them depend on groundwater to fulfill the intensive irrigation requirements of alfalfa production. Groundwater supplies in the area are adequate to meet current needs with a possible surplus to accommodate a reasonable amount of future growth (Williams, 1983).

Groundwater levels are seasonally affected by variations in precipitation, but they are also affected by pumping drawdown and indirectly by the diversion of streamflow on the alluvial fans that would normally recharge the aquifer. In the Benton Valley, no water table data is available, but groundwater levels appear to be stable with depths to groundwater at approximately 30 to 40 feet. In the Hammil Valley, water table levels have been dropping since the mid-1960s as irrigation pumping has increased. In the Chalfant Valley, only a small amount of pumping takes place and water levels have thus experienced only a small decline (Williams, 1983). The declines in the Hammil Valley have been caused primarily by an increase in the amount of agricultural land put into production. It is estimated that at the current level of agricultural production, the groundwater table in the Hammil Valley will stabilize within 50 feet of the present level. The decline in groundwater levels in the Chalfant Valley is caused mainly by LADWP's pumping of groundwater in Laws. Since 1970, LADWP has pumped an average of 17,000 acre-feet per year from this area. Given this rate of pumping and the present land use conditions, it is estimated that groundwater levels in the Chalfant Valley will experience an additional decline of less than 10 feet (Williams, 1979).

Maintenance of a stable water table level is of critical importance in this region because agriculture is extremely dependent on groundwater and pumping costs are directly dependent on the depth of the water table. Deeper water is more expensive to pump and presently many local farmers are finding it increasingly difficult to farm profitably. In fact, several farms have recently been forced out of production (Daynes, 1987). The critical water resource issue in these three valleys is not the presence or absence of adequate water; rather, the critical water issue is economic because of the high costs associated with using groundwater for agricultural production. Farmers are currently attempting to gain a reduction in the electrical rates charged for groundwater pumping (Moss, 1987). Concern over possible exportation of groundwater from the area led to the formation of the Tri-Valley Groundwater Management District in 1990.

FISH SLOUGH

Fish Slough, located in southern Chalfant Valley, is a unique wetland that straddles the border of Mono and Inyo counties. Fish Slough is the last portion of the Owens Valley floor that remains relatively unaffected by man's influence. It provides critical habitat for the Owens Pupfish, federally listed as endangered. Fish Slough also provides protected habitat for three additional species of fish, unique to the Owens Valley. Fish Slough was identified by the Bureau of Land Management (BLM) as an Area of Critical Environmental Concern and a special management plan has been developed for the area (BLM, 1986). Although it has not been well documented, apparently there is a potential for groundwater pumping in the Chalfant Valley to adversely affect water levels in Fish Slough. The possibility of constructing a dam and reservoir on Fish Slough was investigated in the early 1900s. The dam was subsequently shown to be uneconomical and unsafe because it would be located on Bishop Tuff, a material through which water moves easily. It would also have been located in a seismically active valley. Furthermore, it was found that the reservoir would have large evaporation losses. Finally, Fish Slough drains an area very low in rainfall and highly absorptive in character, so that natural flow at the dam site would be minimal. The amount of water that could be captured would be only about 10,000 acre-feet (CDWR, 1960).

GROUNDWATER BASINS AND RECHARGE

As well as the three major surface water basins described above, there are seven groundwater basins, mostly containing alluvial materials and Pleistocene lake deposits, wholly or partially within Mono County. All of these valleys contain man-made or natural lakes or marshes that are an integral part of the aquifers of the adjacent valley fills with the exception of Fish Lake Valley where most of the drainage and uses are in Nevada. Figure 12 shows the valleys and their drainage areas. Their major characteristics are summarized in Table 35.

Recharge of these basins occurs by four different processes, the most important of which is recharge along stream channels where long-term flow is sustained by the gradually melting snowpack in the upper reaches of the Sierra Nevada and White Mountains. Recharge also occurs along ephemeral stream channels. The other three processes include recharge from infiltration of direct precipitation; from lakes and ponds; and, artificially, from flood irrigation of fields.

Antelope Valley Basin, a 30-square-mile basin containing Topaz Lake, is drained by the West Walker River into Nevada. The groundwater basin in Antelope Valley is the only significant source of groundwater in the West Walker Basin in California. The other groundwater basins in the West Walker watershed are small and of little developable value. A possible exception exists in Slinkard Valley, where extensive deep alluvium has been found. The estimated underground storage capacities of aquifers in the Antelope and Slinkard Valleys are 160,000 and 72,000 acre-feet, respectively, at depths between 10 and 100 feet. Groundwater recharge in Antelope Valley comes from high infiltration along the major stream channels of the Little Walker River, and Lost Cannon, Deep and Molybdenite creeks, and the recharge of irrigation water.

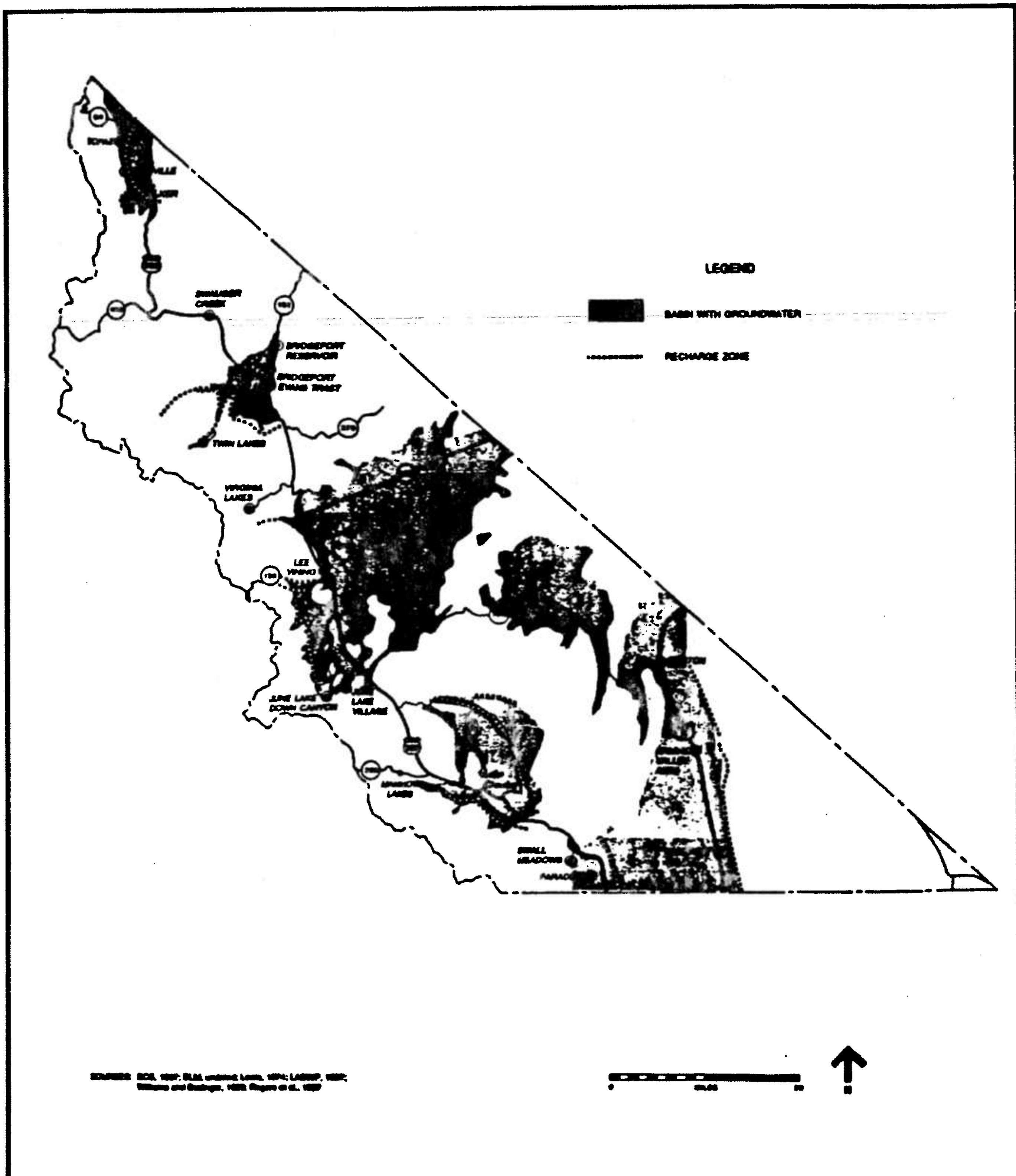
Bridgeport Valley Basin is a 20-square-mile basin drained by the East Walker River into Nevada. Like Antelope Valley on the West Walker River, Bridgeport Valley receives recharge from instream flows of major tributaries to the East Walker River as well as a significant recharge from the numerous diversion dams and ditches used to irrigate the 20,300 acres of pasture in the basin. A third source of recharge to the valley fills of the Bridgeport Valley is the infiltration from Bridgeport Reservoir when the water level in the reservoir is rising. During periods of drawdown, the reservoir produces a net loss to the groundwater storage in the immediate vicinity of the lake.

Mono Valley Basin is a 250-square-mile, internally drained basin that supports Mono Lake with an average rainfall of 10 inches per year. Most of the rainfall runoff that reaches the valley fills and Mono Lake is derived from the high precipitation zones of the Sierra Nevada, which supply 88% of the runoff in the basin (LADWP, 1984). The average annual precipitation of nine inches across the valley fills and lake surface is not sufficient to create runoff. Due to the high infiltration rates of the valley fills and the sparse rainfall available, runoff events are rare.

Adobe Lake Valley is a 60-square-mile basin east of Mono Lake with internal drainage that flows into Adobe Lake and Black Lake. This drainage basin is relatively undeveloped. There is a lack of information on this basin due to the fact that the lands of the basin receive an average of less than six inches of rainfall a year and the runoff produced is all very ephemeral. Groundwater recharge occurs principally along the minor washes that drain this valley into Adobe Lakes and Black Lake. Most of the precipitation that occurs on the alluvial soils infiltrates and is evapotranspirated back into the atmosphere.

Long Valley Basin is a 120-square-mile basin situated in Long Valley Caldera. It serves as the headwaters of the Owens River system. Rainfall averages 20 inches per year with most of the precipitation occurring in the upper reaches of the Sierra Nevada range in the form of snow. The slow release of large volumes of water from melting snowpack provides the major surface flows

FIGURE 12
GROUNDWATER BASINS AND RECHARGE ZONES



of the basin. The hill and mountain zones to the north and east of the valley floor have less than 12 inches of precipitation. Precipitation amounts over the alluvial fills of the Long Valley basin are less than 15 inches per year. Most of the recharge in this basin occurs along the lower reaches of the stream channels of Hilton Creek, McGee Creek, Convict Creek, Hot Creek (including Mammoth Creek) and Deadman Creek.

Benton/Hammil/Chalfant Valley Basin is a 250-square-mile basin drained by Fish Slough into the upper reaches of the Owens Valley. Surface water flow is southward from the Benton Valley to Hammil and then into Chalfant Valley. A water balance for Chalfant Valley shows a net water balance outflow from the Chalfant Valley of 13,700 acre-feet per year and a net water balance outflow from the Hammil and Benton valleys of 5,900 acre-feet per year (Nolte and Associates, 1980); 91% of the water balance comes from runoff from the White Mountains east of the valley. This runoff is in small stream channels that are perennial at the higher elevations but are ephemeral on the lowest reaches and seldom flow to the center of the valley. All of this water infiltrates into the fill material and becomes recharge to the basin fills of the Hammil/Chalfant basin. The groundwater of this basin is the primary source of supply to the wetlands of Fish Slough.

Fish Lake Valley is a northward draining alluvial valley. It includes 35 square miles within the southeastern tip of Mono County. Recharge within this basin occurs primarily from the rapid infiltration of channel flow on the eastern slopes of the White Mountains. These stream courses have steep profiles and drain the limited snowpack of the White Mountain range.

EXPORT OF GROUNDWATER

Although the Los Angeles Department of Water and Power (LADWP) diverts surface water from tributaries to Mono Lake and the Owens River system for export, the only groundwater that it exports from Mono County is the estimated 12,000 acre-feet of "tunnel-make" that enters the Mono Craters diversion tunnel connecting LADWP facilities in Mono Lake Basin to the Owens River Basin.

SHALLOW GROUNDWATER

Areas with shallow groundwater can be difficult to drain and may allow spilled materials to reach the groundwater aquifer, thereby contaminating it. In addition, shallow groundwater may contribute to liquefaction during seismic events. For purposes of identifying areas where shallow groundwater could be a problem, the U.S. Soil Conservation Service (1982) mapped areas shown in Figure 21 (see Appendix A). These areas include generally flat land in valley bottoms, where the groundwater table is within 20 feet of the surface. Groundwater beneath higher, more steeply sloping areas can rise during intense rainfall or rapid snowmelt and contribute to landslides, but these areas are not shown on the shallow groundwater maps.

LONG VALLEY HYDROLOGIC ADVISORY COMMITTEE

The use of water resources, including geothermal resources, in Long Valley Caldera is a major resource management issue in Mono County. There is a consensus that more information about the hydrologic regime would help decision-makers, land managers and users of the resource in their long-range utilization plans for the area. Accordingly, the Long Valley Hydrologic Advisory Committee (LVHAC) has been established under the auspices of the Mono County Energy Management Department to bring together, in an advisory capacity, representatives of agencies that have hydrology-related permitting authority or operations and parties with proposed or current activities which could affect hydrologic systems within Long Valley Caldera. The primary activity of LVHAC is to oversee a hydrologic monitoring program, described in Table 36. The monitoring program is designed to help determine baseline conditions in the hydrologic systems, changes to the systems and factors that may affect the systems (LVHAC, 1988).

One method for estimating how much water is available is to analyze the water budget for Long Valley. This is conceptually a simple process of evaluating how much water flows into the system, how much flows out and what changes occur in storage within the system. In reality, the calculations are difficult to perform because much of the information is unmeasured and must be estimated. Furthermore, the boundaries of the system must be defined. The most recently published water budget for Long Valley above Long Valley Dam (the dam that forms Lake Crowley) is shown in Table 37 (Sorey et al., 1978). Within the accuracy of the estimate, the drainage basin was approximately in balance during the period 1964 to 1974.

The most significant source of error in the water budget is likely to be the lack of information about recharge and discharge to and from groundwater reservoirs - both shallow groundwater and the deeper geothermal reservoir(s). During the period 1964-74, there were apparent water losses of about 25,000 acre-feet/year in the Mammoth Creek, Laurel Creek and the upper Owens River drainage basins. A significant part of these losses may have been recharge to the deep hydrothermal system (Sorey et al., 1976). It is possible that hydrothermal water flows out of the Long Valley under the southeastern part of the caldera. Neither the possible recharge to nor discharge from the geothermal reservoir has been quantified or included in the water balance.

TABLE 35
SUMMARY OF GROUNDWATER INFORMATION

Basin Name	Basin Description	Well Yield Max.	Well Yield Avg.	Depth Zone (feet)	Storage Capacity (acre-feet)	Usable Capacity (acre-feet)	Current and Potential Development	Degree of Knowledge	Problems
Mono Valley	A 250-square-mile basin with internal drainage. Younger alluvium and glacial deposits.	80	35	20-220	3,400,000	---	Limited for domestic, industrial and livestock use. A limited potential for additional development.	Superficial for geology and hydrology. Limited for water quality.	Locally, poor quality for domestic and irrigation use. High TDS, boron and percent sodium.
Adobe Lake Valley	A 60-square-mile basin with internal drainage. Younger alluvium.	---	---	20-120	320,000	---	Limited for irrigation and domestic use. A potential for limited additional development.	Superficial for geology in west and limited in east. Limited for hydrology and water quality.	Locally poor quality for domestic and irrigation use. High fluoride, boron, percent sodium and arsenic from hot springs.
Long Valley	A 120-square-mile basin containing the headwaters of the Owens River. Younger alluvium and glacial deposits.	250	90	20-120	160,000	---	Limited for ground water export, irrigation, industrial, livestock and domestic use. A high potential for additional development.	Limited to moderate for geology and water quality. High for hydrology in Inyo County.	Locally poor quality for domestic and irrigation use. High fluoride, boron, percent sodium and arsenic from hot springs.
Owens Valley	A 128-square-mile basin drained by the Owens River. Younger Alluvium. Benton/Hammil/Chalfant valleys in Mono County.	9,000	1,500+	20-1,000	30,000	---	Limited for domestic, irrigation and livestock use. A potential for limited additional development.	Limited for geology, hydrology and water quality.	Locally high in fluoride marginal for domestic use.
Fish Lake Valley	A 43-square-mile basin drained by Cottonwood Creek. Extends into Nevada. Younger alluvium.	---	---	50-150	320,000	---	Limited for domestic, irrigation, and livestock use. A potential for limited additional development.	Limited for geology, hydrology and water quality.	Artesian wells in central portion of the Valley contain high boron and fluoride concentrations.
Antelope Valley (Topaz)	A 36-square-mile basin drained by West Walker River. Younger alluvium.	---	---	20-120	340,000	---	Limited for irrigation use. A potential for moderate additional development.	Limited for geology, hydrology and water quality.	Artesian wells in central portion of the Valley contain high boron and fluoride concentrations.

Change table 17 contents 1994 (A) (B)

[ABLE 35 (continued)

Basin Name	Basin Description	Well Yield Max.	Well Yield Avg.	Depth Zone (feet)	Storage Capacity (acre-feet)	Usable Capacity (acre-feet)	Current and Potential Development	Degree of Knowledge	Problems
Bridge-port Valley	A 100-square-mile basin drained by Robinson Creek and the East Walker River. Younger alluvium.	---	---	20-120	280,000	---	Limited for irrigation, domestic and stock use. A potential for moderate additional development.	Limited for geology, in north half, superficial in south half. Superficial for hydrology and water quality.	None known.
Slinkard Valley	A basin drained by Slinkard Creek.	---	---	10-100	72,000	---	Limited for domestic, livestock use and wildlife use.	Superficial for geology and hydrology. Limited for water quality.	None Known.

SOURCE: California Department of Water Resources. 1975. California Ground Water Bulletin No. 118.

TABLE 36
LONG VALLEY HYDROLOGIC ADVISORY COMMITTEE MONITORING PLAN

Sites	Purpose	Type[a]	Frequency[b]
Mammoth Creek			
Mammoth Creek at Hwy 395	In conjunction with MCF, to quantify Casa Diablo thermal water input to Mammoth Creek.	F, C[c]	Q
Mammoth Creek Flume at Old Hwy 395	To obtain continuous flow record in Mammoth Creek west of Chance Meadow and to quantify Casa Diablo thermal water input to Mammoth Creek.	F C[c]	C Q
Mammoth Creek above Hot Creek Hatchery	Detect possible changes in water chemistry between MCF and hatchery springs inflows. To quantify Mammoth Creek flow at east end of Chance Meadow.	F C[c]	C Q
Fish Hatchery Springs			
AB & CD group springs at Hot Creek Hatchery	Detect changes in flow, temperature and water chemistry.	F,T C[c], I	C Q
H-2, 3 group springs at Hot Creek Hatchery	Detect changes in flow, temperature and water chemistry.	F,T C[c], I	C Q
Hot Creek Hatchery domestic water supply	Quantify domestic water use from AB supply springs.	Q	M
Hot Creek Gorge Springs			
Hot Creek above swimming area	Upstream site for salinity-gain measurements to calculate flow of thermal springs in gorge.	F, C_L	M
Hot Creek Flume	Downstream site for salinity-gain measurements.	F, C_L	M
Hot Creek Gorge springs	Detect variations in thermal spring chemistry for calibration of salinity-gain measurements.	C_L I	Q A
Observation Well near Hot Creek	Detect pressure, temperature and chemical changes in reservoir supplying thermal water to the gorge hot springs.	A, W T_P C[c], I	C A A
Piezometers 1, 2 and 3	Determine groundwater stream's interaction near cooling-water makeup wells.	W	M

TABLE 36 (continued)

Sites	Purpose	Type[a]	Frequency[b]
Mammoth/Chance Power Plant			
Observation Well	Detect reservoir pressure, temperature and chemical changes that migrate outside the production well field.	W W Tp, C[cd] I[c]	C (first year); M (after one year)
New production & injection wells for Mammoth Chance well field	Determine reservoir characteristics and changes due to production and injection.	C[c], I	S[e]
Casa Diablo Power Plants			
Colton Spring	Detect changes in spring flow, temperature and chemistry caused by wells supplying geothermal power plants.	F T C[cd], I	C M S
Observation Well SF 65-32	Detect reservoir pressure, temperature and chemistry changes that migrate outside the production well field.	W,W Tp, C[c] I	C (first year); M (after one year)
Production and injection wells for MP-I and new wells for MP-II and PLES-I	Determine reservoir characteristics and changes due to production and injection.	C, I	S[e]
Regional Monitoring Sites			
Big Alkali Lake Spring	Monitor moderate-temperature thermal spring outside the area likely to be influenced by geothermal well pumpage and injection for detection of changes in background conditions.	F, T C, I	M S
Little Hot Creek Spring	Monitor high-temperature thermal spring outside of area likely to be influenced by geothermal well pumpage and injection for detection of changes in background conditions.	F, T C, I	M S
Precipitation gauges at Mammoth Ranger District Office and South County Offices	Provide record of quantity of rain and snowfall.	P	D

TABLE 36 (continued)

NOTES:

a) Type of Data:

- A—atmospheric pressure
- C—chemistry components given in footnote c
- C_L—limited chemistry (B, CI, F, specific conductance and temperature)
- F—flow of springs or streams
- I—isotrophic analyses (0 18/16, D/H, ^3H)
- P—precipitation
- Q—quantity of water
- T—temperature
- T_p—temperature profile
- W—water level and/or pressure

b) Frequency:

- C—continuous or at 15 minute intervals
- D—daily
- M—monthly
- Q—quarterly
- S—semiannually
- A—annually

c) pH, alkalinity, chloride, fluoride, nitrite-nitrate, phosphorus, sulfate, ammonia, calcium, magnesium, strontium, sodium, potassium, silica, boron, arsenic, lithium, mercury, iron, manganese, dissolved solids, oxygen isotopes, hydrogen isotopes, tritium.

d) If well completion allows and regulatory agencies approve.

e) Analysis for selected wells. Following drilling, company will provide pressure and temperature profiles and data from short-term flow injection tests. During development, continuously monitor well discharge and injection rates, downhole pressure. Well head temperature and injection pressures to be taken daily.

SOURCE: LVHAC, 1987.

WATER BUDGET FOR LONG VALLEY

The use of water resources in Long Valley is a major resource management issue in Mono County. The major factors that contribute to its importance are:

- Hot Creek Hatchery, the most important hatchery in the Eastern Sierra, depends on springs that flow from shallow groundwater and are influenced by flows from the deeper geothermal reservoir;
- streams and springs throughout the area are important to recreational activities, especially fishing;
- several developments proposed for the Long Valley area would increase use of water for domestic purposes and irrigation;
- existing and proposed geothermal projects extract heat from the geothermal reservoir, which may have the potential to affect the thermal components of springs; and
- water is exported from Long Valley by LADWP.

TABLE 37
WATER BUDGET FOR LONG VALLEY DRAINAGE BASIN FOR WATER YEARS 1964 TO 1974

Inflow	cfs		acre-feet/year	
Owens River[a]		181		132,000
Hot Creek at the gorge[b]	63.9		46,300	
McGee Creek		32.8		23,800
Convict Creek	28.4		20,600	
Hilton Creek		12.1		8,800
Rock Creek Diversion[c]	10.3		7,500	
Laurel Creek[d]	5.9		4,300	
Crooked Creek	4.0		2,900	
Precipitation on Lake Crowley[e]	5.9		4,300	
Ungauged inflow[f]		38.5		28,000
Total inflow (rounded)	383		279,000	
Outflow		cfs		acre-feet/year
Main venturi at Long Valley Dam		341		248,000
Evaporation of shallow groundwater[g]	17.9		13,000	
Evaporation from irrigated grassland[h]	15.2		11,000	
Evaporation from Lake Crowley[i]		16.6		12,000
Owens River gorge, Main Weir	4.3		3,100	
Groundwater loss to regional system	3.9		2,800	
Change in reservoir storage, 1964 to 1974		-3.2		-2,300
Total outflow (rounded)	396		287,000	

NOTES:
a) Includes water imported from Mono Lake basin: 92,000 acre-feet/year average for the 11-year period of record.
b) Includes discharge from Hot Creek Hatchery springs and hot springs in Hot Creek gorge.
c) Period of record: 1966 to 1974 water years.
d) Period of record: 7/70 to 7/73, from CDWR (1973).
e) Average 1 inch on 5200 acres of lake surface.
f) Includes recoverable water from ungaged drainage and all spring discharge except as described in b) above.
g) From 26,000 acre area where water table is less than about 8 feet.
h) Same as from a lake 27 inches; 4700 acres irrigated.
i) Average 27 inches from 5200 acres lake surface.

SOURCE:
Sorey et al., 1978.

WATER QUALITY*

SEDIMENTATION

Water quality in Mono County is generally excellent because a large percentage of the water is derived from the melting snowpack of the Sierra Nevada and most of the land is undeveloped. The primary contaminant to water quality is sediment from a variety of sources. Grazing livestock that damage fragile soils of riparian areas contribute significantly to degradation of water quality. In areas where access to streams is difficult and consequently a few points are heavily overused, the vegetation can be destroyed with a resulting loss of resistance to erosion.

The BLM has cited over-grazing as a significant pollution problem from both the standpoint of sediment loading to water courses and the destruction of meadows (BLM, undated). During moderate to high-intensity storm events, the sediment loading from damaged areas adjacent to stream channels is very high. The diversion of water that reduces streamflows can cause livestock to concentrate at easily accessible locations and further aggravate the problem. Heavy sediment loading can occur at construction sites when loose soils are not artificially retained on the site (Burkham, 1978). Although construction has the potential to produce sediment in quantities similar to that produced by livestock damage, the timing and magnitude of construction can be controlled and remedial steps can be taken before erosion occurs. The Lahontan RWQCB set a standard of 80 mg/l for suspended sediment concentrations (Lahontan RWQCB, 1971). In addition to this general standard, the RWQCB has set specific erosion control standards for construction sites in the Mammoth/Hot Creek watershed above 7,000 feet in elevation that would disturb more than one-quarter acre of soil. The regulation of livestock grazing to eliminate water quality impacts is a much more difficult task.

Other sources of sediment contamination are mining activities, high-intensity recreational area use and runoff from developed areas (BLM, undated). Catastrophic sedimentation is always a possibility from earthquakes, severe flooding or forest fire damage to watersheds.

The primary negative effect of sedimentation is on fisheries. Aquatic breeding habitat is occasionally heavily impacted by high silt and sediment loads in the water (Setmire, 1984). Sediment also tends to accumulate in the many lakes and reservoirs and becomes a problem when cleaning operations are undertaken to remove the accumulated material. Standard practice has been to remove the sediment to an adjacent area where the material will not wash back into the same reservoir. This often means that if the material is inadequately stabilized, it will wash into the channel below the impoundment and create a sediment problem downstream.

CHEMICAL AND BACTERIAL CONTAMINATION

The contamination of surface waters or groundwater by sewage is another major concern that results from human activities. Most of the small communities and rural households in the county use septic systems for sewage treatment. When these systems fail, they can allow wastewater to escape and reach groundwater or flow into adjacent streams, thus presenting health hazards to downstream users (Setmire, 1984). Contamination of surface water with animal wastes from livestock grazing can limit its usefulness as a source of drinking water. Since many of the small communities of Mono County depend partially or completely on surface water supplies, the potential contamination of these waters is a major problem. The potential also exists for agricultural lands to contribute leachate from fertilizers and pesticides to water in areas like Antelope Valley, where groundwater provides some recharge to the water supply of a downgradient reservoir.

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*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific information on water quality.

Chemical nutrients that enter reservoirs and impoundments allow for conditions that stimulate algal growth and the creation of algal mats that float on the surface of the lakes (Setmire, 1984). These chemicals also contribute to a high biochemical oxygen demand (BOD), which can cause eutrophication of lakes and damage fish populations.

The quality of groundwater in Mammoth Lakes, Chalfant Valley, Antelope Valley and Bridgeport Valley appears to be good, with the presence of some trace minerals. The groundwaters of Long Valley are notable for their high levels of boron and arsenic and occasional high iron content (Lewis, 1974).

Groundwater use can be considered relatively minor in Mono Basin. Small amounts are used for domestic purposes and for stock watering. Because such waters have a slow flow path in the subsurface and are in contact with the mineral grains for a longer time, they have a higher mineral content than the associated surface streams which recharge the groundwater aquifer. Nevertheless, the total dissolved solids (TDS) values are usually under 500 ppm. Some of the wells near Mono Lake have very high salinity that is caused by lake water left behind when Mono Lake receded. The springs in Mono Basin acquire some mineralization before they discharge (LADWP, 1984).

WASTEWATER MANAGEMENT

The restricted use of the federal lands in Mono County has precluded widespread development. The preservation of this environment has enabled the area to become one of the state's finest recreational areas. The many lakes and perennial streams originating as runoff from the Sierra Nevada support a diversified ecology, provide a source of domestic water supply and serve as the principal source of groundwater replenishment. The excellent opportunity for year-round outdoor recreation has led to the establishment of numerous campgrounds and residential-recreational developments, many of which rest on the shallow alluvial or glacial deposits in the higher elevations of the watersheds. These soils, as well as the high groundwater tables in the alluvial valleys, have limited the effectiveness of subsurface waste disposal systems. Numerous system failures have posed nuisance conditions, public health hazards and/or adverse nutrient additions to surface waters. Wastewater management in Mono County consists of five basic regional community collection, treatment and disposal systems serving Lee Vining, June Lake, Mammoth Lakes, Hilton Creek and Bridgeport. A sixth non-public system serves the U.S. Marine Corps base at Pickel Meadow with a 100,000-gallon-per-day (GPD) package plant and associated leach fields. These systems will be augmented with other local facilities when concentrations of population, economic conditions or water quality problems warrant conversion to community systems. Considering the widespread inadequacy of individual septic tank/leach field systems, areas relying on such systems must be monitored.

The population centers that are potentially of concern are listed below:

Lee Vining Area: Waste disposal facilities in the Lee Vining Public Utilities District are adequate for the present needs of its service area. The U.S. Forest Service has installed chemical recirculating toilets at campgrounds in the Lee Vining Creek watershed.

June Lake Loop: The June Lake Loop, located in the Rush Creek watershed, is served by individual leaching units and a community waste disposal system operated by the June Lake Public Utilities District which serves the community of June Lake. The high groundwater table, shallow soil cover and poor percolation characteristics of the soils are not suitable for the disposal of sewage by leaching. Malfunction of these facilities is a hazard to public health, a source of nuisance, a cause of eutrophication of Gull Lake and a general degradation of water quality in the area. A wastewater treatment plant providing secondary treatment is located northeast of Grant Lake Dam.

Mammoth Area: At Mammoth Lakes, geohydrologic conditions are not suitable for percolation of wastes and individual sewage disposal units do not function reliably. The Mammoth Community Water District operates a semi-tertiary treatment facility for the community of Mammoth Lakes and transports the filter sludge to the Mono County sludge disposal facility (Saari, 1988).

Crowley Lake: The Hilton Creek Community Services District operates a centralized system that serves residents of the Hilton Creek area. Residents of Long Valley, McGee Creek, Aspen Springs, Tom's Place and Sunny Slopes use septic systems and leach fields.

U.S. Forest Service: In the past, campgrounds have relied primarily on septic tank and leach field systems for the disposal of wastewater. However, the system's poor performance has posed a potential pollution threat to the quality of surface water. Presently, waste disposal practices are being upgraded to eliminate the use of leach fields. The Hilton Creek campground area is now served by a treatment pond system.

Bridgeport Area: The Bridgeport Public Utilities District operates a centralized system with a sewerage treatment lagoon. Portions of this service district are still on septic tanks.

Coleville Area: All of the residents of this area are still using septic tank and leach field operations.

Walker Area: All of the residents of this area are still using septic tank and leach field operations.

Pickel Meadow: The U.S. Marine Corps Mountain Warfare Training Center at Pickel Meadow has its own 100,000 GPD package waste treatment plant and leach fields. This is not a public system and is available for use only by the Marine Corps base.

CHAPTER 14
GEOTHERMAL RESOURCES*

Geothermal energy is generated by natural processes within the earth's interior. It occurs at great depths everywhere, but appears at the earth's surface in active volcanoes, hot springs, fumaroles and geysers. This energy has been used for centuries for religious and health uses and in more recent times to generate electricity, process foods and other consumer goods and to heat and cool buildings.

TYPES OF GEOTHERMAL RESOURCES

Geothermal resources are divided into three major categories: <u>hydrothermal</u> systems with naturally occurring hot water; <u>geopressured</u> systems with pressured hot brines containing natural gas; and <u>hot dry rock</u> systems, where water must be injected. The discussion below focuses on hydrothermal systems, because geopressured and hot dry rock systems are too experimental to contribute significantly to energy production within the next 15 to 20 years.

The U.S. Geological Survey has divided hydrothermal resources into three categories: high temperature resources above 300°F (about 150°C); moderate temperature resources between 195 and 300°F (90 to 150°C); and low temperature resources less than 195°F (90°C). High temperature resources are generally suitable for development of electric power; moderate- and low-temperature resources may be used for industrial, agricultural and space heating and cooling applications. High temperature resources are further subdivided into those that have just steam (vapor-dominated systems) and those with steam and water (liquid-dominated systems).

Use of a geothermal resource typically involves pumping hot water or naturally flowing steam from the reservoir through production wells extracting useful heat and injecting the cooler effluent fluids back into the ground.

The geothermal resources in Mono County, shown in Figure 13, are mostly moderate and low temperature fluids. High temperature, liquid-dominated systems are found at Casa Diablo, where fluids about 330-340°F are used to generate electricity at the Mammoth Pacific I power plant and at Shady Rest, where temperatures up to 400°F have been found.

HYDROTHERMAL RESOURCE DEVELOPMENT

Exploration

Development of geothermal resources begins with exploration, usually conducted in a phased program. The first phase involves screening a large area to identify potential sites for further study and testing activities. Obvious indicators of a potential geothermal resource include hot springs, geysers and fumaroles. Indirect evidence may include volcanic activity, faulting and the presence of hydrothermally altered rocks. Detailed studies of geology; hot spring and well-water chemistry; and the thermal, magnetic and gravity properties of the area are used to identify sites for exploratory drilling. The second phase of exploration includes the drilling and testing of exploratory wells. The test results are analyzed to determine temperatures and production or injection capacities.

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*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific information on geothermal resources.

Mammoth Area: At Mammoth Lakes, geohydrologic conditions are not suitable for percolation of wastes and individual sewage disposal units do not function reliably. The Mammoth Community Water District operates a semi-tertiary treatment facility for the community of Mammoth Lakes and transports the filter sludge to the Mono County sludge disposal facility (Saari, 1988).

Crowley Lake: The Hilton Creek Community Services District operates a centralized system that serves residents of the Hilton Creek area. Residents of Long Valley, McGee Creek, Aspen Springs, Tom's Place and Sunny Slopes use septic systems and leach fields.

U.S. Forest Service: In the past, campgrounds have relied primarily on septic tank and leach field systems for the disposal of wastewater. However, the system's poor performance has posed a potential pollution threat to the quality of surface water. Presently, waste disposal practices are being upgraded to eliminate the use of leach fields. The Hilton Creek campground area is now served by a treatment pond system.

Bridgeport Area: The Bridgeport Public Utilities District operates a centralized system with a sewerage treatment lagoon. Portions of this service district are still on septic tanks.

Coleville Area: All of the residents of this area are still using septic tank and leach field operations.

Walker Area: All of the residents of this area are still using septic tank and leach field operations.

Pickel Meadow: The U.S. Marine Corps Mountain Warfare Training Center at Pickel Meadow has its own 100,000 GPD package waste treatment plant and leach fields. This is not a public system and is available for use only by the Marine Corps base.

CHAPTER 14
GEOTHERMAL RESOURCES*

Geothermal energy is generated by natural processes within the earth's interior. It occurs at great depths everywhere, but appears at the earth's surface in active volcanoes, hot springs, fumaroles and geysers. This energy has been used for centuries for religious and health uses and in more recent times to generate electricity, process foods and other consumer goods and to heat and cool buildings.

TYPES OF GEOTHERMAL RESOURCES

Geothermal resources are divided into three major categories: hydrothermal systems with naturally occurring hot water; geopressured systems with pressured hot brines containing natural gas; and hot dry rock systems, where water must be injected. The discussion below focuses on hydrothermal systems, because geopressured and hot dry rock systems are too experimental to contribute significantly to energy production within the next 15 to 20 years.

The U.S. Geological Survey has divided hydrothermal resources into three categories: high temperature resources above 300°F (about 150°C); moderate temperature resources between 195 and 300°F (90 to 150°C); and low temperature resources less than 195°F (90°C). High temperature resources are generally suitable for development of electric power; moderate- and low-temperature resources may be used for industrial, agricultural and space heating and cooling applications. High temperature resources are further subdivided into those that have just steam (vapor-dominated systems) and those with steam and water (liquid-dominated systems).

Use of a geothermal resource typically involves pumping hot water or naturally flowing steam from the reservoir through production wells extracting useful heat and injecting the cooler effluent fluids back into the ground.

The geothermal resources in Mono County, shown in Figure 13, are mostly moderate and low temperature fluids. High temperature, liquid-dominated systems are found at Casa Diablo, where fluids about 330-340°F are used to generate electricity at the Mammoth Pacific I power plant and at Shady Rest, where temperatures up to 400°F have been found.

HYDROTHERMAL RESOURCE DEVELOPMENT

Exploration

Development of geothermal resources begins with exploration, usually conducted in a phased program. The first phase involves screening a large area to identify potential sites for further study and testing activities. Obvious indicators of a potential geothermal resource include hot springs, geysers and fumaroles. Indirect evidence may include volcanic activity, faulting and the presence of hydrothermally altered rocks. Detailed studies of geology; hot spring and well-water chemistry; and the thermal, magnetic and gravity properties of the area are used to identify sites for exploratory drilling. The second phase of exploration includes the drilling and testing of exploratory wells. The test results are analyzed to determine temperatures and production or injection capacities.

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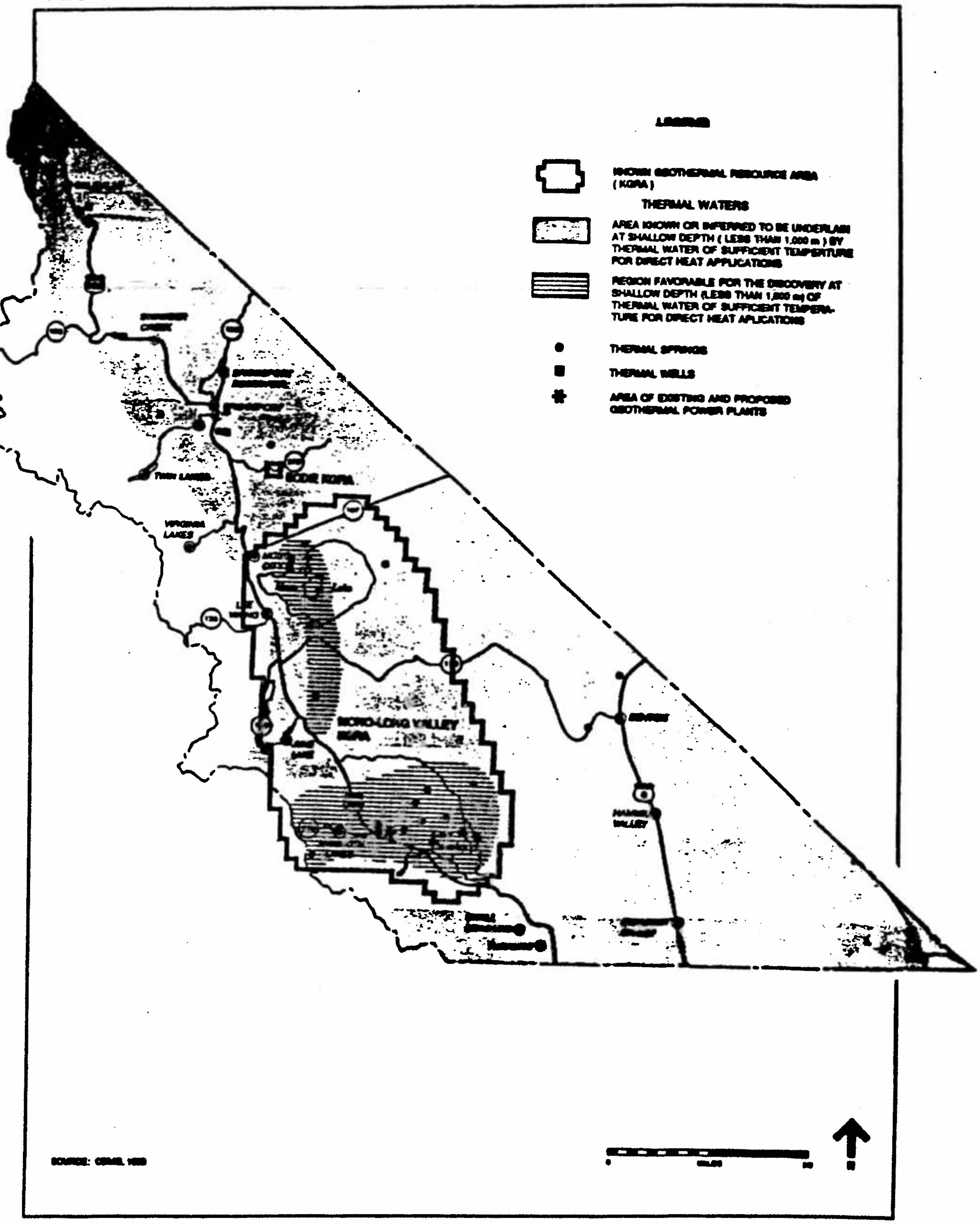
*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific information on geothermal resources.

FIGURE 13
GEOTHERMAL RESOURCES



the presence of hydrothermally altered rocks. Detailed studies of geology; hot spring and well-water chemistry; and the thermal, magnetic, and gravity properties of the area are used to identify sites for exploratory drilling. The second phase of exploration includes the drilling and testing of exploratory wells. The test results are analyzed to determine temperatures and production or injection capacities.

Field Development
If exploration well tests confirm the commercial viability of a field, then wells are drilled for both production and injection, suitably spaced so that the drawdown from each production well will not seriously diminish the temperature or flow rate in other production wells and so that cooler fluid from injection wells does not break through into the production reservoir.

Electric Power Generation
Three basic systems are used to convert geothermal energy into electricity: dry steam, flashed steam, and binary heat-exchange systems. Dry steam systems, the most efficient, use steam directly from production wells to drive a turbine generator and produce electricity. The steam is then condensed and the resulting condensate reinjected. Dry steam is not found in Mono County. The flashed steam system is similar to the dry steam application and next in efficiency. The hot pressurized geothermal fluid is flashed to steam by reducing the pressure and the resulting steam is used to drive a generator. The residual hot water can be used in direct application and/or reinjected. The geothermal resource in Mono County is not at a high enough temperature or pressure to use this method. For example, the fluids used in the Mammoth Pacific I power plant at Casa Diablo could convert 15% of the pumped liquid to steam if the pressure is reduced to one atmosphere. Such a low yield of steam renders this method uneconomic for development of Mono County's hydrothermal resources.

Binary heat exchange systems use hot water to heat a secondary working fluid, such as isobutane. The working fluid vaporizes and drives a turbine generator. The working fluid is then condensed and reused within a closed system. The cooling of the working fluid can be done in a cooling tower using water or in a set of air-cooled condensers. The geothermal fluid is also fully contained in a closed system from production to injection. The Mammoth Pacific I power plant at Casa Diablo is an air-cooled binary system power plant that uses isobutane as the working fluid.

Direct Applications
Geothermal energy can be used efficiently as a direct source of heat, either cascaded from a power plant or used directly from a well. Heat losses from pipelines sometimes require direct uses to be very near the production wells. Space heating can be provided even with low temperature resources (55°F) if a heat pump is used. Cooling of buildings requires minimum geothermal water temperatures of 200°F, but the systems are not usually economically attractive unless driven by steam (Lunis, Blackett, and Foley, 1982). In a cooperative project, Mono County, the U.S. Department of Energy, and the California Energy Commission have drilled an exploratory well at Shady Rest. The Town of Mammoth Lakes and the California Energy Commission are currently investigating the feasibility of direct use of geothermal fluids within the town of Mammoth Lakes.

HISTORICAL SUMMARY OF GEOTHERMAL RESOURCE DEVELOPMENT IN MONO COUNTY[8]

Geothermal energy in the Sierra Nevada has been developed most extensively in Long Valley near Mammoth Lakes. The large complex of geothermal power plants, located at Casa Diablo near the junction of Highways 395 and 203, had a capacity of more than 30 megawatts in 1991.

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[8]Most of this section is from a summary of exploration activity compiled by Pacific Energy dated January 15, 1988.

Written accounts of hot spring activity in the Long Valley area first appeared in 1889, when travelers along the highway between Bishop and Mono Lake bathed at Casa Diablo. In 1930, an attempt to stimulate the flow of geothermal resources at the Casa Diablo Hot Springs Resort by drilling resulted in a jet of boiling water that reached a height of 100 feet. This "geyser" continued to discharge sporadically through the mid-1950s and then subsided.

Commercial geothermal exploration in the region began during the late 1950s and early 1960s when Magma Power Company drilled ten relatively shallow wells on private land at Casa Diablo near the junction of U.S. Highway 395 and the road to the town of Mammoth Lakes. One well was also drilled on Chance Ranch near the site of Hot Creek Hatchery. The Casa Diablo geothermal reservoir was found to be relatively localized in geographic extent and had a maximum temperature of about 340°F, which was too low a temperature for the then available electric power generation technology.

In 1971, the U.S. Geological Survey (USGS) selected the Long Valley as a typical hot water geothermal system. At that time, the USGS began a comprehensive series of studies that included drilling approximately 36 shallow holes within the Long Valley Caldera. None of the holes encountered a geothermal resource with commercially viable temperatures.

In 1971, two deep wells were drilled by special permit from the California State Lands Commission on the shores of Mono Lake: one by Getty Oil on the south and one by Geothermal Resources International on the north as operators for Southern California Edison. The wells were drilled into state-owned land underneath the lakebed to basement rock at a depth of 4,000 feet. Temperatures in the wells were no higher than 150°F. No geothermal resources were encountered.

In 1974, the Bureau of Land Management leased several land parcels in the Hot Creek Gorge area for geothermal exploration and development. In late 1975 and early 1976, Republic Geothermal drilled six shallow holes and the first deep exploration well in Long Valley near Whitmore Springs, northwest of the head of Crowley Lake. The temperature in the deep well at 6,900 feet was 160°F. No fluids were produced.

In 1977, the Ben Holt Company completed a geothermal space heating demonstration project at the Home Lumber Company at Casa Diablo utilizing the wells that had been drilled by Magma Power Company.

In 1979, Union Oil Company, as operator for Magma, drilled two wells at Casa Diablo. The first was a deep exploratory well that reached below the shallow reservoir previously encountered by Magma. The second was on private land at the Clay Pit in Little Antelope Valley northeast of Casa Diablo. The results of these exploration wells were not encouraging and they did not discover any new commercial reservoirs.

Beginning in the early 1980s, Occidental Geothermal began a drilling program in an attempt to locate geothermal resources beneath the resurgent dome situated north and east of Casa Diablo. Numerous wells were completed over a wide area at depths up to several thousand feet. The results of the wells remain proprietary, but appear to have been discouraging.

In 1982, Mono County adopted a geothermal element for the County's General Plan, which encouraged geothermal development when there are positive social, economic or fiscal impacts and there are no extensive environmental impacts, or when mitigation measures adequately remove or reduce the impacts.

In 1982, the first geothermal lease block of approximately 27,000 acres on the Inyo National Forest was offered for competitive lease by the Forest Service. The block lies north and west of Casa

Diablo in an area about six miles square. With the exception of one parcel situated east of Smokey Bear Flat, the bids reflected a lack of enthusiasm for the land on the part of the geothermal industry. Magma Power Company, which held grandfather rights in the region deriving from old mineral claims, matched the bids on several of the leases and acquired the geothermal resource mineral rights.

Also in 1982, Phillips Petroleum Company initiated a geothermal exploration program in the western portion of Long Valley Caldera. This program included coring two intermediate depth exploration holes at locations three and five miles northwest of Casa Diablo. Although one of the wells exhibited a rapid increase in temperature at the bottom of the hole, neither well encountered commercial temperatures.

In 1983, the second lease block in the Inyo National Forest was offered for competitive lease. This block is situated north and west of the first lease block and covers an irregularly shaped area of 85,000 acres encompassing Inyo Craters, Lookout Mountain, Obsidian Dome, Lower Deadman Creek and Mono Craters. Mono Craters were removed from the second lease block because of environmental concerns and were included in the Mono Lake National Scenic Area. Union Oil Company was the successful bidder on the majority of the leases in the second lease block.

In late 1983 and early 1984, Mammoth Pacific drilled five production wells (one was abandoned) and two injection wells during development of the Mammoth Pacific Unit I geothermal power plant project on private land leased from Magma Power Company at Casa Diablo. These wells were in the same vicinity as the ones drilled in the late 1950s and early 1960s by Magma. One of the deep exploratory wells drilled by Union was subsequently utilized by Mammoth Pacific as an injection well.

In 1985, Union Oil Company attempted to establish the commercial potential of its leases that had been acquired in the second lease-block sale. Union drilled an exploration well approximately three miles north of the town of Mammoth Lakes, to a depth of 5,900 feet. Although high temperatures (400°F) were encountered, the well apparently lacked productivity.

In 1985, Sandia National Laboratory began a continuing investigation of the thermal characteristics of the recent volcanic rocks at Inyo Craters. At least four holes have been drilled. The highest recorded temperature is less than 190°F.

In 1986, Pacific Lighting Energy Systems (since renamed Pacific Energy) drilled one commercial production well on the federal lease acquired from Santa Fe Minerals to the south of the Mammoth Pacific Power Plant. The well encountered temperatures similar to the existing wells at Casa Diablo and has the potential to be the most productive well drilled at Casa Diablo to date.

Also in 1986, a scientific investigation team funded by the U.S. Department of Energy, California Energy Commission and Mono County drilled a 2,345-foot-deep hole immediately north of the town of Mammoth Lakes, near the Shady Rest campground. Although this well has never been flow tested, maximum temperature measures ($\pm$ 390°F) and secondary mineralization suggest that a liquid dominated geothermal resource was encountered.

In December 1987 and January 1988, the Town of Mammoth Lakes drilled two temperature gradient wells within the Town limits to depths of 1,610 feet and 1,464 feet and recorded maximum temperatures of 163°F and 174°F, respectively.

In the summer of 1987, Santa Fe Minerals completed three thermal gradient wells in the Long Valley, east of Casa Diablo. Although the results have not been released, Santa Fe has indicated publicly that it has no present plans for further exploration or development in this area.

Of the approximately 90 geothermal wells (including temperature gradient holes) drilled to date in the Long Valley region, only the production wells in the immediate vicinity of Casa Diablo have proven to be commercial.

Table 38 lists some of the exploratory wells mentioned in this discussion as well as others from the Mono Basin.

GEOTHERMAL RESOURCE POTENTIAL IN MONO COUNTY

Assessment of geothermal resource potential done by proponents of geothermal development is generally proprietary, although it is perhaps possible to infer that, except in the Casa Diablo areas, the resources are not economically attractive for power generation given current technology and energy prices.

In summarizing previous work, Sorey, Lewis and Olmsted (1978) report that the eastern part of Long Valley Caldera probably can be eliminated as an attractive geothermal resource, but that the western half likely has major potential. A subsequent study by Higgins et al. (1985) suggests that although shallow thermal fluids are widespread in Mono County, not only are the highest temperature fluids found in the western part of Long Valley Caldera, they may represent recharge by modern meteoric water. The capacity to support sustainable operations by recharge on the basis of present knowledge appears to be potentially feasible only in the western part of the Long Valley Caldera.

POTENTIAL IMPACTS OF GEOTHERMAL DEVELOPMENT

Geothermal development has the potential to cause adverse impacts to surface water quality from surface disturbance or spills of either drilling fluids or geothermal fluids. Temperatures of groundwater supplies could be affected by the pumping of geothermal fluids and injection of the cooler fluids after heat has been extracted. The two KGRAs in Mono County include a variety of important streams and lakes dependent on water quality and water supply. All hot springs, fumaroles and other thermal features depend on geothermal water to some extent. Biota dependent upon water availability, quality or temperature could be affected by changes in surface water and groundwater resources. Disturbed soil, power plants, wellhead facilities and electrical and fluid transmission lines could cause visual impacts. Noise from power plants or wells could disturb nearby sensitive receptors. Policies have been developed in the Conservation/Open Space Element to protect the Hot Creek area. Development is limited in the Hot Creek Buffer Zone (see Figure 14) and the Hot Creek Deer Migration Zone (see Figure 15).

TABLE 38
DATA ON SELECTED EXPLORATORY WELLS IN MONO COUNTY

Name	Location	# of Holes	Depth (m)	Max. Temp. (° C)	Operator
Fales 1	Fales Hot Springs	1	126	38	Magma Power Co.
Bridgeport Geothermal Project	Bridgeport	Several	Average 100-125 all 300	Proprietary	Getty Oil Co.
B-2	Bridgeport Valley	1	107	20	Phillips Petroleum
B-3	Bridgeport Valley	1	152	15	Phillips Petroleum
Bridgeport 1	The Hot Springs	1	300	51	Magma Power Co.
Big Foot 1	Travertine Hot Springs	1	568	Proprietary	Lahontan, Inc.
BA-28	Fletcher Valley	1	152	19	Phillips Petroleum
Strat. Test 2	Fletcher Valley	1	453	41	Phillips Petroleum
Strat. Test 3	Fletcher Valley	1	229	38	Phillips Petroleum
PRC 4572.1	Mono Lake (north shore)	1	745	58	Getty Oil Co.
PRC 4397.1	Mono Lake (south shore)	1	1253	54	Geothermal Resources Int.
Great Western	Paoha Island	1	6098	45	Great Western Oil and Dev. Co.
Dechambeau	Black Point	1	287	67	Unknown
Unknown	Southern Bodie Hills	5	Unknown	Unknown	Bureau of Reclamation
Conduit	Inyo Domes	1	538	80	Sandia
Dike	Inyo Domes	1	759	15	Sandia
BR-1 to BR-6	Benton Area	6	60-90	Unknown	Phillips Petroleum
Long Valley 66-29	Long Valley	1	2109	72	Republic Geothermal
Clay Pit 1	Long Valley	1	1846	147	Union Geothermal
Mammoth 1	Long Valley	1	1604	157	Union Geothermal
OLV-1	Long Valley	1	900	Unknown	Santa Fe Geothermal
PLV-1	Long Valley	1	711	124	Phillips Petroleum
PLV-2	Long Valley	1	640	46	Phillips Petroleum

Source: Higgins et al., 1985.

FIGURE 14
HOT CREEK BUFFER ZONE

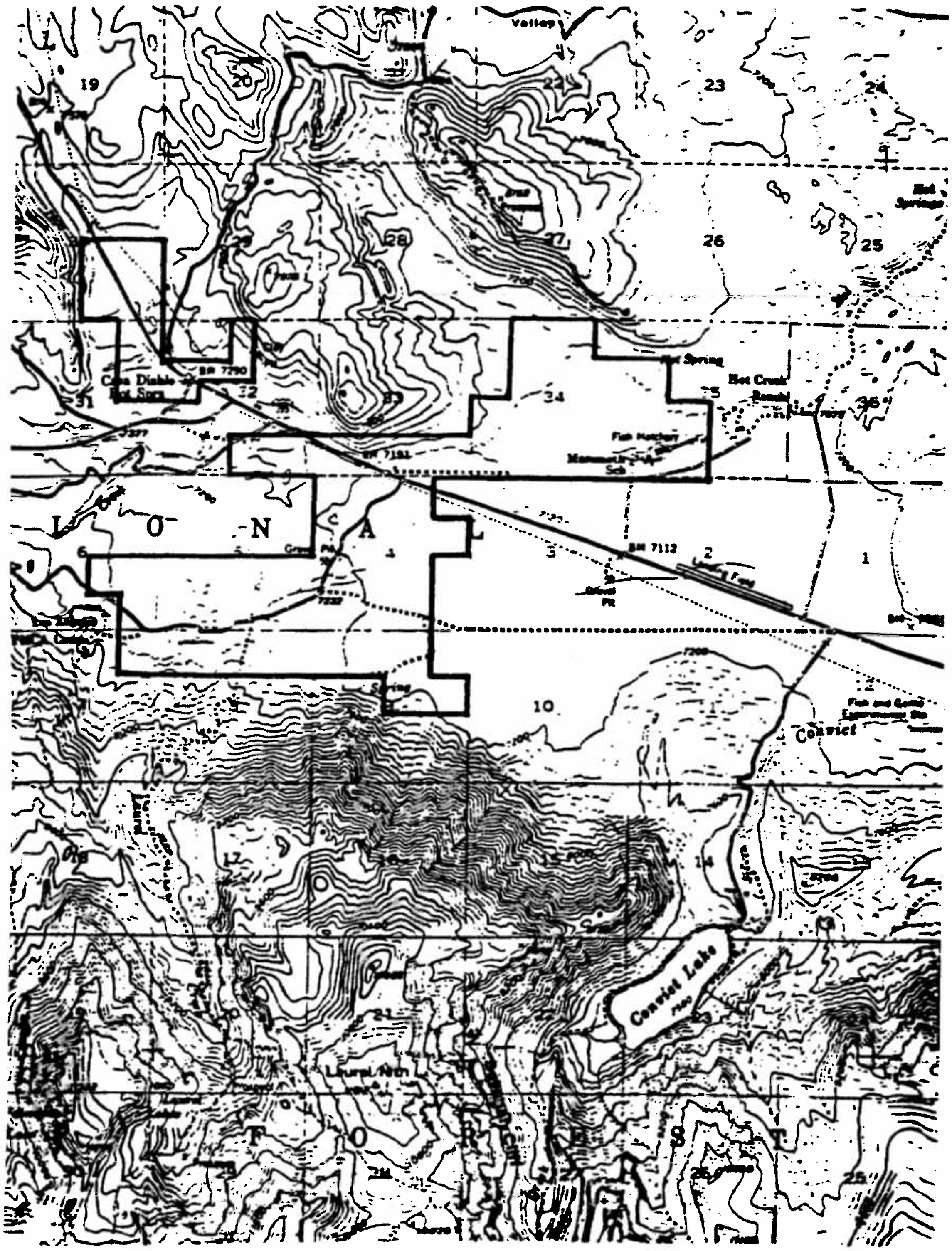
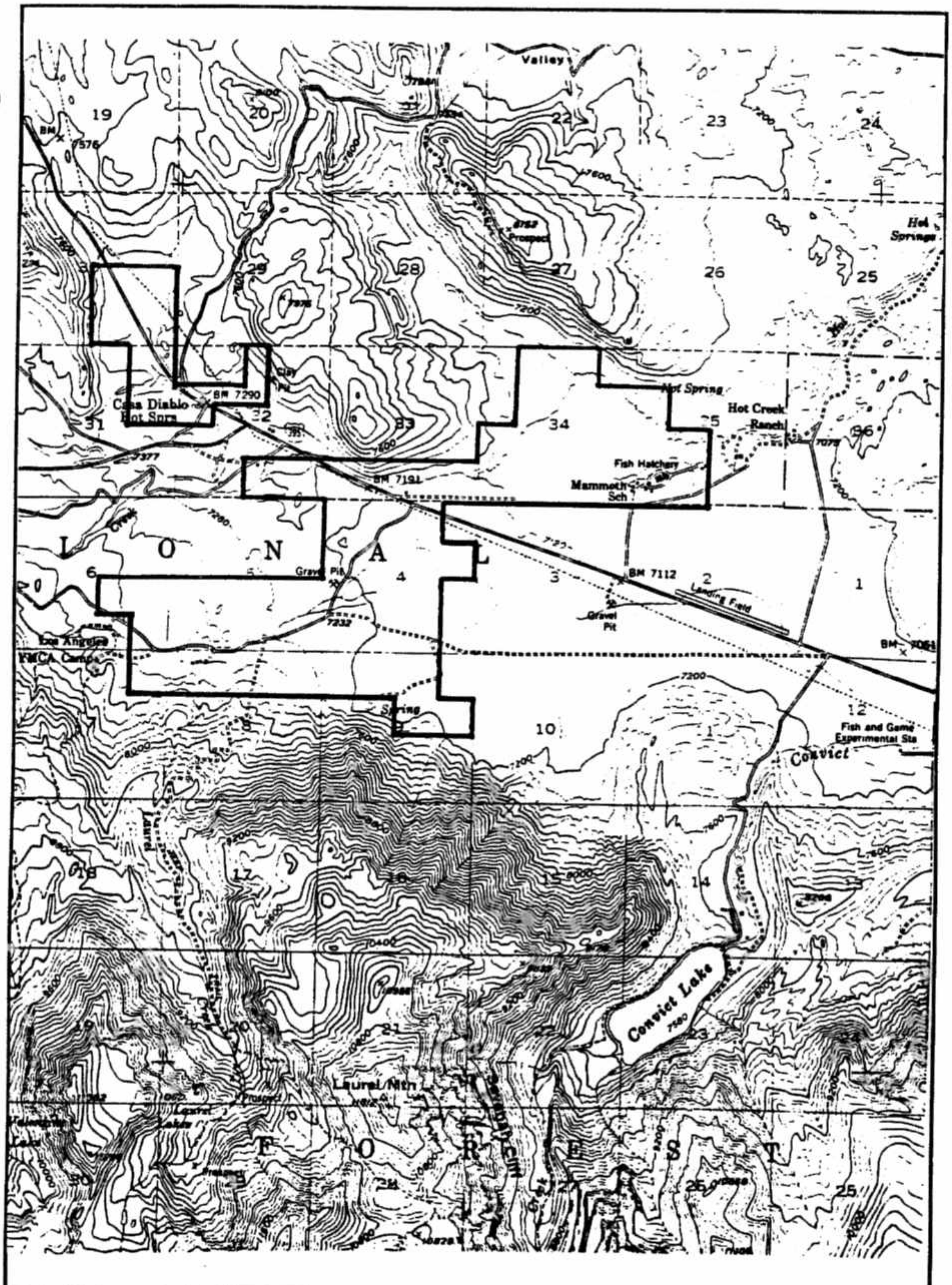


FIGURE 15
HOT CREEK DEER MIGRATION ZONE



Valley
Prospect
Hot Springs
Casa Diablo Hot Sprs
BM 7290
Clay Pit
Hot Spring
Hot Creek Ranch
Fish Hatchery
Mammoth Sch
BM 7191
L O N A L
Gravel Pit
BM 7112
Landing Field
Gravel Pit
Los Angeles YMCA Camps
Spring
Fish and Game Experimental Sta
Convict
Convict Lake
Laurel Mtn
F O R E S T

LAKE

CHAPTER 15
ENERGY RESOURCES*

SOLAR ENERGY RESOURCES

Energy from the sun can be used for heating and cooling or it can be used to generate electricity. Most systems in use today supply hot water to homes or swimming pools or are used for space heating. Electricity can be generated from photovoltaic cells either dispersed in individual projects or in a centralized power plant; at present costs for conventional fuels, it is not economically feasible to supply electrical power commercially from this source. However, Southern California Edison is currently working on supplying power from disbursed units that are connected to the grid. Large increases in the price of conventional fossil fuels or improvements in technology leading to reductions in cost and increases in efficiency of photovoltaic cells could make centralized solar power plants appealing to utilities or developers. Now however, electricity generated from photovoltaic cells is economically feasible only when the user is remote from more conventional supplies of electricity and the costs of transmission lines can be eliminated by using electricity generated on site.

Basic environmental considerations for siting collectors of solar energy systems include the following:

- location and orientation with respect to solar radiation, both direct and reflected;
- visual impacts of the collectors, which are often large and visually intrusive;
- sources of materials which could impair collector performance, such as dust, chemical precipitates, frost or drifting snow;
- strong prevailing winds which could cool the collector and impose severe structural stress; and
- safety factors, such as seismic hazards for tanks of water mounted on rooftops or reflected light that could be distracting to passers-by, especially motorists.

Application of these criteria would be necessary for siting specific facilities in Mono County. This document will not give detailed siting criteria for solar collectors, but will discuss the general assessment of solar energy potential based on solar data published by Lawrence Berkeley Laboratory (Berdahl, 1978).

SOLAR ZONES

California has been divided into 15 "solar zones" on the basis of topography and atmospheric conditions related to solar radiation. The most important atmospheric condition is cloud cover, but air quality and fog are also important. Within each solar zone, a characteristic solar potential is expected to prevail, but there are microclimates within each zone where local solar radiation is different from the overall zone. Mono County is located within Solar Zone 13, an area that extends from north of Woodfords in Alpine County to the southern boundary of Inyo County.

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*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific information on energy resources.

There are 19 solar measurement stations in or near California that have records of sufficient length and accuracy to provide an assessment of solar energy potential. There is one solar station in Zone 13, located in Reno, Nevada, which is approximately 100 miles north of Bridgeport. In addition, data are collected at China Lake in an adjacent zone that can be used for comparison. The data are shown in Table 39.

MONO COUNTY SOLAR ENERGY POTENTIAL

The entire county, subject to the siting constraints listed above, is appropriate for dispersed use of solar energy. Each system must be sized to meet the demands that the structure and its uses would place on the system. The major constraints to common use of solar technology in residential and commercial sectors are (CEC, 1981):

- lack of familiarity with solar technology by builders, developers, designers and building officials;
- high initial costs;
- difficulty in obtaining financing;
- building codes which prohibit or appear to prohibit solar technologies;
- poor reliability of installed systems; and
- unwillingness of renters to invest in improvements to rental property and unwillingness of landlords to make investments that would reduce utility bills if renters pay the bills.

TABLE 39a
MONTHLY SOLAR DATA, RENO, NEVADA

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
SOLAR RADIATION (KBtu/ft^2 per month)													
horizontal surface	23	29	46	59	69	68	72	64	52	39	24	20	556
direct beam (normal incidence)	42	46	61	71	79	73	82	76	69	59	40	38	737
PERCENT OF POSSIBLE SUNSHINE	66	68	74	80	81	85	92	93	92	83	70	63	80
FRACTION OF EXTRATERRESTRIAL RADIATION (K_T)	.54	.58	.61	.64	.65	.62	.66	.65	.65	.62	.52	.52	.61

SOURCE: Berdahl et al., 1978. California Solar Data Manual, California Energy Commission Publication, P500-80-018.

TABLE 39b
MONTHLY SOLAR DATA, CHINA LAKE/INYOKERN

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
SOLAR RADIATION (KBtu/ft^2 per month)													
horizontal surface	31	36	56	68	78	79	77	71	59	46	34	29	644
direct beam (normal incidence)	58	57	79	86	94	94	90	86	78	69	60	57	909
PERCENT OF POSSIBLE SUNSHINE	40	40	30	30	30	10	20	10	10	20	30	30	30
FRACTION OF EXTRATERRESTRIAL RADIATION (K_T)	.64	.65	.70	.72	.72	.73	.70	.70	.70	.67	.66	.64	.69

SOURCE: Berdahl et al., 1978. California Solar Data Manual, California Energy Commission Publication, P500-80-018.

WIND ENERGY RESOURCES

There are numerous areas in Mono County that the California Energy Commission has identified as areas suitable for wind turbine siting (see Figure 16). These areas are characterized by strong and persistent winds where the average annual wind speeds are in excess of 11 mph (CEC, 1985).

To economically convert wind into electricity, large clusters of individual wind turbines are required at any given site due to their conversion efficiency and to the diffuse nature of wind energy. Between each unit an access road must be constructed in addition to a transmission line system. Accompanying the environmental consequences associated with access roads and transmission lines, factors affecting the siting of large wind energy systems include, but are not limited to:

- areas of special biological significance (including rare and endangered species, migration routes, etc.);
- conflicting land use (farmlands, urbanized areas, rural highways, roads, rights-of-way, airports, scenic highways and sites and recreational areas);
- aesthetic considerations; and
- institutional factors (national and state parks, state lands, federal lands (BLM and USFS), established wilderness and wilderness study areas and privately owned land).

Of these factors, it is the aesthetic considerations that are of special interest in Mono County. The clustering of turbines in large groups in sparsely populated areas increases the potential for impact, as well as the need for transmission line corridors and access roads. Aesthetics could be of particular concern if sites are near or adjacent to areas of recreational value. Location of wind turbines may not only cause visual impacts but also may impact an area's economy if the area is dependent on recreational or tourist activity (CEC, 1980).

FIGURE 16
WIND RESOURCE AREAS

HYDROELECTRIC RESOURCES

EXISTING HYDROELECTRIC POWER GENERATION

The five hydroelectric generating stations in Mono County generate power for Southern California Edison (SCE) and the Los Angeles Department of Water and Power (LADWP) utility companies (FERC, 1981). All are located on streams that flow from the east side of the Sierra Nevada (see Figure 17). Some streams that drain the White Mountains have sufficient quantity of water to run small hydroelectric facilities that are known as "Ranch Units." These operations sell excess power to SCE.

The hydroelectric power resources of the Mono Basin have been extensively developed by SCE that operates hydroelectric plants on Rush, Lee Vining and Mill creeks. SCE's plants are all located on Forest Service lands and operate under license from the Federal Energy Regulatory Commission (FERC). These projects divert water at sites associated with agricultural and other diversions dating back to at least the early 1900s. These hydroelectric facilities use small storage reservoirs in the upper reaches of the streams and from these reservoirs, water is diverted into penstocks and released back into the streams below powerhouses, near the floor of the basin. Over the years, loss of fish and wildlife habitat in these streams due to hydroelectric diversions has been significant. Equally significant, aesthetic impacts have been caused by these diversions due to the containment of water that would otherwise flow in the streams (Felando, 1987). There is some disagreement over the environmental and aesthetic impacts of SCE's diversions; SCE believes that these impacts are slight or non-existent, while staff from resource management agencies believe that the impacts are significant. SCE notes that agricultural and mining diversions pre-date its development of hydropower on Lee Vining, Rush and Mill creeks.

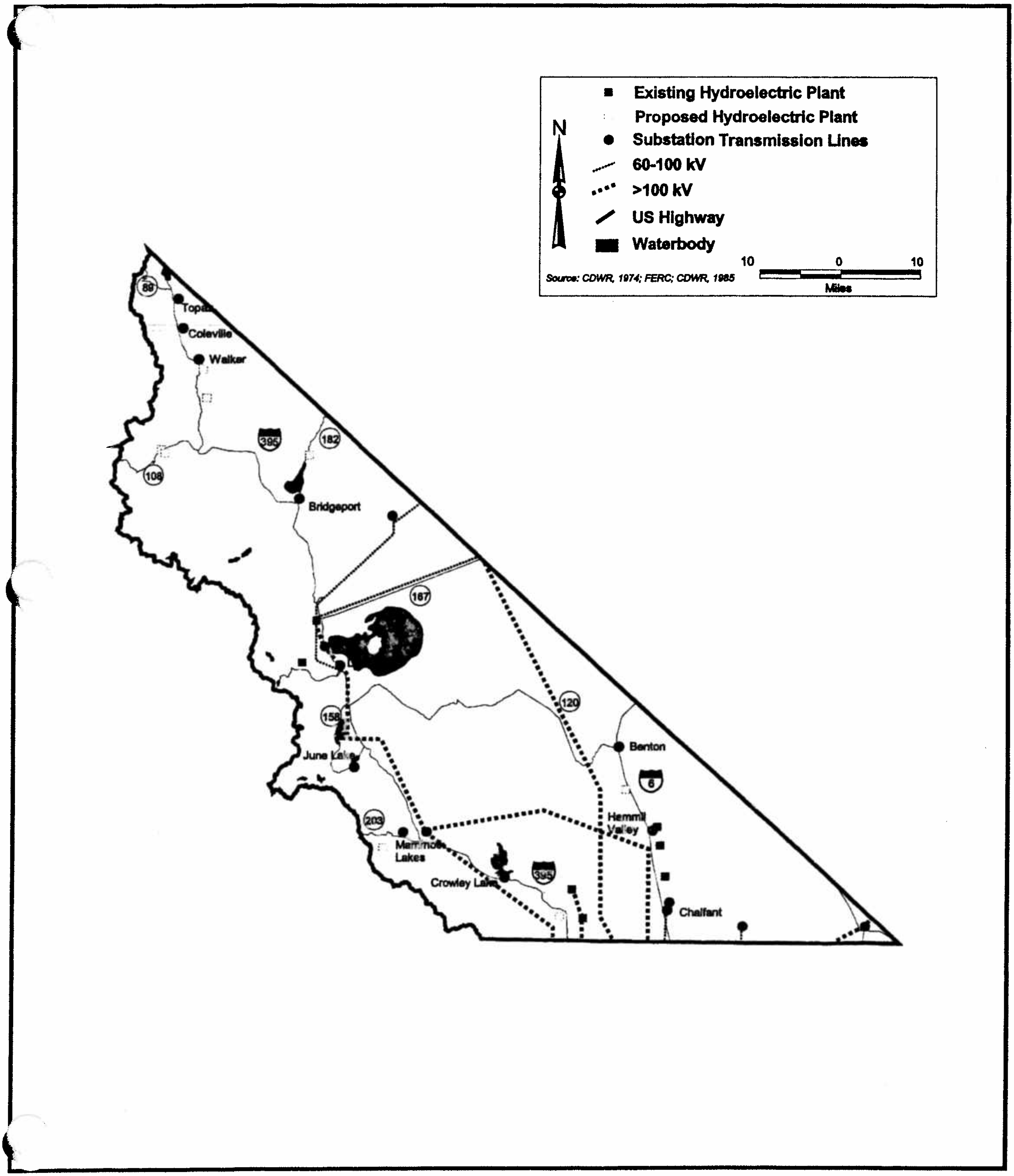
Most of the hydroelectric potential in the Mono Basin has already been developed. Three small hydroelectric projects have been proposed in the basin in recent years on Wilson Creek, Lee Vining Creek and Lee Vining Creek's Warren Fork. The "Paoha" project on Wilson Creek was recently approved by FERC. The proposed "Leggett" project on Lee Vining Creek was recently denied by FERC; it is possible that the project proponent will appeal that decision.

There are three hydroelectric plants in the Owens Gorge. They are the only hydroelectric developments in the Owens Basin within Mono County. Several hydroelectric projects have been proposed for small streams flowing from the Sierra Nevada into Long Valley; however, none of these projects is currently being pursued.

Five small hydroelectric plants are currently operating on Pellisier, Cottonwood, Milner, Leidy and Paiute creeks, which drain the slopes of the White Mountains. These projects are located on high gradient, low volume streams whose flows would otherwise be naturally absorbed into downstream alluvial fans. The Leidy Creek generating facilities are in Nevada, but the penstocks on Leidy Creek are in Mono County on the eastern slopes of the White Mountains. The other four of these plants use streamflows that had been previously diverted into pipelines and canals for irrigation in the Hammil and Chalfant Valleys (Simon, 1986). Since these plants use existing diversions, the impacts associated with their construction have not been significant. The electricity generated by these projects is consumed by their owners for farm operations and/or sold to Southern California Edison (Holton, 1987).

In contrast to most other parts of Mono County, there has been very little hydroelectric development in the Walker River Basin. Currently there is one hydroelectric project operated by the U.S. Marine Corps on Silver Creek. A number of small hydroelectric developments are in the planning and review stages. These projects would be located on the East Walker River, Silver Creek, the Little Walker River and Green Creek.

FIGURE 17
HYDROELECTRIC PLANTS AND TRANSMISSION CORRIDORS



Many of the hydroelectric facilities and their attendant penstocks and diversion structures are under the jurisdiction of the U. S. Forest Service. The Inyo National Forest has addressed some of these concerns in its Forest Plan. The Toiyabe National Forest Plan does not directly address the environmental issues of hydroelectric facilities, but states that any future site development within the Toiyabe National Forest will be opposed (Toiyabe NF, 1986).

TRANSMISSION CORRIDORS

EXISTING TRANSMISSION LINES

The existing transmission corridors in Mono County are shown in Figure 17. Two transmission lines (60-100 kV) that originate in Nevada, come into Mono County from the northeast to meet just west of Mono City. One of these lines runs parallel to Hwy. 167, while the other comes into Mono County northeast of the terminus of Hwy. 270. These transmission lines combine and along with energy generated at a hydroelectric plant west of Mono City, form a transmission corridor (voltage greater than 100 kV) that generally follows U.S. Highway 395 south through the county. At the substation east of Mammoth Lakes, another transmission line leads east into Hammil Valley, then south out of the county.

Another high voltage line (greater than 100 kV) comes into Mono County from Nevada where Hwy. 167 meets the Nevada border and continues in a southeasterly direction into Inyo County.

There is a major transmission corridor near June Lake which may have segments realigned. Mono County, SCE and Inyo National Forest are negotiating to relocate the transmission line that crosses through the campground on Oh! Ridge. The County and SCE agreed not to move the transmission line at the Rodeo Grounds and to place a county-operated ballpark under the transmission lines and to place the 12kv distribution line in that vicinity underground.

PROPOSED CORRIDORS FOR FUTURE USE

On land managed by the Inyo National Forest, electric energy purveyors have expressed their need for a future utility corridor paralleling the major north-south interstate Oregon-Sylmar 750 kV high-voltage direct current transmission line (Inyo NF, 1987).

Future need for more utility corridors in Toiyabe National Forest lands is also expected. Existing utility corridors will be expanded and where possible, new utility corridors will be combined with established roads to reduce acreage devoted solely to rights-of-way (Toiyabe NF, 1987). The Bureau of Land Management (BLM) will include the need for a new utility corridor in its revised Resource Management Plan. The BLM is looking into the possibility of expanding the present north-south high-voltage corridor and the possibility of a new east-west intertie that would pass through Montgomery Pass and the town of Benton (Beehler, 1988).

In the mid-1980s, a major transmission line corridor was proposed for the Tri-Valley area in eastern Mono County. Significant community opposition developed and the corridor was not officially designated.

Senate Bill 2431 (Garamendi, 1988) called for a report on the projected need for additional electrical transmission rights-of-way to be submitted before November 1990, to the Legislature by the State Energy Resources and Development Commission in consultation with the Public Utilities Commission. The report considered whether the state should create transmission rights-of-way, particularly in regard to a trans-Sierra corridor.

POTENTIAL IMPACTS OF TRANSMISSION LINES

Potential impacts of electrical transmission lines include degradation of visual quality; impacts to birds from lines and towers; impacts to biota and water quality due to access roads and tower construction and public health and safety impacts. Public health and safety impacts of transmission lines are not well documented, but there are tentative indications that long exposures to the electro-magnetic fields which surround overhead transmission lines may have some adverse health effects. The extent of these impacts and the possible mechanisms are unknown at present.

ENERGY CONSERVATION

Energy conservation in Mono County is enforced through state regulations that govern the energy-efficiency of new buildings and appliances and is encouraged through voluntary programs sponsored by the local utilities.

ENERGY CONSERVATION STANDARDS

Building Energy Efficiency Standards

The energy consumption of new buildings in California is regulated by the State Building Energy Efficiency Standards, known as "Title 24." (These standards are contained in the California Administrative Code, Title 24, Part 2, Chapter 2-53; enforcement of the regulations is addressed in the California Administrative Code, Title 20, Chapter 2, Subchapter 4, Article 1.) Title 24 applies to all new construction of both residential and non-residential buildings and regulates energy consumed for heating, cooling, ventilation, water heating and lighting.

Compliance with Title 24 can be achieved through either a "performance" or "prescriptive" approach. Title 24 establishes the maximum amount of energy that can be consumed by new buildings (the performance compliance approach), or alternatively, establishes various "packages" of energy-related design features that will satisfy Title 24 requirements (the prescriptive compliance approach). In both cases, there are also certain mandatory requirements that must be fulfilled.

In the performance compliance approach, a building must be designed to consume no more energy than specified in the appropriate energy "budget." The energy budget is based on the building type and size and the climatic zone in which it is located. The calculated energy consumption may exclude energy obtained from "non-depletable" resources.

In the prescriptive compliance approach, a building must comply with design requirements that have been determined to achieve building designs that meet the applicable energy budgets. In this approach, the builder can choose from a variety of alternative component packages which specify features such as insulation, glazing, lighting, shading and water and space heating systems.

The Title 24 Building Energy Efficiency Standards are enforced by Mono County through the permit approval process; implementation of Title 24 is specified in Title 20. The County is required to determine that the proposed construction is designed to comply with requirements of Title 24 prior to issuing a building permit.

As specified in Title 20, applications for building permits are required to designate the compliance approach selected, indicate features and specifications needed to comply with Title 24 and provide plans and specifications demonstrating compliance with the standards. Prior to building occupancy, installation certificates that verify compliance with the State Appliance Energy Efficiency Standards (described below) must be posted. The builder is required to provide to the building owner, manager and original occupants a list of energy-consuming or energy-conserving features and equipment installed and instructions on how to use them efficiently. For new non-residential buildings, the builder is required to provide maintenance information for energy-consuming or energy-conserving features and equipment that require routine maintenance for efficient operation.

Appliance Energy Efficiency Standards
The energy efficiency of new appliances in California is regulated by the State Appliance Energy Efficiency Standards (California Administrative Code, Title 20, Chapter 2, Subchapter 4, Article 4, Sections 1601 through 1608). Title 20 regulates the sale of refrigerators, freezers, air conditioners, space heaters, water heaters, plumbing fittings, fluorescent lamp ballasts and lights. The installation of heating, cooling, water-heating and water-using appliances in all new buildings is regulated through Title 24.

Voluntary Energy Conservation Programs
Electricity is supplied to Mono County by two utilities: Southern California Edison (SCE) and Sierra Pacific Power Company (natural gas service is not available in Mono County). Sierra Pacific provides electric service to a small area in the northernmost portion of Mono County (in the vicinity of Walker and Coleville); SCE provides service to the remainder of the county. Both of these utilities encourage energy conservation and have a variety of voluntary energy conservation programs.

SCE provides informational materials on energy conservation, maintains a toll-free energy conservation information telephone number, provides free home energy surveys (in-home surveys by a SCE representative, telephone surveys and self-completed mail-in surveys are available), provides financial incentives for certain energy-conserving improvements and provides energy conservation assistance to low-income customers. Sierra Pacific provides informational materials on energy conservation to customers and schools, performs free residential and commercial energy audits (residential audits include free low-flow shower heads, hot water heater blankets and pipe insulation) and estimates itemized electricity bills upon request.

CHAPTER 16
NOISE*

DESCRIPTION OF COUNTY NOISE ENVIRONMENT

Major Noise Sources in Mono County

The major noise sources in Mono County are highways, aviation facilities, industrial uses such as batch plants, quarries, mines, woodlots and geothermal plants, construction activities and certain recreational activities. Commonly reported complaints include loud music, noisy private parties and late-night or early-morning construction activity. The complaints received are few in number and intermittent in nature indicating a lack of ongoing, serious noise problems in the area. Noise sensitive receptors, such as local schools and hospitals, are not experiencing excessive exposure to noise. Potential noise impacts, however, are a key concern in the development of mining and geothermal operations.

Highways are a major source of noise throughout the county. In most communities in the county, the highway is the primary artery and major local street in the area; State Routes 6, 158, 182 and U.S. Highway 395 bisect communities throughout the county. These highways are considered low-volume with less than 20,000 vehicles per day. Most of the land uses adjacent to the major thoroughfares in the county are non-residential uses. Tables 40, 41 and 42 contain data on current traffic levels for highways in the county. Table 43 shows the average noise level emitted by various vehicles.

Air traffic is another significant source of noise in Mono County. Noise near airports typically consists of brief, loud events separated by periods of relative quiet. Aviation facilities in Mono County include the Bridgeport (Bryant Field) and Lee Vining airports, which are general aviation, non-commercial facilities with low numbers of flights. A larger number of private aircraft and a small commercial aircraft service operate out of the Mammoth/Yosemite Airport, which has an average of 56 operations per day forecast for 2007. There are also several helipads in Mono County at the hospitals and certain Forest Service ranger stations. Table 44 provides data on the operations of the aviation facilities in the county.

In addition to the three airports, there are several helipads throughout the county. They are located at the medical facilities (Mammoth Community Hospital in Mammoth and the Medical Clinic in Bridgeport), at the Pickel Meadow Marine Corps Base and scattered throughout the county for use by the Forest Service, the BLM and CDF for firefighting.

Noise contours for each of the airports in the county show that residential land uses are generally not impacted by aircraft noise. In Bridgeport, a small area of single-family residential development is within the 55 CNEL[9] contour on the eastern edge of the airport. The Master Plan for Bryant Field notes that the average annual aviation noise contours for existing and future conditions are essentially the same in magnitude since aircraft volume is projected to increase but

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*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific information on noise.

[9] Community Noise Equivalent Level (CNEL)-- The average equivalent A-weighted sound level during a 24-hour period. Weighting factors are applied that place greater importance on evening sound levels (i.e., 5 decibels are added to noise events occurring between 7 and 10 p.m.) and even greater importance upon nighttime sound levels (i.e., 10 decibels are added to noise events occurring between 10 p.m. and 7 a.m.).

not a significant amount. The airport at Lee Vining is located outside of the town and does not affect any residential uses.

Mammoth/Yosemite Airport is also located outside of the town. Residential uses at the Hot Creek Hatchery and Hot Creek Ranch are outside of the 55 CNEL contour projected for 2007 in the Airport Master Plan, including the area that would be impacted by development of a crosswind runway. The Airport's Master Plan notes that the airport's noise impact area would not expand significantly even if the Airport should receive regular service by medium-size turbine-powered aircraft. However, the Mammoth/Yosemite Airport Master Plan and Airport Land Use Plan both note that the airport's noise impacts extend beyond the 55 CNEL noise impact area. Noise contours projected in the Town of Mammoth Lakes Noise Element (1996) confirm that even with a crosswind runway and the use of Boeing 737 and 757 jets by the year 2015, residential uses at Hot Creek Hatchery and Hot Creek Ranch would remain outside of the 55 CNEL contour.

A few noise generating industrial sites, including batch plants and woodlots, operate in Mono County. Potential intrusive noise impacts are largely mitigated by the fact that batch plants are either situated within an industrial district or on public land outside of developed areas; wood lots, although allowed in commercial zones along with high density residential uses, are subject to a use permit which imposes conditions of operation.

Existing mining operations in the county include a silver mine, a pumice mine, several sand and gravel operations, a cinder mine, a kaolin mine and a sericite mine. All of these operations are located outside of developed area and noise impacts from these sites are minimal. The existing geothermal plants at Casa Diablo are also located away from developed areas, although their proximity to the Mammoth Lakes area has in the past resulted in some complaints about noise. All mining operations, including geothermal development, are subject to permits that impose conditions of operation, including mitigation of potential adverse noise.

In the past, noise at the geothermal power plant at Casa Diablo was perceived as a problem. During January 1987, 24-hour average noise levels were measured near Mammoth Pacific I, a 7-megawatt power plant. At a distance of 150 feet from the plant, an average noise level of 78 dBA, Ldn[10], was measured. Major sources of noise from the plant include expander turbines, air-cooled condenser fans and piping between the expanders and condensers. Noise control retrofitting of this plant reduced noise levels by 10 to 12 dBA. Conditions placed in the permits for the Mammoth Pacific II and PLES-I geothermal plants require that operational noise not exceed a certain dBA.

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[10]Decibel (dB)—Environmental noise is measured in units of decibels (dB),0 on a logarithmic scale. The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sound of different frequencies. The normal range of hearing extends from about 3 dBA to about 140 dBA. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness; a 3-dBA increase is barely noticeable to most people outside a laboratory setting. Environmental noise fluctuates in intensity over time and is typically described as a time-averaged noise level.

Day-Night Average Level (Ldn)--The Ldn is a measure of the average A-weighted sound level obtained during a 24-hour period. A weighting factor is applied to nighttime sound levels (i.e., 10 decibels are added to noise events occurring between 10 p.m. and 7 a.m.) to account for the greater sensitivity of people to noise during that period.

Heavy recreational usage in the county is another source of noise emissions. Numerous recreational vehicles and motorcycles, as well as snowmobiles and motorboats, adversely impact the county noise environment. There are no railroads traversing Mono County.

TABLE 40
ANNUAL AVERAGE DAILY TRAFFIC (AADT)

Route	1989 AADT	1998 AADT	Change 1989-1998
On US 395 North of Jct. SR 108 (Antelope Valley)	4,300	2,750	-1,550/-36%
On US 395 North of Jct. SR 182 (Bridgeport Valley)	5,200	3,300	-1,900/-37%
On SR 167 East of US 395 (Mono City)	650	210	-440/-67%
On US 395 North of North Limits (LeeVining)	4,850	3,500	-1,350/-28%
On SR 158 West of US 395 (June Lake)	1,350	1,450	+100/+7%
On US 395 South of Casa Diablo (Long Valley)	6,000	5,500	-500/-8%
On US 6 South of SR 120 West (Benton/Hammil)	1,200	1,200	0
On US 6 North of Laws (Chalfant)	1,750	1,550	-200/-11%

SOURCE: Caltrans, Traffic Volumes on California State Highways, 1989 & 1998.

TABLE 41
PEAK HOUR TRAFFIC--STATE AND FEDERAL HIGHWAYS

Route	1989 Peak Hour	1998 Peak Hour	Change 1989-1998
On US 395 North of Jct. SR 108 (Antelope Valley)	810	510	- 300/37%
On US 395 North of Jct. SR 182 (Bridgeport Valley)	900	550	-350/39%
On SR 167 East of US 395 (Mono City)	65	40	-25/38%
On US 395 North of North Limits (LeeVining)	1,400	640	-760/54%
On SR 158 West of US 395 (June Lake)	200	260	+60/30%
On US 395 South of Casa Diablo (Long Valley)	1,050	970	-80/8%
On US 6 South of SR 120 West (Benton/Hammil)	110	130	+20/18%
On US 6 North of Laws (Chalfant)	200	170	-30/15%

SOURCE: Caltrans, Traffic Volumes on California State Highways, 1989 & 1998.

TABLE 42
PERCENT OF HIGHWAY TRAFFIC THAT IS TRUCKS

Route	1995 Percent Total	2000 Percent Total	Change 1995-2000
On US 395 North of Jct. SR 108 (Antelope Valley)	5		
On US 395 North of Jct. SR 182 (Bridgeport Valley)	5		
On SR 167 East of US 395 (Mono City)	NA		
On US 395 North of North Limits (LeeVining)	5		
On SR 158 West of US 395 (June Lake)	12		
On US 395 South of Casa Diablo (Long Valley)	5		
On US 6 South of SR 120 West (Benton/Hammil)	14		
On US 6 North of Laws (Chalfant)	14		

NOTE: "NA" indicates data not available.
SOURCE: Caltrans District 9, Environmental Investigations.

TABLE 43
AVERAGE NOISE LEVEL EMITTED,
MOTOR VEHICLES & AIRCRAFT

Motor Vehicles (from 50 feet)	Decibels	Aircraft (from 1000 feet)	Decibels
Standard Sedan	64-76	Single Engine Prop	72-85
Compact Car	70-80	Multi Engine Prop	75-86
Sports Car	70-87	Commercial Prop	79-87
Pick-up Truck	70-85	Executive Jet	84-95
2-3 axle Truck	80-89	Turbine Light Utility Helicopter	69
4-5 axle Truck	85-95		
Bus	70-87		
Motorcycle ($\leq$350cc)	64-85		
Motorcycle (>350cc)	74-95		
Trail Bike	80-105		
Snowmobile	70-105		
Outboard Power Boat	65-90		
Inboard Power Boat	75-105		
Chainsaw	72-82		

Source: CA Transportation Plan Issue Paper II, Part III-Noise, 7/76.

TABLE 44
AIRPORT ACTIVITY INFORMATION

A. Aircraft Fleet Mix (# of operations)

	1980	1990 Master Plan Projections	1995 Master Plan Projections
Bryant Field and Lee Vining[1]			
Single Engine Prop	6,400	8,000	8,800
Multi-Engine Prop	2,100	2,300	2,400
Helicopter	500	700	700
Total	9,000	11,000	12,000
Mammoth Lakes Airport			
Single Engine Prop	24,000	33,000	20,000 (in 2007)
Multi-Engine Prop	8,000	11,000	----
Small Turboprop	5,400	2,600	----
Executive Jet	-----	800	600 (in 2007)
Total	37,400	47,400	20,600 (in 2007)

B. Flights Per Day (Mean Day Operations)

	1980	1990 Master Plan Projections	1995 Master Plan Projections
Bryant Field/Lee Vining	25	30	36
Mammoth Lakes Airport	103	142	78

C. Busy Hour Aircraft Operations

	1980	1990 Master Plan Projections	1995 Master Plan Projections
Bryant Field/Lee Vining (98% day, 1% evening, 1% night)	9	11	12
Mammoth Lakes Airport (90% day, 5% evening, 5% night)	28	39	N.A.[2]

NOTES:
1. No statistics are available for Lee Vining Airport. Since Lee Vining is similar in operation to Bryant Field, the Bryant Field statistics are being used to represent both facilities.
2. Not available.

(This table will be updated as soon as new information becomes available-2001.)

Community Noise Survey—Baseline 1980-1981 Study
Prior to 1987, the State Noise Element guidelines required the quantification of noise exposure levels to be presented in terms of day-night average level (Ldn) noise contours[11]. Due to the unreliability of modeling techniques for low volume roadways, staff conducted a noise-monitoring field survey for each of the community areas within the county. During the fall of 1980 and the winter and spring of 1981, a community noise analyzer was leased from the U.S. Environmental Protection Agency to accomplish this task. Approximately 30 noise-monitoring sites located throughout the county were selected. Noise sensitive land uses, as well as several key sites along major thoroughfares, were each monitored for three consecutive eight-hour periods (early: 6 a.m. to 2 p.m., midday: 2 to 10 p.m. and late: 10 p.m. to 6 a.m.). All other locations were monitored for three 30-minute periods during the early part of the day, midday and late in the day. The equivalent energy level (Leq) for each period was computed by the Community Noise Analyzer. The Ldn was then calculated using the Sound Exposure Level (SEL) program and plugging in the Leq readings as follows:

X= 6 a.m. - 2 p.m.
Y= 2 p.m. - 10 p.m.
Z= 10 p.m. - 6 a.m.

$$\text{Ldn} = 7\ \text{Leq}\ (X) + 8\ \text{Leq}\ (Y) + 9\ \text{Leq}\ (Z + 10)$$

The results of the noise survey are on file at the Mono County Planning Department. Once the Ldn for each location was calculated, that information was plotted on community scale maps and adjusted to represent the 60 Ldn, 65 Ldn and, where applicable, the 70 Ldn noise contours using the alteration curve based upon the Federal Highway Administration's Highway Traffic Noise Prediction Model (i.e., RD-77-108 for "infinite" roadways).

As illustrated in Figure 27 (see Appendix A), with the exception of three sites located in the Antelope Valley and one site in the Benton/Hammil/Chalfant area, the 60 dB contours in Mono County are generally within 300 feet of the traveled way. Although noise-sensitive land uses (e.g., schools, hospitals) throughout the county are located on parcels impacted by the 60 dB contour, these sensitive land use activities are set back far enough from the traveled way to avoid direct impacts. Most of these noise sensitive land uses create noise impacts of their own, including noise emanating from school buses, ambulances, etc.

Ldn calculations provided by Caltrans for state and federal highways utilizing 1995 traffic flow data indicate that current traffic-related noise impacts have not changed substantially from the 1980-81 baseline study. The noise contours plotted in 1981 are still assumed to be valid.

Community Noise Survey--1996 Update
In 1996, staff completed a Noise and Traffic Study that included the following elements:

- A noise-monitoring and traffic-count field survey on county roads within each of the community areas in the county;
- Ldn calculations provided by Caltrans staff for state and federal highways based on current traffic flow data;

[11]Noise Contours are lines drawn about a noise source indicating constant levels of noise exposure. It is best to think of noise contours not as absolute bands of demarcation but as bands or similar noise exposure. CNEL and Ldn (see previous footnotes) are the metrics utilized to describe community exposure to noise.

- Noise data for Bodie State Historic Park provided by the California Department of Parks and Recreation, based on noise surveys conducted at the park in 1990; and

- Updated information for the Mammoth Lakes Airport provided in the Town of Mammoth Lakes General Plan Noise Element, completed in 1996.

County Roads

In the spring and summer of 1996, staff conducted a noise-monitoring and traffic-count field survey on county roads within each of the communities in the county. The purpose of the survey was to determine ambient noise levels on county roadways during peak use periods. Traffic counts were measured over a 24-hour period utilizing a manual traffic counter installed at the monitoring site. Noise measurements were taken for 15-minute periods in the morning and the afternoon utilizing a hand held noise meter recording dBA's at 10 second intervals. Most readings were taken around the Memorial Day weekend when traffic was heavy and would represent a peak use scenario. Noise-monitoring data collected in the field were converted to a Leq reading (an average of the dBA data). The results of the noise monitoring and traffic count field survey are shown in Table 43 on page 226.

TABLE 45
TRAFFIC COUNTS AND NOISE MEASUREMENTS--COUNTY ROADS, 1996

Location	Traffic Count (24 hours)	Leq
Old U.S. 395 at Paradise Lodge	270	66 dB
Owens Gorge Road adjacent to U.S. 395 at Sunny Slopes	557	64 dB
South Landing Road	1922	67 dB
Crowley Lake Drive at the Fire Station	668	66 dB
Leonard Avenue--June Lake	522	63 dB
Twin Lakes Road at Rancheria	988	30 dB
Bridgeport Airport--South end of Runway	na	na
Eastside Lane--north of U.S. 395 Junction	272	60 dB
Cunningham Lane--east of U.S. 395 Junction	171	56 dB

Notes: A map showing the exact location of traffic count and noise readings is on file in the Planning Department. Most traffic counts and noise readings taken during Memorial Day weekend, 1996, during a peak travel period.

State and Federal Highways

Ldn contours for state and local highways were provided by Caltrans. Calculations were based on current (1995) traffic flow data and were not checked against actual field data. The results of these calculations show that traffic-related noise impacts along state and federal highways varied little from the baseline data collected in 1980-81. Traffic volumes along these highways were, in general, lower in 1995 than in 1990, indicating that noise impacts would also be lower. For the purposes of the 1996 update of the Noise Section of the MEA and the Noise Element, it is assumed that the 1980-81 noise contours represent current conditions along state and federal highways.

Bodie State Historic Park
Noise surveys conducted at Bodie State Historic Park during the summer of 1990 resulted in average noise levels ranging from 26.5 dBA to 40.6 dBA on a busy tourist day. When wind speeds increased to 19 mph, noise levels ranged from 50.7 dBA to 62.8 dBA (at wind speeds of 15 mph and greater, noise measurement begins to be dominated by the wind itself). Average noise levels during a weekend sampling period later in the summer ranged from 31 dBA to 51 dBA while average noise levels for weekday sampling ranged from 24 dBA to 47 dBA. Evening noise levels measured in November ranged from 26 dBA to 35 dBA.

Ambient noise levels at Bodie State Historic Park are low. Visitors to the park frequently comment upon the quietness of the park, which they believe adds to their sense of place. The California Department of Parks and Recreation recommends utilizing existing ambient background noise studies as the noise standards for the park.

Mammoth/Yosemite Airport
In 1996, the Town of Mammoth Lakes completed a General Plan Noise Element that includes noise data for the town and for the Mammoth/Yosemite Airport. Data for the Mammoth/Yosemite Airport were calculated assuming a worst-case scenario, including the construction of a crosswind runway and the use of Boeing 737 and 757 aircraft by the year 2015. As indicated also by the Mammoth/Yosemite Airport Land Use Plan, residential uses at the Hot Creek Hatchery and Hot Creek Ranch remain outside the 55 CNEL contour projected by the worst-case scenario.

Projected Future Noise Environment
The county's future noise environment will be determined by changes in the operational activity of existing noise sources, by the expansion of existing sources and by the development of new noise sources. Data on the operational activity of existing noise sources show little change between 1990 and 1995, particularly for traffic, the major source of noise in Mono County. Master Plans for both the Bridgeport Airport and the Mammoth/Yosemite Airport note that projected increases in aircraft volume at those airports will not significantly affect the noise contours. Data are not available for Lee Vining Airport, but since it is similar in operations to Bridgeport Airport, it can be assumed that noise impacts in Lee Vining will not increase significantly. It is assumed, therefore, that the 1980 noise contours are still applicable.

The greatest potential increase in operations activity is assumed to be in traffic volumes. Although traffic volumes on most state and federal highways decreased between 1990 and 1995, it is difficult to project future traffic volumes. Even a substantial increase in traffic, however, is not expected to produce a significant increase in noise impacts. A 62% increase in operational activity is only expected to produce an increase of 2-dB (10 log 1/.62) and an increase of 22% to 38% would result in a 1-dB increase. Since noise readings are known to vary from 1 to 2-dB and a 1-dB increase is expected to result in only a 2% shift in the number of people highly annoyed due to excessive noise exposure.

Noise-Sensitive Areas
Noise-sensitive receptors include schools, hospitals, residential areas and certain open space areas. Most of the individual noise-sensitive receptors in the county, such as hospitals and schools, are either located along secondary roadways or are situated on parcels adjacent to major thoroughfares but are large enough to provide adequate setbacks from the traveled way. Residential areas are also generally located along secondary roads. Certain open-space areas,

because of their use for various recreational pursuits or their value as wildlife habitat or wilderness areas, are also noise-sensitive areas. The Hoover, Minaret, Ansel Adams and John Muir wilderness areas and the Hall Natural Area, all of which are situated along the western boundary of the county, as well as the "roadless areas" designated within the Inyo and Humboldt-Toiyabe national forests and Bodie State Historic Park, are all sensitive to excessive noise exposure.

CURRENT REGULATION OF THE NOISE ENVIRONMENT

Noise emissions are currently regulated in several ways. The County Noise Ordinance (Chapter 10.16 of the County Code) regulates noise. The Chief Building Inspector is designated as the Noise Control Officer for the county and is empowered to enforce those regulations. The Planning and Energy departments have the ability to regulate noised-generating land use activities through their permit processes, which allow the departments to impose conditions of operation and to set limits for noise emissions.

The Sheriff's Department, along with the California Highway Patrol, enforces code provisions in the State Motor Vehicle Code and the Harbors and Navigation Code that pertain to noise. Section 38365A of the State Vehicle Code requires that ORVs must be equipped with a muffler to reduce noise to an acceptable level; Section 38370 defines acceptable noise levels according to the age of the vehicle (i.e., pre-1973, 92 decibels; 1973 and 1974, 88 decibels; and post-1974, 86 decibels).

Traffic, including air traffic, is the most significant source of environmental noise in Mono County. An important part of planning for a healthful environment is the avoidance of unnecessary transportation noise. The Circulation Element of the General Plan includes policies intended to reduce congestion and keep traffic flowing smoothly, thereby helping lower expected future noise levels. The Mammoth/Yosemite Airport Land Use Plan and the master plans for Mammoth/Yosemite Airport and Bryant Field in Bridgeport include policies to regulate noise at those facilities.

State of California airport noise standards, as well as Federal Aviation Regulations, establish a CNEL of 65 dBA as the maximum acceptable noise exposure for residential land uses. This criterion, however, is set primarily with regard to air carrier airports in urban locations. For general aviation airports located in comparatively quiet rural settings such as Mono County, a 60 or even 55 CNEL standard is suggested.

In the very low ambient-noise environment of the Mammoth/Yosemite Airport any operations of moderately loud aircraft are potentially audible, especially when winds are calm. Any location frequently overflown by arriving and departing aircraft is subject to single-event noises that can be obtrusive. Procedures telling pilots to avoid overflight of noise sensitive areas have been established. The Mammoth/Yosemite Airport Land Use Plan also includes policies restricting future development in noise-impacted areas in the airport vicinity and requiring extra soundproofing to limit interior noise levels.

The Land Use Element of the General Plan contains policies to avoid the juxtaposition of incompatible land uses unless potentially significant impacts (such as noise impacts) are adequately mitigated. Noise impacts resulting from adjacent incompatible land uses are not currently a major problem in the county. Noise receptors are generally located in community areas; aside from highway noise, noise sources are generally located away from community areas. In some cases, however, noise does carry a great distance due to the local topography and wind currents. As a result, there is a need to ensure that off-site noise impacts will not significantly impact sensitive noise receptors. Also, since much of the land in the county is used for recreational purposes, noise sources such as geothermal and mining development that are located away from community areas may still have a significant impact on land use in the project vicinity.

The Noise Element of the General Plan contains policies to avoid the juxtaposition of incompatible land uses unless potentially significant impacts (such as noise impacts) are adequately mitigated, to enforce existing noise ordinances and policies and to assess and mitigate the impacts of proposed noise generating land uses.

CHAPTER 17
BIOLOGICAL RESOURCES*

VEGETATION

CLIMATIC AND SOILS INFLUENCES ON VEGETATION

The biological resources of Mono County are strongly influenced by the region's topography and climate. The dominant topographic features of the area are the Sierra Nevada Mountain Range to the west and the White Mountains to the southeast. Most of the county is in the rainshadow of the Sierra Nevada and receives less than ten inches of rain annually. Much greater amounts of precipitation fall at higher elevations in the mountains than at lower elevations. Approximately 70% of the precipitation falls as snow during winter storms (USFS, 1980). Cold winters with below-freezing temperatures and hot, dry summers are typical of the region. The climatic regime is the dominant influence on the plant communities and, consequently, the animal communities of the region. In the Mammoth Lakes region, the Sierra Crest is lower than areas to the north and south, so rainfall is higher and the area is more forested than the regions of the same elevation to the north and south (Taylor and Buckberg, 1987).

Geology and soil also influence vegetation type. Mono County contains several "special" soil types in which atypical vegetation may occur. These include soils that form on glacial alluvium derived from granitic bedrock, volcanic ash deposits and alkaline-saline internally drained basins.

Soils that occur on recent glacial moraines and in glacially derived alluvium along the Sierra foothills are deep, well-drained loams and sandy clay loams with abundant gravel and cobbles. These soils are relatively undeveloped and, consequently, have little organic matter. Vegetation growing in soil formed in glacially derived alluvium is used primarily for grazing. Vegetation types that typically grow on these soils are big and low sagebrush, rabbitbrush, bitterbrush and mixed perennial grasses.

Soils of the volcanic uplands occur on nearly flat to rolling terrain of volcanic tuff, tuffaceous sandstone and old alluvium. Many of these soils are ashy. Soil horizon thickness varies from shallow to deep. Soils are well to excessively drained. These units are used for grazing and, in some places, as a source of pumice. Vegetation that typically occurs on these soils includes shadscale, fourwing saltbush, Fremont dalea, Nevada dalea, little horsebrush, spiny hopsage, needleleaf rabbitbrush, blackbrush and Nevada ephedra.

Soils that form in internally drained basins are often strongly alkaline and have a high percentage of sodium. The high pH and/or high sodium content of these alkaline-saline soils interfere with the growth of most plants. In closed basins or where drainage is poor due to a high water table, excessive salt buildup occurs in soils. Uses are severely restricted because of soil texture, chemistry and drainage. Rubber rabbitbrush, inland saltgrass and black greasewood are tolerant of such conditions and occur on alkaline-saline soils (BLM).

VEGETATION AND LANDCOVER

Mono County is on the boundary of two biogeographic provinces, the Great Basin and the Californian and both mountain and desert plant series occur there. Dominant vegetation types

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*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific information on biological resources--vegetation, wildlife, wildlife habitat, special-status species, etc.

include Alkali Desert Scrub, Sagebrush, Jeffrey Pine and Pinon-Juniper forest (see Figure 18, MEA Vegetation and Landcover-California GAP Analysis Landcover). Dominant landcovers include shrubland, evergreen forest and grasslands/herbaceous coverage (see Figure 19, MEA Vegetation and Landcover-USGS Landcover Analysis).

Figure 18 maps the major vegetation communities of Mono County in detail; Table 46 describes those vegetation communities. Eleven plant communities are found in the region. Seven of these are forest types and include conifers such as Jeffrey pine and red fir (USFS, 1981). Sagebrush scrub is the dominant brush community of the region. Meadows, alpine scrub and perennial grass series are the other remaining plant communities. Although they do not occupy large areas, these three communities provide diversity and are very important habitats for many wildlife species (Taylor and Buckberg, 1987; USFS, 1981). Other minor plant communities unique to the region are discussed later in the section on Special Habitats.

Figure 18 and Table 46 utilize the CALVEG classification system (USFS, 1979 and 1981). Most of Mono County falls into the South Sierran Ecological Province and, within that, into five Formation-Types: Conifer Forest/ Woodland, Sagebrush Shrub, Desert Shrub, Dwarf Scrub (Alpine) and Herbaceous. On the vegetation maps, the formation-types are further subdivided into vegetation Series (i.e., general dominance types), as shown in Table 46. Series are general categories, usually described by one dominant plant species.

In other plant classification systems (e.g., that of Holland, 1986 which is used widely in California), vegetation is further subdivided into Associations, which more accurately reflects the natural variation due to local conditions. For example, small areas within a series may have different vegetation because of the presence of streams or lakes, unusual soils, poor drainage patterns, etc. Association-level vegetation descriptions are usually done on a project-by-project basis, because they require more intensive field surveys. For cross-referencing, some of the plant associations from Holland (1986) that have the potential to occur in Mono County are listed below.

The Conifer Forest/Woodland

The Conifer Forest/ Woodland Formation Type includes the following Series: Mixed Conifer-Fir, Mixed Conifer-Pine, Jeffrey Pine, Red Fir, Lodgepole Pine, Singleleaf Pinon and Western Juniper. Conifers usually occur on cooler, moister mountain sites in Mono County. Lodgepole Pine and Red Fir series are tall, dense to moderately open forests that occur at high elevations and may have shrub and herb associates. At treeline, lodgepole pines may have the Krumholtz form; i.e., stunted and wind-pruned.

The Mixed Conifer-Fir and Mixed Conifer-Pine Series are found at lower elevations. These are dense to moderately open forests of tall needleleaf evergreen trees that may have shrub and broadleaf tree associates. The Jeffrey Pine Series is a more open forest that occurs on shallow serpentine soils with low soil fertility, glaciated soils on granitic outcrops and colder flats. The Pinon and Juniper Series consists of open stands of low needleleaf trees with shrub and herb associates. It typically occurs on drier, lower-elevation slopes and may interface with Sagebrush associations.

Potential associations within this Formation Type include: Whitebark Pine Forest, Bristlecone Pine Forest, Jeffrey Pine Forest, Great Basin Pinon Woodland and Great Basin Pinon-Juniper Woodland (Holland, 1986).

Sagebrush Scrub

These associations often occur on cold soils, or upland volcanic soils and ash deposits, from 4,000 to 10,600 ft. elevation. They form moderately dense to open cover of shrubs that are low to medium in height (USFS, 1981). Typical species include sagebrush and bitterbrush, with juniper, shrubs and bunchgrasses. Sagebrush scrub may occur on certain atypical soils such as the glacially influenced soils derived from granitic bedrock.

Within this Formation Type several potential associations include: Big Sagebrush Scrub, Subalpine Sagebrush Scrub, Sagebrush Steppe and Great Basin Mixed Scrub (Holland, 1986).

Desert Scrub

This Formation Type is represented only in the extreme southern part of Mono County. It is an open shrub community dominated by creosotebush and may also have yuccas, cacti and Mormon tea.

Possible associations within the community are Mojave Creosotebush Scrub and Blackbrush Scrub.

Dwarf Scrub (Alpine)

Dwarf Scrub consists of short grasses and forbs, in dense to very open mosaics with extensive barren areas. It occurs at high elevations above treeline. The dominant specie is Phlox, with its most common associates being either buckwheat or Cymopterus. Other species associates are locally variable.

Possible associations include the Sierra Nevada Fell-Field and White Mountains Fell-Field (Holland, 1986).

Herbaceous

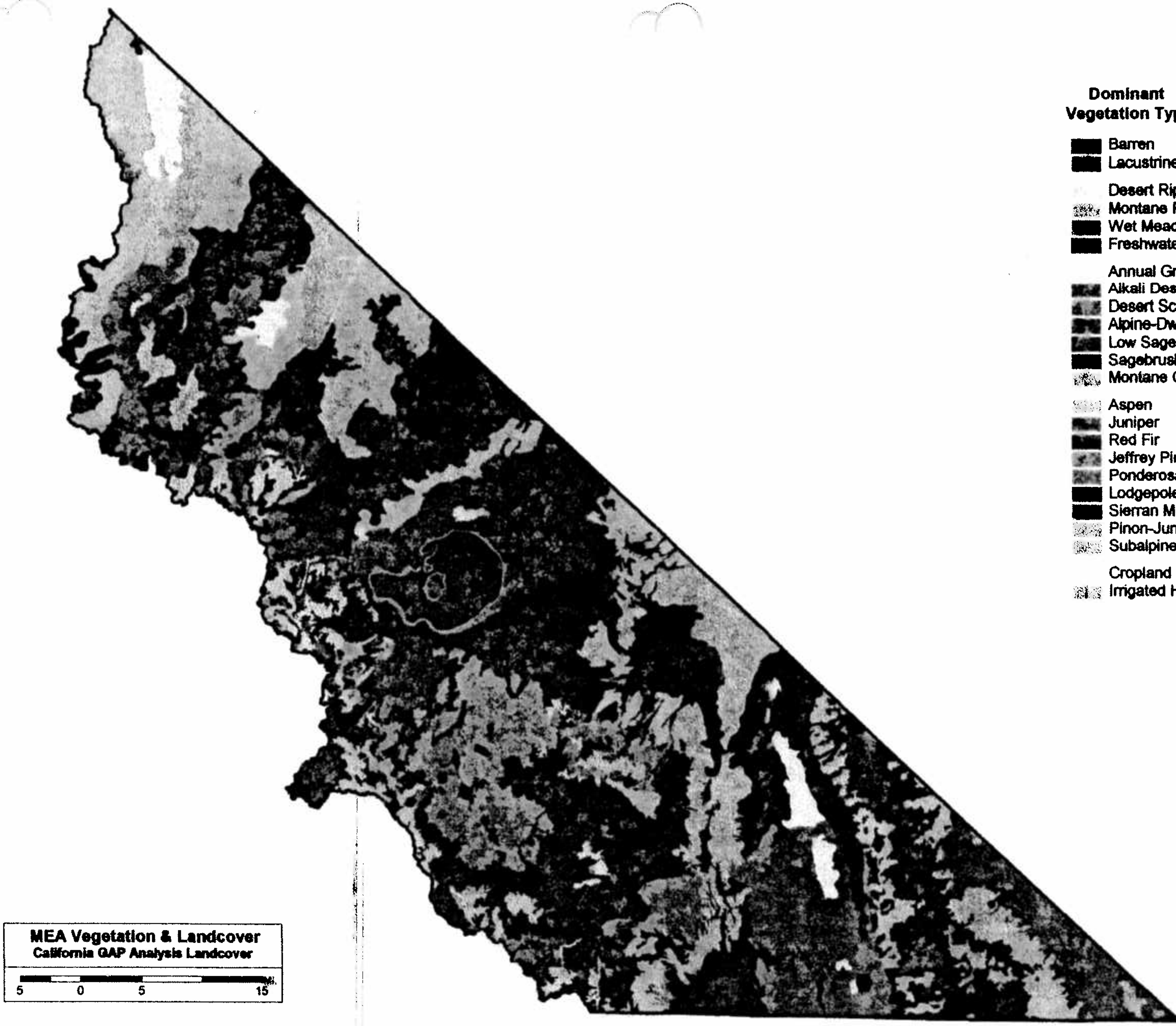
There are three distinct kinds of herbaceous communities within this Formation Type, these are described below (USFS, 1981). The first occurs in mountain meadows of Red Fir forests and consists mainly of forbs and grasses (e.g., Poa, Elymus and Bromus). The second type occurs on saline flats around Mono Lake and is characterized by salt-tolerant plants such as saltgrass, iodine bush or saltbush. A third type of herbaceous association occurs on the dry pumice flats and it consists of needlegrass, lupine, pussypaws, hulsea and evening primrose.

Potential associations include: Great Basin Grassland, Alkali Meadow and Montane Meadow.

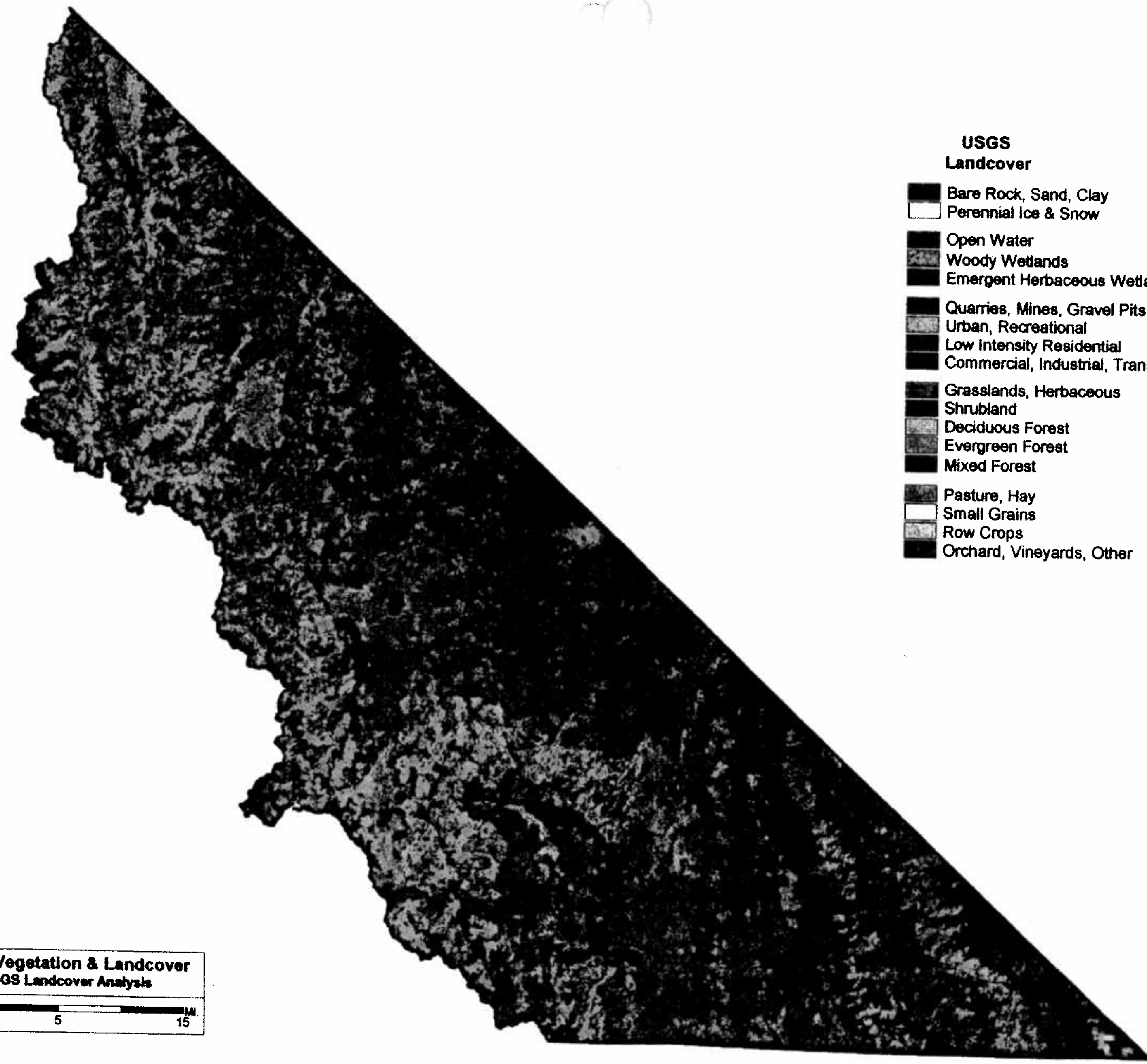
Other

Other associations that occur locally within Mono County are not extensive enough to be mapped at the scale of the USFS maps of the Mono County vegetation. Some of these include:

- Riparian (e.g., Aspen Riparian Forest, Cottonwood-Willow Riparian Forest, Montane Riparian Scrub and Modoc-Great Basin Riparian Scrub)
- Areas with highly alkaline or saline soils and internally drained basins (e.g., Desert Greasewood Scrub, Alkali Playa, Shadscale Scrub, Rabbitbrush)
- Uplands with volcanic ash deposits (e.g., Shadscale, Blackbrush)



Dominant Vegetation Type	Approximate Acreage
Barren	113,240
Lacustrine	46,588
Desert Riparian	6,782
Montane Riparian	7,607
Wet Meadow	15,299
Freshwater Emergent Wetland	21,440
Annual Grassland	1.1
Alkali Desert Scrub	238,795
Desert Scrub	9,818
Alpine-Dwarf Shrub	57,240
Low Sage	64,159
Sagebrush	579,809
Montane Chaparral	6,206
Aspen	8,237
Juniper	65,932
Red Fir	9,722
Jeffrey Pine	154,843
Ponderosa Pine	3,406
Lodgepole Pine	69,795
Sierran Mixed Conifer	918
Pinon-Juniper	399,585
Subalpine Conifer	79,723
Cropland	41,599
Irrigated Hayfield	3,112



USGS Landcover	Approximate Acreage
Bare Rock, Sand, Clay	79,831
Perennial Ice & Snow	595
Open Water	50,961
Woody Wetlands	6
Emergent Herbaceous Wetlands	235
Quarries, Mines, Gravel Pits	703
Urban, Recreational	10
Low Intensity Residential	965
Commercial, Industrial, Transportation'	2,077
Grasslands, Herbaceous	141,997
Shrubland	1,295,255
Deciduous Forest	7,277
Evergreen Forest	409,695
Mixed Forest	6,738
Pasture, Hay	33,970
Small Grains	3,913
Row Crops	336
Orchard, Vineyards, Other	0.68

MEA Vegetation & Landcover
USGS Landcover Analysis

TABLE 46
VEGETATION COMMUNITIES IN MONO COUNTY

CONIFER FOREST/WOODLAND

Map Symbol:	**MF**
Series:	Mixed Conifer Fir
Dominant Species:	White Fir
Associated Species:	Red Fir, Lodgepole Pine, Douglas Fir
Elevation Range:	3,800 to 6,700 feet
Notes:	Stand structure and local dominance are highly visible.
Map Symbol:	**JP**
Series:	Jeffrey Pine
Dominant Species:	Jeffrey Pine
Associated Species:	Singleleaf pinon, lodgepole pine (occasionally), basin sagebrush
Elevation Range:	>6,500 feet
Notes:	Occurs as pure stands on glaciated soils or granitic outcrops.
Map Symbol:	**RF**
Series:	Red Fir
Dominant Species:	Lodgepole Pine
Associated Species:	Mountain Hemlock
Elevation Range:	5,500 to 8,000 + feet
Notes:	Grows in pure dense stands except in rocky ridgetops and areas with shallow water tables.
Map Symbol:	**MH**
Series:	Mountain Hemlock
Dominant Species:	Mountain Hemlock
Associated Species:	Lodgepole Pine, Western White Pine, Foxtail Pine, Red Fir (s. of Yosemite)
Elevation Range:	
Notes:	Dominates the subalpine forest north of Yosemite, usually in pure stands with very few associated conifer species. Occurs only on cold, moist slopes south of Yosemite.
Map Symbol:	**LP**
Series:	Lodgepole Pine
Dominant Species:	Lodgepole Pine
Associated Species:	
Elevation Range:	> 7,200 feet
Notes:	Occurs above Red Fir species. Grows in open or closed, even-aged stands on poorly drained soils or adjacent to meadows. Usually indicates glacial scouring or areas with shallow water tables. Is an important invader series following fire or disturbance.

TABLE 46 (continued)

Map Symbol:	**PJ**
Series:	Singleleaf Pinon
Dominant Species:	Singleleaf Pinon
Associated Species:	Western Juniper, Utah Juniper, Curlleaf Mountain Mahogany, Basin Sagebrush, Bitterbrush, Rabbitbrush
Elevation Range:	
Notes:	Dominates open woodlands on dry slopes north of Mono Lake. Becomes sole dominant conifer in low elevation mountain areas near Lee Vining.

Map Symbol:	**BP**
Series:	Bristlecone Pine
Dominant Species:	Bristlecone Pine
Associated Species:	Limber Pine
Elevation Range:	9,500 to 11,500 feet
Notes:	Occurs on dolomite soil, also in scattered populations on dry, rocky slopes. Indicates treeline and very poor soil conditions.

Map Symbol:	**WJ**
Series:	Western Juniper
Dominant Species:	Jeffrey Pine, Curlleaf Mountain Mahogany, Mule Ears
Associated Species:	Currant tobacco bush, Snowberry, Bitterbrush, Rabbitbrush
Elevation Range:	> 6,000 feet
Notes:	Occurs on dry, exposed ridges.

HARDWOOD FOREST/WOODLAND

Map Symbol:	**CG**
Series:	Greenleaf Manzanita
Dominant Species:	Greenlead Manzanita
Associated Species:	Jeffrey Pine
Elevation Range:	> 3,800 feet
Notes:	Sprouts after fire, seeds are viable for many years. Site can be occupied after about 5 years following fire or disturbance. Geographically associated with Mixed Conifer Fir and Red Fir series.

Map Symbol:	**CW**
Series:	Whiteleaf Manzanita
Dominant Species:	Wedgeleaf ceanothus
Associated Species:	
Elevation Range:	3,500 to 6,700 feet
Notes:	Dominant on dry slopes in same elevational range as Ponderosa Pine and Mixed Conifer Fir series. Usually occurs on south and west aspects or in rocky soils with dominant species. Indicates moderately poor soils and hot microclimates.

TABLE 46 (continued)

SAGEBRUSH SHRUB

Map Symbol:	**BS**
Series:	Basin Sagebrush
Dominant Species:	Bitterbrush
Associated Species:	Jeffrey Pine, Mountain Mahogany, Juniper, Greenleaf Manzanita, Rabbitbrush, Squirrel Tail
Elevation Range:	4,000 + feet
Notes:	Usually found on frigid soils lacking profile development.

Map Symbol:	**AP**
Series:	Saltbush
Dominant Species:	Saltbush
Associated Species:	Sagebrush, creosote, grasses
Elevation Range:	
Notes:	Generally occurs on dry alkaline plains and hills. Fourwing saltbush possibly abundant on saline desert flats and washes.

Map Symbol:	**BA**
Series:	Blackbush
Dominant Species:	Blackbush
Associated Species:	Yucca, Hopsage, Agave, Mormon tea
Elevation Range:	
Notes:	Occurs on non-saline soils, often under scattered Joshua trees or pinon pines.

DESERT SHRUB

Map Symbol:	**DL**
Series:	Creosote
Dominant Species:	Creosote
Associated Species:	Mormon tea, Cacti, Spanish bayonet, Joshua tree
Elevation Range:	
Notes:	Occurs on low elevation east slopes of Sierra Nevada. Dominant shrub of series.

Map Symbol:	**AC**
Series:	Cushion Plant
Dominant Species:	Cushion Plant
Associated Species:	Squirrel tail, Phlox, Buckwheat, Cymopterus
Elevation Range:	
Notes:	Diversity affected by local conditions and seed sources.

Map Symbol:	**HG**
Series:	Annual grass-forb
Dominant Species:	Owl's clover, Fiddleneck, Stork's bill
Associated Species:	Hardwoods growing in sheltered areas, Digger Pine
Elevation Range:	

TABLE 46 (continued)

Notes: May occur in pure stands or contain an overstory of oaks or buckeye.

Map Symbol:	**HM**
Series:	Perennial grass
Dominant Species:	Needlegrass, lupine, Pussy paws, Hulsea, Evening primrose
Associated Species:	
Elevation Range:	
Notes:	Includes many grasses and forbs. Dominates openings of poorly developed, drier soils within Red Fir and Lodgepole Pine series. Commonly bordered by Basin Sagebrush series and may include some of its components.

TABLE 46 SOURCE: Cal Veg., 1981; ESA, 1988.

INFLUENCE OF INSECT PESTS AND PATHOGENS ON SIERRA FORESTS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

Currently, Sierra Nevada forests are in the aftermath of the 1987-92 drought. Over the last few years, these forests have sustained catastrophic levels of tree mortality due to drought, fire, disease and bark beetles.... Although these losses have occurred throughout the Sierra Nevada, they have been particularly high on the east side of the range, where mortality, mainly of pines and firs, has exceeded 80% of the standing volume in some stands (U.S. Forest Service [USFS] 1994). Mortality has been greatest in overly dense stands, especially those where past logging and/or fire-exclusion practices have promoted tree species susceptible to insects, pathogens, fire and drought. Wildfires also occurred during the drought, leaving many scorched trees susceptible to insects. Exacerbating these losses are the extreme fire hazards resulting from the dead and dying trees (SNEP, Vol. II, Ch. 45, p. 1179).

The Inyo National Forest has growing stock = 1,830 ft^3/acre; annual growth as a percentage of growing stock is 1.4%; annual mortality as a percentage of growing stock is 0.1%; annual mortality as a percentage of growth is 7.6% (SNEP, Vol. II, Ch. 45, Table 45.3, p. 1182).

Increased tree mortality (more than 0.2 trees per acre killed) was observed on the Inyo National Forest during the following years of below-average precipitation: 1919, 1920, 1922, 1923, 1926, 1927 and 1933 (SNEP, Vol. II, Ch. 45, Table 45.4, p. 1183).

Located at middle elevations on the steep eastern slope of the Sierra Nevada, Jeffrey pine forests are found on somewhat dry sites. They are composed almost wholly of Jeffrey pine with an understory of bitterbrush, sagebrush and scattered mountain mahogany. Key insect pests and pathogens are Jeffrey pine beetle, annosus root disease and dwarf mistletoe, operating in pest complexes as described for the other forest types (SNEP, Table 45.1). Located in the rain shadow of the Sierra Nevada, this forest type is well adapted to dry conditions, but, during droughts, outbreaks of Jeffrey pine beetle cause widespread mortality of trees, especially those weakened by root disease or mistletoe (SNEP, Vol. II, Ch. 45, p. 1187).

Found at the lowest, driest elevations on the east flank of the Sierra Nevada, the pinon-juniper forest type is composed almost wholly of single-leaf pinon pine and western juniper, growing singly or in combination, with a mainly sagebrush shrub layer. Key insects and pathogens are pine engravers killing pinon pines, often those weakened by black-stain root disease or annosus root disease, with the latter also infecting western juniper. Usually single trees or small groups are killed, but where stands are dense, large clumps can be killed (SNEP, Vol. II, Ch. 45, p. 1187).

STATUS OF RARE AND ENDEMIC PLANT SPECIES

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

The Sierra Nevada remains one of the botanical gems of North America. New plant species are still being discovered in this range and land managers across this magnificent landscape need to be aware of the unique biodiversity contained within the Sierra Nevada. Land managers should appreciate the evolutionary forces that have contributed to such a remarkable rare and endemic flora and provide appropriate levels of conservation to ensure that this resource is sustained for the American people (SNEP, Vol. II, Ch. 24, p. 704).

The Sierra Nevada represents nearly 20% of the California land base yet contains over 50% of the state's flora. Approximately 405 vascular plant taxa are endemic to the Sierra Nevada. Of this total, 218 taxa are considered rare by conservation organizations and/or state and federal agencies. In addition, 168 other rare taxa have at least one occurrence in the Sierra Nevada (SNEP, Vol. II, Ch. 24, p. 691).

[Assessment of plant distribution is compromised by very limited field surveys and difficulties in archiving information. For example,] ... *Sedum pinetorum* is believed to have been collected along the eastern slope of the Sierra Nevada in the vicinity of Mammoth, Mono County. However, the type population has never been relocated, nor has the species been collected since. Again, focused surveys may yet rediscover this inconspicuous plant of the eastern Sierra Nevada in the Mammoth area (SNEP, Vol. II, Ch. 24, p. 695).

Koch (1958) listed 72 mosses for the Harvey Monroe Hall Research Natural Area and vicinity toward Lee Vining along the eastern escarpment of the Sierra Nevada in Mono County. However, too few studies have been conducted to allow comparisons between the Sierra Nevada and the overall California bryophyte flora (SNEP, Vol. II, Ch. 24, p. 697).

Chapter 24, Volume II, of the SNEP documents provides the following information concerning rare and endemic plants in Mono County:

A. Distribution of Rare and Endemic Plants by River Basin

River Basin	# of Taxa from Database	Sierran Endemics	Rare Taxa	Endemic to River Basin
Mono Lake	65	45	32	1
Walker	33	18	23	4
Owens	104	71	59	8

B. Sierra Nevada Endemics at the River Basin Level

Mono Lake Basin: *Arabis tiehmii*

Walker River Basin: *Draba incrassata*
Orthotrichum spjutii
Plagiobothrys glomeratus
Senecio pattersonensis

Owens River Basin: *Astralagus sepultipes*
Galium hypotrichium ssp. inyoense
Lomatium rigidum
Lupinus pratensis var. eriostachys
Penstemon papillatus
Phacelia inyoensis
Sedum pinetorum
Sidalcea covillei

C. Distribution of Rare and Endemic Plants in Mono County

Number of Taxa from Database	103
Sierra Endemics	60
Rare Taxa	65
Endemic to County	6

D. Sierra Nevada Endemic Species in Mono County

Astralagus monoensis
Carex tiogana
Draba incrassata
Lupinus duranii
Sedum pinetorum
Senecio pattersonensis

IMPACT OF NONINDIGENOUS PLANTS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

Owing to the rain shadow created by the Sierra Nevada, there is a sharp environmental gradient from the relatively moist crest of the Sierra down the eastern slope to some of the most arid environments in North America. Desert regions in California are, in general, common and cover close to 28 million acres, or approximately 28% of the state. The desert communities of California, often severely degraded by mineral extraction, water diversion, military training, suburb expansion and motorized recreation, recover very slowly (on the order of hundreds of years). Exacerbating the current pressures on desert communities are a number of aggressive nonindigenous plants introduced by early European settlers (SNEP, Vol. II, Ch. 47, p. 1211).

The vegetation of the eastern slope varies considerably with altitude and latitude. The slope vegetation of the Great Basin desert is dominated by a mixture of woody shrubs such as Great Basin sagebrush, rabbitbrush and bitterbrush. In pristine, ungrazed sites, native perennial grasses make up the understory of this two-layer landscape, but in most places non-native grasses have replaced the native species. The understory of native annual and perennial species has also been largely replaced by nonindigenous plants. The problems caused by introduced plants in this habitat are exemplified by one single species that is the most widespread and pervasive of all weeds in these arid grasslands: cheat grass (SNEP, Vol. II, Ch. 47, pp. 1211-1212).

Cheat grass (*Bromus tectorum*), being indigenous to Central Asia, has a long association with human occupation and disturbance. Cheat grass is well adapted to frequent burning, intense grazing and agriculture and so it spreads rapidly in disturbance-dominated landscapes. In its native range, cheat grass thrives in chronically disturbed grasslands. Like with many of the early introductions, cheat grass probably came to the western United States via contaminated seed lots in the mid to late 1800s. When introduced to western North America, cheat grass encountered an equitable climate, ample disturbance and a landscape free of its associated pests and pathogens. Its spread was rapid, filling more than 200,000 km^2 (80,000 mi^2) of the intermountain west in just 40 years. Cheat grass now dominates much of the arid western United States and the eastern slope of the Sierra Nevada, having both negative ecological and negative economic impacts (SNEP, Vol. II, Ch. 47, p. 1212).

EAST-SLOPE SIERRAN ECOSYSTEMS AND FIRE

For a discussion of this topic, see the section "Fire Hazards" in Chapter 19, Natural Hazards.

RANGELANDS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section. For additional information on rangelands, see the section "Rangelands" in Chapter 3, Land Use.

Fletcher (1987) describes the presettlement vegetation of Mono Basin, based on historical accounts and ethnographic investigations. Perennial grasses were evidently abundant in the sagebrush-scrub community, especially giant wild rye (*Elymus cinereus*) and Indian rice grass (*Oryzopsis hymenoides*). The Kuzedika Paiute, a small band centered in the Mono Basin, collected seeds from these bunchgrasses and from desert needlegrass (*Stipa specosa*) as part of their varied diet, which also included desert peach (*Prunus andersonii*), elderberry (*Sambucus mexicana*) and buffaloberry (*Shepherdia argentea*). In addition, the Kuzedika held rabbit drives every fall, setting fire to the sagebrush to flush out the animals, a practice that would have been favorable to grass growth (SNEP, Vol. II, Ch. 3, p. 40).

On the east side, rangeland productivity decreased, evidently because of livestock mismanagement. Fletcher (1987) notes that geologist Israel Russell, who had visited Mono Lake in 1881, observed the effects of overgrazing there in 1887: "There was formerly sufficient wild grass in many portions of the basin to support considerable numbers of cattle and sheep; but owing to overstocking, these natural pastures are now nearly ruined" (Russell, 1889) (SNEP, Vol. II, Ch. 3, p. 41).

Historic unregulated grazing, which ended in the early 1900s, created widespread, profound and in some places, irreversible ecological impacts. Current livestock practices continue to exert reduced but significant impacts on the biodiversity and ecological processes of many middle- to high-elevation rangelands even though properly managed grazing (appropriate timing, intensity, duration of use, control of cowbirds and exclusion from wetlands) can be compatible with sustainable ecological functions (SNEP, Vol. I, Ch. 7, p. 114).

Increases in native perennial grasses are occurring on some eastside sagebrush steppe rangelands, but the continuing cheat-grass invasion of these habitats indicates that complete restoration of native plant communities is highly unlikely. In spite of persistent problems, the remarkably recovered condition of many ecosystem components of montane meadows and uplands today indicates that well-watered meadow/riparian ecosystems have tremendous potential for restoration of plant communities, while providing very important agricultural grazing values to society (SNEP, Vol. I, Ch. 7, p. 114).

Indicators of rangeland community health were mixed for the Toiyabe and Inyo national forests as shown below (SNEP Vol. III, Ch. 22, Tables):

Cover and Species Composition Data (Percentages) from Condition and Trend Plots in Sagebrush-Steppe Communities Over Four Decades

	1956-65	1966-75	1976-85	1986-95
Toiyabe NF				
Big Sagebrush	24.4	32.0	20.4	21.0
Perennial grasses	2.8	2.0	5.2	0.5
Forbs	29.3	25.3	28.1	43.0
Bull thistle	0	0	0.2	0
Litter	35.5	21.5	30.2	23.5
Bare Soil	18.5	20.0	24.8	10.5
Erosion pavement	8.5	18.5	6.4	19.0
Inyo NF				
Big Sagebrush	16.9	14.0	na	13.4
Perennial grasses	0.4	0	na	3.3
Forbs	24.8	25.5	na	23.7
Cheat grass	0.9	0.5	0	4.8
Litter	19.9	29.5	na	23.5
Bare Soil	19.2	23.5	na	26.5
Erosion pavement	32.9	20.5	na	17.4

Species Composition (Percentages) in Meadows Over Four Decades

	1956-65	1966-75	1976-85	1986-95
Toiyabe NF				
Grasses	16.3	17.0	24.8	na
Legumes	6.7	0	8.7	na
Sedges	26.4	44.4	22.4	na
Rushes	6.2	14.0	7.4	na
Inyo NF				
Grasses	12.5	13.0	9.6	18.0
Legumes	6.9	5.0	10.2	2.5
Sedges	37.8	25.5	53.8	35.3
Rushes	8.6	33.5	3.4	8.1

Cheat grass is the most common non-native component of the monitored sagebrush-steppe communities (Table 2). While cheat grass cover in all cases was low relative to native perennial grasses, competitive effects reducing native perennial grass and forb seedling recruitment could be important ... but sample sizes are so small that it is impossible to detect trends (SNEP, Vol. III, Ch. 22, p. 934-935).

Litter cover (%) and bare soil and erosion pavement exposure (%) indicate soil surface processes and protection or lack thereof from wind and water erosion (Table 3).... Cheat grass litter is a much less effective agent protecting against surface soil erosion than bases of perennial bunchgrasses or sagebrush canopy cover protecting against raindrop impact. Since litter cover has increased and bare soil has also increased on the Inyo Forest, some serious concerns arise on these upland sagebrush-steppe communities. Given that most of the Inyo sagebrush-steppe communities have strong rainshadow influences and are relatively dry systems, they need particularly well-managed livestock grazing programs. The same can be said for the Toiyabe Forest (SNEP, Vol. III, Ch. 22, p. 934-935).

Based on our historical review of livestock grazing on what is now National Forest land, the Modoc Forest was the most disturbed in the sagebrush-steppe and the Lassen, Inyo and Toiyabe were probably not far behind. While the Modoc and other forests are showing declines in sagebrush and increase in cheat grass, the increase in native perennial grasses is a very favorable change. Similarly, increases in native perennial grasses on the ... Inyo National Forest is a very favorable indicator of improving ecosystem biodiversity. The general reduction in sagebrush cover is desirable so long as it remains as a major component of the sagebrush-steppe. Promiscuouis prescribed burning of sagebrush-steppe must be avoided where additional spreading of cheat grass is the likely result (Rasmussen 1994). Some reduction in sagebrush will be required to free up water resources for maintenance of a larger composition of perennial grasses. The slowing declining forb composition will likely contribute to poorer ground nesting bird diets in the future. The high and increasing cheat grass component on many of the forests is alarming, especially as California becomes more populated and even remote areas have greater probability of fire ignition (SNEP, Vol. III, Ch. 22, p. 934-935).

WILDLIFE

The plant communities of the region provide habitats for a diversity of resident and migratory wildlife. More than 350 species of terrestrial vertebrates are known or expected to occur in Mono County. No comprehensive biological survey of the county has been conducted. Each of the plant communities described above supports its own characteristic assemblage of wildlife species. Many species use several habitats on a daily or seasonal basis, in meeting their life history needs. Although a particular habitat may only be used for a short period, that habitat may be crucial to the species' survival. The spring breeding habitat for the California gull at Mono Lake is an excellent example of this crucial dependence.

Some specialist species, such as the sage grouse, are restricted to a single habitat, while generalist species such as the coyote, range over almost all habitats of the region.

Typical small mammals of the region include voles, deer mice and several species of chipmunks. White-tailed hares and Nuttal's cottontails are common (USFS, 1980; USFS, 1986; Ingles, 1965; National Academy of Science, 1987). Populations of these species fluctuate seasonally and year to year as weather changes affect food production and mortality (Ingles, 1965). Predators such as coyote, bobcat, badger, mountain lion and black bear are also found in the region. Mammals known or expected to occur in Mono County are listed in Table 47.

MULE DEER

A decline in mule deer numbers has occurred throughout California, including Mono County, since the mid-1960s. This decline prompted the Department of Fish and Game (CDFG) in 1975 to formulate a general statewide plan to restore and maintain deer herds in a healthy quantity in proportion to the available habitat. In 1977, the State legislature, through Assembly Bill 1520, mandated that CDFG develop deer herd management plans. The Bill required that a geographical unit of deer range be considered distinct from adjacent ranges and subsequently be planned for individually through individual management plans.

Seven of these management plans apply to Mono County, which provides deer habitat during part or all of the year for the Casa Diablo, Sherwin Grade, Buttermilk, Inyo/White Mountains, Mono Lake, East Walker and West Walker herds.

Deer herds in Mono County are defined largely by their winter ranges; frequently the summer ranges of deer from several herds will overlap. Mule deer migrate to upper elevations to breed (summer range) and travel downslope to spend the winter (winter range) in lower elevation pinon pine and desert shrub communities (Airola, 1980). Many deer that winter in Mono County cross the crest of the Sierra Nevada and summer on the west side (Kucera, 1985). Optimal summer habitats are intermediate canopy stages of conifer forest, high elevation riparian and montane shrub types. In the spring and summer deer feed primarily on herbaceous forage and shrubs in open tree stands, meadows and shrub lands, which are crucial for fawn development. Just as important as winter and summer habitats are the migration corridors, most of which are fairly narrow due to topographic constraints and therefore very susceptible to blockage from development (Kucera and McCarthy, 1988). A few of these corridors are wide swaths with ill-defined boundaries, such as San Joaquin Ridge. One current area of conflict is the migration route between U.S. Highway 395 and the Sierra escarpment that connects Swall Meadows to Mammoth Lakes (Thomas, 1988).

TABLE 47
MAMMALS KNOWN OR EXPECTED TO OCCUR IN MONO COUNTY

Scientific Name Status	Common Name	Special Habitat[a]
Antilocapra americana	Pronghorn	5,4
Aplodontia rufa californica	Sierra Nevada mt. beaver	7,8
Canis latrans	Coyote	all
Castor canadensis	Beaver	7
Dipodomys microps	Great basin kangaroo rat	5
Dipodomys ordii Ord's	Kangaroo rat	6
Dipodomys panamintinuc	Panamint kangaroo rat	5
Eptesicus fuscus	Big brown bat	most
Erethizon dorsatum	Porcupine	2,7
Eutamias alpinus	Alpine chipmunk	1
Eutamias amoenus	Yellow-pine chipmunk	3,4
Eutamias minimus	Least chipmunk	5,4,3
Eutamias panamintinus	Panamint chipmunk	4,5
Eutamias speciosus	Lodgepole chipmunk	2,3
Felis concolor	Mountain lion	2,3,4
Gulo gulo	Wolverine	1,2
Lagurus curtatus	Sagebrush vole	5,4,6
Lasuirus cinereus	Hoary bat	most
Lepus californicus	Black-tailed jackrabbit	5,6,8
Lepus townsendii	White-tailed hare	1,2,3
Lynx rufus	Bobcat	4,5
Marmota flaviventris	Yellow-bellied marmot	1
Martes americana	Marten	2,1
Martes pennanti	Fisher	2,3
Mephitis mephitis	Striped skunk	7
Microdipodops megacephalus	Dark kangaroo mouse	6
Microtus californicus vallicola	Owens Valley vole	7,8
Microtus longicaudus	Long-tailed vole	7,8
Microtus montanus	Montane vole	8

Mustela erminea	Short-tailed weasel	2,1,4	
Mustela frenata	Long-tailed weasel	all	
Mustela vison	Mink	7,8	
Myotis leibii	Small-footed myotis	5,7	
Myotis lucifugus	Little brown bat	most	
Myotis volans	Long-legged myotis	most	
Neotoma cinerea	Bushy-tailed woodrat	most	
Neotoma lepida	Desert woodrat	most	
Ochotona princeps	Pika	1	
Odocoileus hemionus	Mule deer	7,4,3,2	
Ondatra zibethica	Muskrat	ponds	
Onychomys leucogaster	Northern grasshopper	5,6,4	
Ovis canadensis	Mountain sheep	1	Endangered
Perognathus parvus	Great basin pocket mouse	4,5	
Peromyscus maniculatus	Deer mouse	all	
Peromyscus truei	Pinon mouse	4	
Phenacomys intermedius	Heather vole	1	
Procyon lotor	Raccoon	7	
Reithrodontomys megalotis	Western harvest mouse	8	
Scapanus latimanus	Broad-handed mole	7,8	
Sorex lyelli	Mt. Lyell shrew	7,8	
Sorex merriami	Merriam's shrew	6	
Sorex monicolus	Dusky shrew	7,8	
Sorex palustris	Water shrew	7,8	
Sorex tenellus	Inyo shrew	7	
Sorex vagrans	Vagrant shrew	7,8	
Spermophilus beecheyi	California ground squirrel	8	
Spermophilus beldingi	Belding ground squirrel	8	
Spermophilus lateralis	Golden-mantled gr. squirrel	2,3,4,7	
Spermophilus townsendii	Townsend ground squirrel	5,6	
Spilogale putorius	Spotted skunk	rocky, 7	
Sylvilagus idahoenis	Pygmy rabbit	5,7	
Sylvilagus nuttallii	Nuttall's cottontail	7,8,4,5	
Tadarida brasiliensis	Brazilian free-tailed bat	most	
Tamias panamintinus acrus	Kingston mountain chipmunk		
Tamiasciurus douglasii	Chickaree	2,3	
Taxidea taxus	Badger	8	
Thomomys talpoides	Northern pocket gopher	8,7	
Urocyon cinereoargenteus	Gray fox	4,7	
Ursus americanus	Black bear	1,2	
Vulpes fulva	Red fox	2,1,8	Threatened
Vulpes macrotis	Kit fox	6,5	
Zapus princeps	Western jumping mouse	7,8	

NOTES: a) Habitat: 1 = alpine/subalpine, 2 = Lodgepole forest, 3 = Jeffrey pine forest, 4 = Pinon juniper, 5 = sagebrush-steppe, 6 = exposed lake bed and dunes, 7 = riparian, 8 = meadows and marshes.
SOURCE: National Academy of Sciences, 1987; CNDDB, 2000.

Development of the town of Mammoth Lakes, stimulated by development of recreational ski facilities at Mammoth Mountain, has already blocked a main migration route. Further development of this area can only worsen the situation (Thomas, 1988). Along the migration routes are holding areas that serve as rest and feeding stops between the summer and winter ranges. As the deer ascend in the summer to higher terrain, they may delay at a holding area for up to six weeks to wait for a late winter storm to pass, for snow to melt and for the green-up of herbaceous forage before they continue their journey. An overview of Deer Herd Use Areas throughout the county is shown in Figure 20. Figure 30 (see Appendix A) provides more detailed information on deer movement throughout the county and designates general and critical use areas. Figure 21 provides a summary of deer kill locations throughout the county.

Specific herd information has now been collected on the Sherwin Grade, Casa Diablo, West Walker, East Walker and Mono Lake herds. Information on key habitats, such as aspen groves and riparian habitats, is available for all major herds in the county. Information on key deer use areas, especially winter and migration habitats, for the Sherwin Grade and West Walker herds is available as a result of telemetry studies performed on these two herds. Such information collection was possible because individual development projects proposed within critical deer ranges were required to assess the impacts of their construction. More field research (telemetry studies) has been performed for the Sherwin Grade and West Walker herds since a large percentage of the private land in Mono County is within the ranges of these two herds.

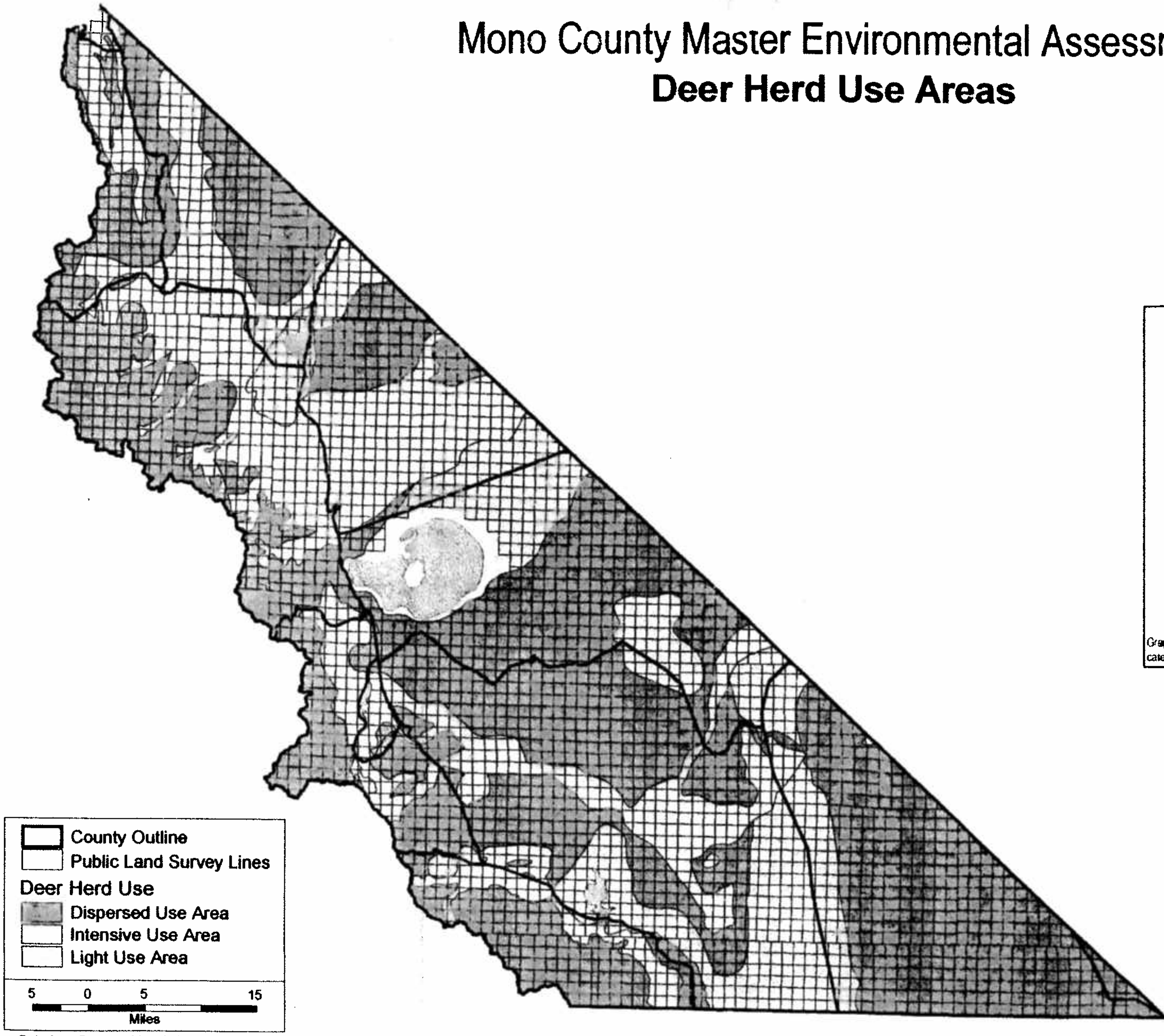
In addition to the threats posed by residential and recreational development to deer migration routes, there are other significant human influences (CDFG, 1986). Dispersed recreational use of portions of the deer's summer range by people, dogs and pack stock can disturb key fawning habitats, affecting reproduction and survival. Competition for grazing resources with livestock on all seasonal ranges is depressing herd vitality. Likewise, an unknown level of competition exists between deer and feral horses and burros (e.g., on the Truman Meadow winter range). Hunting, while potentially inflicting only a minimal impact in comparison to the other impacts associated with residential and recreational development, does influence the number of bucks in the herd and this in turn affects the ratio and age structure within the population. Each year, motorists kill an unquantified number of deer migrating across major highways in Mono County, especially U.S. Highway 395. Finally, other types of development, such as hydroelectric and geothermal energy projects and logging projects, affect deer herd populations depending on the specifics of the project, such as size, location, number of new roads, etc.

In response to these threats, CDFG is pushing for critical habitat acquisitions in various areas, such as Swall Meadows, Antelope Valley and Slinkard Valley, Sonora Junction area, Conway Summit area, Crowley Lake area and Round Valley. They are also recommending zoning for large acreage minimum parcels in areas designated as key wildlife areas, including deer winter and migratory ranges (Thomas, 1986).

Inyo and Humboldt-Toiyabe national forests have developed specific standards and guidelines for protection of mule deer habitat in their respective Land Management Plans. These include protective measures such as minimizing activities (grazing, timber, mining, vehicular access, energy and facility developments, etc.) that would affect key mule deer habitats, managing vegetation and habitats in key fawning areas, winter ranges, holding areas and key migration routes; and closing roads seasonally to benefit mule deer.

Mono County Master Environmental Assessment

Deer Herd Use Areas



Data from Bureau of Land Management, 2001

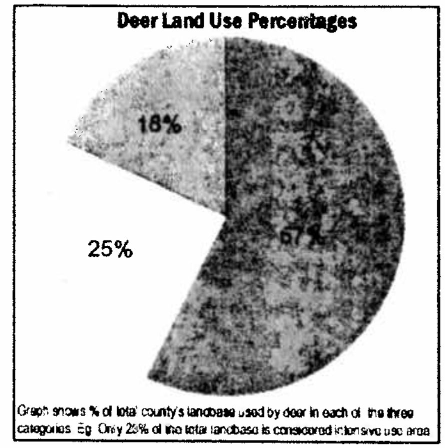
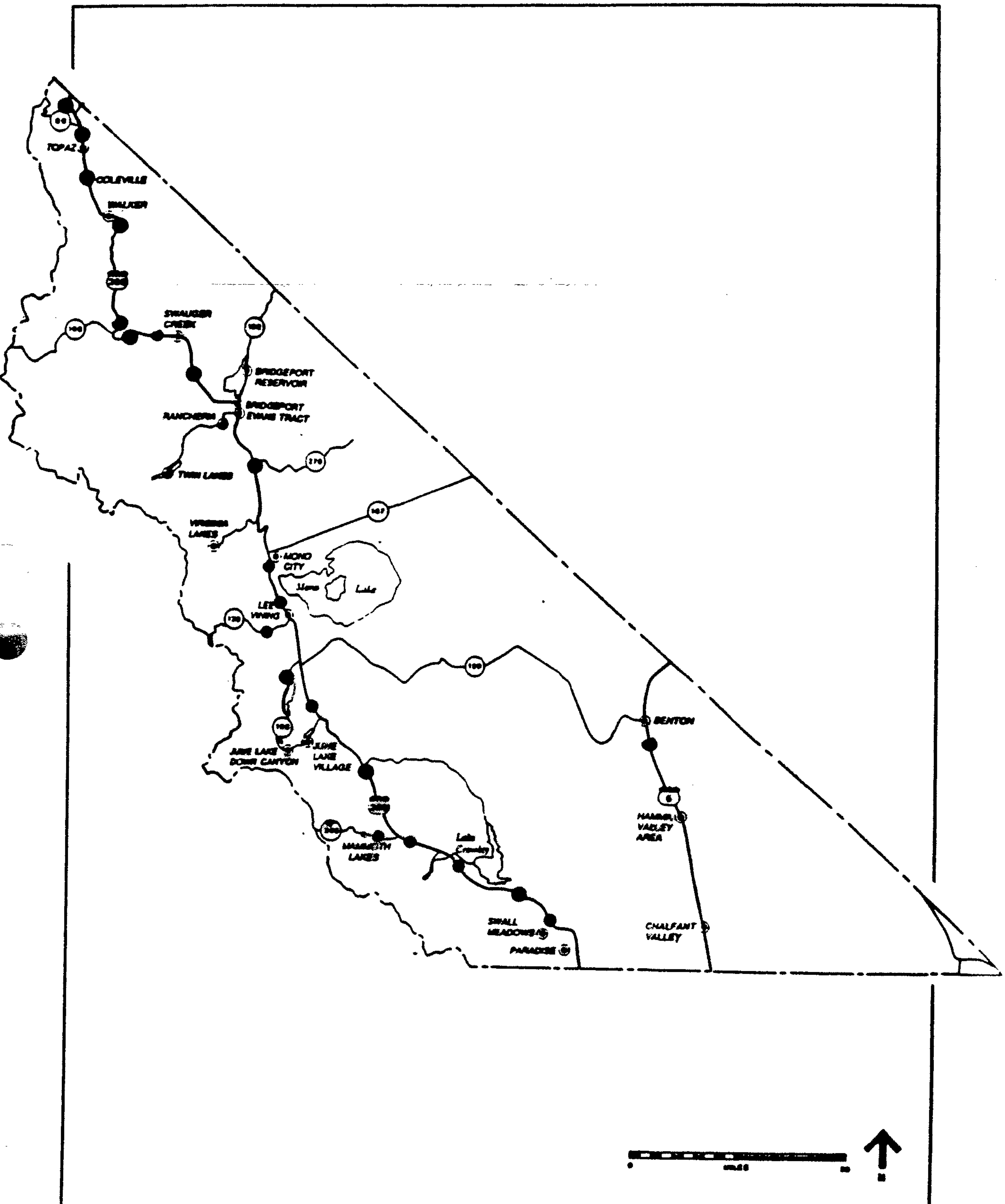


FIGURE 21
DEER KILL LOCATIONS--MONO COUNTY



BIGHORN SHEEP

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

Mountain (bighorn) sheep (*Ovis canadensis*) populations in the Sierra Nevada were decimated following the arrival of Europeans in the mid-19th century. Sheep populations in the Sierra were originally scattered along the crest and east slope from Sonora Pass south, and along the Great Western Divide of what is now Sequoia National Park; there was also a population in the Truckee River drainage. Likely causes for the precipitous population decline include market hunting, severe overgrazing by domestic livestock, and probably most importantly the transmission of respiratory bacteria from domestic sheep to bighorn that were fatal to the latter (SNEP, Vol. II, Ch. 25, p. 714).

By the 1970s, only two populations remained in the Sierra Nevada: in the vicinity of Mount Baxter (ca 220 individuals) and Mount Williamson (ca 30 individuals), west of Independence. From 1979 until 1988, the Mount Baxter population was used by the California Department of Fish and Game, in cooperation with the U.S. Forest Service and the National Park Service, to successfully reestablish herds near Wheeler Ridge, Mount Langley, and Lee Vining Canyon. Some cougars were removed from the Lee Vining Canyon areas to reduce significant losses while that herd was getting established. By 1990, the three introduced herds were all increasing and the overall Sierra bighorn population was at least 300 (SNEP, Vol. II, Ch. 25, p. 715).

Between 1977 and 1987, cougar (*Felis concolor*) depredation reports in Inyo and Mono counties, as well as for California as a whole, increased dramatically. During the extended drought of the late 1980s and early 1990s, the herds gradually abandoned their low elevation winter ranges for much higher elevation sites that, while inferior from the standpoint of forage and protection from cold, were relatively snow-free during the drought and afforded protection from predation. This profound behavior change is attributed by Wehausen (1995) to heavy cougar predation pressure on the traditional low-elevation ranges. Concurrent with this change in behavior has been a steady decline in population (SNEP, Vol. II, Ch. 25, p. 715).

The Lee Vining Canyon population declined from approximately thirty-six ewes in 1993 to fourteen in 1995. Whether from accidents or an inferior energetic balance, the new situation is distinctly pessimistic, with the Sierra Nevada population probably well below the 250 recorded when reintroduction began in 1979 (SNEP, Vol. II, Ch. 25, p. 715).

There is no reason to assume cougar populations were smaller than at present prior to settlement, although they may well have fluctuated significantly over time. But whereas sheep were widespread in the Sierra at settlement, presently they only persist in scattered small pockets of high elevation habitat where snow depths are tolerable and cougars absent. One possible explanation is that in the past, sheep herds were sufficiently well-distributed and large that herds in decline on account of heavy predation or weather were supplemented by colonists from other thriving herds, thus providing a buffer for local perturbations as well as maintaining genetic diversity. The small and isolated populations now present can no longer provide either function (SNEP, Vol. II, Ch. 25, p. 715).

Management of the Sierran bighorn is facilitated by the Sierra Interagency Bighorn Sheep Advisory Group, which includes technical representatives from participating agencies. This group is now considering a recommendation that a captive breeding program be established as insurance against a complete collapse of the Sierran populations and as a source for future reintroduction. However, domestic sheep and cattle allotments on the public lands of the eastern slope and Sierra crest, with their well-known potential for disease introduction into bighorn, greatly reduce the number of potential sites available for reintroduction. So long as populations are relatively small and disconnected, some controls on predation, especially through cougar removals, may also be necessary (SNEP, Vol. II, Ch. 25, p. 715).

BIRDS

There is a diverse breeding avifauna in the area, which is complemented by winter migrants. There are approximately 240 bird species potentially breeding in the county during the spring. Waterfowl and shorebirds comprise the bulk of the winter migrants and are mainly concentrated around Mono Lake and Crowley Lake (USFS, 1980).

Typical bird species of forest habitats are the Clark's nutcracker, blue grouse, hermit thrusher and white-breasted nuthatch, among others. The drier sagebrush habitats contain sage grouse, sage thrasher and vesper sparrow. The important avian predators of the area are the American kestrel, red-tailed hawk, Cooper's hawk, northern goshawk, northern harrier, great horned owl and golden eagle. Bald eagles move through during fall migration, following the Owens River (McCarthy, 1987). Birds known or expected to occur in Mono County are listed in Table 48.

TABLE 48
BIRDS KNOWN OR EXPECTED TO OCCUR IN MONO COUNTY

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Accipiter cooperii	Cooper's hawk	4,5,6	R	
Accipiter gentilis	Northern goshawk	4,6	R	
Accipiter gentillis	Sharp-shinned hawk	4,5,6	R	
Actixis macularia	Spotted sandpiper	1,2,3,4	M	
Aechmophorus occidentalis	Western grebe	1	R	
Aegolius acadicus	Northern saw-whet owl	4,6	M	
Aeronautes saxatalis	White-throated swift	1-7	M	
Agelaius phoeniceus	Red-winged blackbird	3,4,5	R	
Alectoris chukar	Chuckar	5	R	
Amphispiza belli	Sage sparrow	5	R	
Amphispiza bilineata	Black-throated sparrow	5	M	
Anas acuta	Northern pintail	1,3	R	
Anas americana	American widgeon	1	R	
Anas clypeata	Northern shoveler	1,3	R	
Anas cressa	Green-winged teal	1,3	R	
Anas cyanoptera	Cinnamon teal	1,3	R	
Anas discors	Blue-winged teal	1,3	M	
Anas platyrhynchos	Mallard	1,3	R	
Anas strepera	Gadwall	1,3	R	
Anser albifrons	Greater white fronted goose	1	M	
Anthus spinoletta	Water pipit	1,2,5	M	
Aphelocoma coerulescens	Steller's jay	4,5,6	R	
Aquila chrysaetos	Golden eagle	4,5,6	R	
Archilochus alexandri	Black-chinned hummingbird	4,5	M	
Ardea herodias	Great blue heron	1-5	M	
Arenaria interpres	Ruddy turnstone	1,2	M	
Asio otus	Long-eared owl	4,5,6	R	
Asio otus	Short-eared owl	3,5	M	
Asyndesmus lewis	Lewis' woodpecker	4,6	M	
Athene cunicularia	Burrowing owl	5	M	
Ayhthya valisineria	Canvasback	1	M	
Aythya affinis	Lesser scaup	1	M	
Aythya americana	Redhead	1	R	
Aythya collaris	Ring-necked duck	1	M	
Aythya marila	Greater scaup	1	M	
Bombycilla cedrorum	Cedar waxwing	4,5,6	M	
Bombycilla garrulus	Bohemian waxwing	6	M	
Botaurus lentiginosus	American bittern	3	M	
Brachyramphus marmoratum	Marbled murrelet	1	M	
Branta bernicula	Brant	1	M	
Branta canadensis	Canada goose	1-3,5	R	
Bubo virginianus	Great horned owl	4,5,6	M	
Bubulcus ibis	Cattle egret	5	R	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Bucephala albeola	Bufflehead	1	M	
Bucephala clangula	Common goldeneye	1	M	
Buteo jamaicensis	Red-tailed hawk	4,5,6	R	
Buteo lagopus	Rough-legged hawk	3,5	M	
Buteo lineatus	Red-shouldered hawk	4	M	
Buteo swainsoni (nesting)	Swainson's hawk	4,5	M	CA Threatened
Butorides striatus	Green-backed heron	1,3	M	
Calamospiza melanocorys	Lark bunting	5	M	
Calcarius lapponicus	Lapland longspur	2,5	M	
Calcarius ornatus	Chestnut-collared longspur	5	M	
Calidris alpina	Dunlin	1,2,3	M	
Calidris canutus	Red knot	1,2	M	
Calidris minutilla	Least sandpiper	1,2	R	
Calypte anna	Anna's hummingbird	4,5	M	
Capella gallinago	Common snipe	1-5	R	
Carpodacus cassinii	Cassin's finch	4,5,6	R	
Carpodacus mexicanus	House finch	5	M	
Carpodacus purpureus	Purple finch	5,6	M	
Cassidix mexicanus	Great-tailed grackle	3,5	M	
Cathartes aura	Turkey vulture	1-6	R	
Catharus guttata	Hermit thrush	6	M	
Catharus ustulata	Swainson's thrush	4	M	
Catherpes mexicanus	Rock wren	5,6	M	
Catoptrophorus semipalmatus	Willet	1,2	M	
Centrocercus uropasianus	Sage grouse	5	R	
Certhia familiaris	Pygmy nuthatch	6	R	
Chaetura pelagica	Chimney swift	1-7	M	
Chaetura vauxi	Vaux's swift	1-7	M	
Charadrius alexandrinus	Snowy plover	1,2	M	
Charadrius semipalmatus	Semipalmated plove	1,2	M	
Charadrius vociferus	Killdeer	1,2,3,5	R	
Chen caerulescens	Snow goose	1	M	
Chen rossii	Ross' goose	1	M	
Chlidonias niger	Black tern	1	M	
Chondestes grammacus	Lark sparrow	5	M	
Chordeiles minor	Common nighthawk	3,5	M	
Cinclus mexicanus	American dipper	1,4	R	
Circus cyaneus	Northern harrier	3,5	R	
Cistothorus palustris	Marsh wren	3	R	
Coccyzus americanus	Yellow-billed cuckoo	4	M	
Colaptes auratus	Northern flicker	4,5,6	R	
Columba fasciata	Band-tailed pigeon	4,5,6	M	
Contopus sordidulus	Western wood pewee	4,6	M	
Corvus brachyrhynchos	Black-billed magpie	5	R	
Corvus corax	American crow	5	M	
Cosmerodious albus	Great egret	1,3	M	
Crocethia alba	Sanderling	1,2	M	
Cyanocitta stelleri	Barn swallow	1-5	M	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Cygnus buccinator	Trumpeter swan	1	M	
Cygnus columbianus	Tundra swan	1	M	
Cypseloides niger	Black swift	1-7	M	
Dendragapus obscurus	Blue grouse	6	R	
Dendrocopos albolarvatus	White-headed woodpecker	6	R	
Dendrocopos nuttallii	Nuttall's woodpecker	4	M	
Dendrocopos pubescens	Downy woodpecker	4	R	
Dendrocopos villosus	Hairy woodpecker	4,6	R	
Dendroica coronata	Yellow-rumped warbler	4,5,6	M	
Dendroica discolor	Prairie Warbler	4	M	
Dendroica nigrescens	Black-throated gray warbler	4,6	M	
Dendroica occidentalis	Hermit warbler	4,6	M	
Dendroica palmarum	Palm warbler	4	M	
Dendroica pensylvanica	Chestnut-sided warbler	4	M	
Dendroica petechia	Yellow warbler	4	M	
Dendroica striata	Blackpoll warbler	4	M	
Dendroica townsendi	Townsen's warbler	4.6	M	
Egretta thula	Snowy egret	1,3	M	
Empidonax difficilis	Western flycatcher	4,6	M	
Empidonax hammondii	Hammond's flycatcher	4,6	M	
Empidonax oberholseri	Dusky flycatcher	4,5,6	M	
Empidonax traillii (nesting)	Willow flycatcher	4	M	CA Endangered
Empidonax wrightii	Gray flycatcher	5	M	
Eremophila alpestris	Horned lark	5	R	
Ereunetes pusillus	Semipalmated sandpiper	1,2	M	
Erolia bairdii	Baird's sandpiper	1,2	M	
Erolia fuscicollis	White-rumped sandpiper	1,2	M	
Erolia melanotos	Pectoral sandpiper	1,2,3	M	
Euphagus carolinus	Rusty blackbird	1,3	M	
Euphagus cyanocephalus	Brewer's blackbird	2,4,5	M	
Eupoda montana	Mountain plover	1,2	M	
Falco columbarius	Merlin	3,4,5,6	M	
Falco mexicanus	Prairie falcon	2-5	R	
Falco peregrinus	Peregrine falcon	2-5	M	
Falco sparverius	American kestrel	3,4,5,6	R	
Fulica americana	American coot	1-3	R	
Gallinula chloropus	Common moorhen	3	M	
Gavia arctica	Arctic loon	1	M	
Gavia immer	Common loon	1	R	
Gavia stellata	Red-throated loon	1	M	
Glaucidium gnoma	Northern pigmy owl	4,5,6	R	
Gymnorhinus cyanocephalus	Scrub jay	5	R	
Haliaeetus leucocephalus	Bald eagle	1,4	M	CA Endangered
Hesperiphona vespertina	Evening grosbeak	4,6	R	
Heteroscelus incanum	Wandering tattler	1,2	M	
Himantopus mexicanus	Black-necked stilt	1,2	M	
Hirundo rustica	Cliff swallow	1-5	M	
Hydroprogne caspia	Caspian tern	1,4	M	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Icteria virens	Yellow-breasted chat	4	M	
Icterus cucullatus	Hooded oriole	4	M	
Icterus galbula	Northern oriole	4,5	M	
Icterus spurius	Orchard oriole	4	M	
Ictinia misisippiensis	Mississippi kite	4	M	
Iridioprocne bicolor	Tree swallow	4	M	
Ixobrychus exilis	Least bittern	3	M	
Ixoreus naevius	Varied thrush	4,6	M	
Junco hyemalis	Dark-eyed junco	4,5,6	R	
Lagopus leucurus	White-tailed ptarmigan	5,7	R	
Lanis excubitor	Northern shrike	4,5,6	M	
Lanis ludovicianus	Loggerhead shrike	5	M	
Larus argentatus	Herring gull	1	M	
Larus californicus	California gull	1-5	R	
Larus delawarensis	Ring-billed gull	1	R	
Larus philadelphia	Bonaparte's gull	1	M	
Leucosticte arctoa	Rosy finch	5,7	R	
Limnodromus griseus	Short-billed dowitcher	1,2,3	M	
Limnodromus scolopaceus	Long-billed dowitcher	1,2,3	M	
Limosa fedoa	Marbled godwit	1,2	M	
Lophodytes cucullatus	Hooded merganser	1	M	
Lophortyx californicus	California quail	4,5	R	
Loxia curvirostra	Red crossbill	4,6	R	
Megaceryle alcyon	Belted kingfisher	1,3,4	R	
Melanerpes formicivorus	Acorn woodpecker	6	M	
Melanitta deglandi	White-winged scoter	1	M	
Melanitta perspicillata	Surf scoter	1	M	
Melospiza georgiana	Swamp sparrow	3	M	
Melospiza lincolnii	Lincoln's sparrow	4,5	R	
Melospiza melodia	Song sparrow	3,4,5	R	
Mergus merganser	Common merganser	2	M	
Mergus serrator	Red-breasted merganser	1	M	
Mimus polyglottos	Northern mockingbird	5	M	
Mniotilta varia	Black-and-white warbler	4	M	
Molothrus ater	Brown-headed cowbird	3-6	M	
Myadestes townsendi	Townsend's solitaire	4,6	R	
Myiarchus cinerascens	Ash-throated flycatcher	4,5,6	M	
Nucifraga columbiana	Pinon jay	5,6	R	
Numenius americanus	Long-billed curlew	1,2	M	
Numenius phaeopus	Whimbrel	1,2	M	
Nuttallornis borealis	Olive-sided flycatcher	4,6	M	
Nycticorax nycticorax	Black-crowned night heron	3	M	
Oidemia nigra	Black scoter	1	M	
Oreortyx pictus	Mountain quail	4,6	R	
Oreoscoptes montanus	Sage thrasher	5	M	
Otus flammeolus	Flammulated owl	5,6	M	
Otus kennicottii	Western screech owl	4	M	
Oxyura jamaicensis	Ruddy duck	1	R	
Pandion haliaetus	Osprey	1	M	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Parula americana	Northern parula	4	M	
Parus gambeli	Common raven	1-6	R	
Parus inornatus	Mountain chickadee	4,6	R	
Passer domestieus	House sparrow	2,4,5	R	
Passerculus sandwichensis	Savannah sparrow	1,3,5	R	
Passerella iliaca	Fox sparrow	5	M	
Passerina amoena	Lazuli bunting	4,5	M	
Passerina cyanea	Indigo bunting	4	M	
Pelecanus erythrorhynchos	White pelican	1	R	
Phainopepia nitens	Phainopepla	4,5	M	
Phalacrocorax auritus	Double-crested cormorant	1	M	
Phalacrocorax pelagicus	Pelagic cormorant	1	M	
Phalaenoptilus nuttallii	Common poorwill	5	M	
Phalaropus fulicarius	Red phalarope	1	M	
Phalaropus lobatus	Red-necked phalarope	1	M	
Pheucticus ludovicianus	Rose-breasted grosbeak	4	M	
Pheucticus melanocephalus	Black-headed grosbeak	4,6	M	
Pica pica	Clark's nutcracker	6	R	
Picoides arcticus	Black-backed woodpecker	6	R	
Piplio chlorurus	Green-tailed towhee	5	M	
Piplio erythrophthalmus	Rufous-sided towhee	4,5	R	
Piranga ludoviciana	Western tanager	4,5,6	M	
Piranga rubra	Summer tanager	4	M	
Plegadis chihi	White-faced ibis	1	M	
Pluvialis dominica	Lesser golden plover	1,2	M	
Pluvialis squatarola	Black-bellied plover	1,2	M	
Podiceps auritus	Horned grebe	1	M	
Podiceps nigricollis	Eared grebe	1	R	
Podilymbus podiceps	Pied-billed grebe	1	M	
Polichonyx oryzivorus	Bobolink	3,4	M	
Polioptila caerulea	Blue-gray gnatcatcher	5	M	
Pooecetes gramineus	Vesper sparrow	5	M	
Porzano carolina	Sora	1-2	M	
Psaltriparus minimus	Plain titmouse	5,6	R	
Pyrocephalus rubinus	Vermillion flycatcher	3	M	
Rallus limicola	Virginia rail	3	R	
Recurvirostra americana	American avocet	1,2	M	
Regulus calendula	Ruby-crowned kinglet	4,5,6	M	
Regulus strapa	Golden-crowned kinglet	4,6	R	
Rhynchophanes mccownii	McGown's longspur	5	M	
Riparia riparia (nesting)	Bank swallow	1,3	M	CA Threatened
Salpinctes obsoletus	Brown creeper	4,6	R	
Sayornis nigricans	Black phoebe	5	M	
Sayornis saya	Say's phoebe	5,6	M	
Seiurus aurocapillus Oporornis tolmiei	Overbird	4	M	
Selasphorus platycercus	Broad-tailed hummingbird	4,5	M	
Selasphorus rufus	Rufous hummingbird	4,5,6	M	
Setophage ruticilla	American redstart	4	M	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Sialia currucoides	Mountain bluebird	5,6	R	
Sitta canadensis	Bushtit	5,6	R	
Sitta carolinensis	Red-breasted nuthatch	6	R	
Sitta pygmaea	White-breasted nuthatch	6	R	
Sphyrapicus thyroideus	Williamson's sapsucker	6	R	
Sphyrapicus varius	Red-breasted sapsucker	4,6	R	
Sphyrapicus varius	Yellow-bellied sapsucker	4	M	
Spinus lawrencei	Lawrence's goldfinch	4	M	
Spinus pinus	Pine siskin	4,5	R	
Spinus psaltria	Lesser goldfinch	4,5	M	
Spinus tristis	American goldfinch	4,5	M	
Spizella arborea	American tree sparrow	4,5	M	
Spizella atrogularis	Black-chinned sparrow	5	M	
Spizella breweri	Brewer's sparrow	5	M	
Spizella passerina	Chipping sparrow	5,6	M	
Stecorarius longicaudus	Long-tailed jaeger	1	M	
Steganopus tricolor	Wilson's phalarope	1	M	
Stelgidopteryx serripennis	N. roughwinged swallow	4	M	
Stellula calliope	Calliope hummingbird	4,5,6	M	
Stercorarius parasitious	Parasitic jaeger	1	M	
Stercorarius pomarinus	Pomarine jaeger	1	M	
Sterna forsteri	Forster's tern	1	M	
Sterna hirundo	Common tern	1	M	
Strix nebulosa	Great gray owl	6	R	CA
Endangered (nesting)				
Strix occidentalis	Spotted owl	6	R	
Sturnella neglecta	Western meadowlark	5	R	
Sturnus vulgaris	European starling	2,4,5	R	
Tachycineta thalassina	Violet-green swallow	4,6	M	
Thryomanes bewickii	Canyon wren	5,6	R	
Totanus flavipes	Lesser yellowlegs	1,2	M	
Tringa melanoleuca	Greater yellowlegs	1,2	M	
Tringa solitaria	Solitary sandpiper	1,2,3	M	
Troglodytes aedon	House wren	4,5	M	
Troglodytes bewickii	Bewick's wren	4,5	R	
Troglodytes troglodytes	Winter wren	4	M	
Turdus migratorius	American robin	4,5,6	R	
Tyrannus verticalis	Western kingbird	4,5	M	
Tyto alba	Common barn-owl	3,4,5	M	
Vermirora peregrina	Tennessee warbler	4	M	
Vermivora celata	Orange-crowned warbler	4,5	M	
Vermivora ruficapilla	Nashville warbler	4,5,6	M	
Vermivora virginiae	Virginia's warbler	4,6	M	
Vireo gilvus	Warbling vireo	4,6	M	
Vireo solitarius	Solitary vireo	4,6	M	
Wilsonia citrina	Hooded warbler	4	M	
Wilsonia pusilla	Wilson's warbler	4,6	M	
Xanthocephalus xanthoceph.	Yellow-headed blackbird	1,3	M	
Xema sabini	Sabine's gull	1	M	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Zenaida asiatica	White-winged dove	4	M	
Zenaidura macroura	Mourning dove	4,5,6	R	
Zonotrichia albicollis	White-throated sparrow	4	M	
Zonotrichia atricapilla	Golden-crowned sparrow	4,5	M	
Zonotrichia leucophrys	White-crowned sparrow	4,5	R	
Zonotrichia querula	Harris' sparrow	4	M	

NOTES:

a. Habitat: 1 = lake, 2 = exposed lakebed, 3 = marsh, 4 = riparian zones, 5 = sagebrush-steppe, 6 = conifer forests, 7 = alpine.

b. R = Resident; M = Migratory.

c. As noted by the California Natural Diversity Data Base for Mono County, 2000.

SOURCE: National Academy of Sciences, 1987; CNDDB, 2000.

REPTILES AND AMPHIBIANS

At least ten reptile and amphibian species have been recorded in the Long Valley Caldera (USFS, 1980). These species have received little study in the area. Thus, there is almost no published information on their distribution and habitat use. Rattlesnakes (*Crotalus viridis*), gopher snakes (*Pituophis melanoleucus*), garter snakes (*Thamnophis elegans*), rubber boas (*Charina bottae*) and California Mountain Kingsnakes (*Lampropeltis zonata*), along with western fence lizards (*Sceloporus occidentalis*) and whiptails (*Cnemidophorus tigris*) are expected to occur. In wetter habitats, common species such as the Pacific treefrog (*Hyla regilla*), Great Basin spadefoot toad (*Scaphiopus intermontanus*) and western toad (*Bufo boreas*) should occur (WESTEC, 1986). Tiger salamander (*Ambystoma tigrinum*) have been recorded in the Long Valley Caldera; surveys in 1989 revealed other salamander sites.

Native amphibians of Mono County include Tiger salamander, *Ambystoma tigrinum* ssp. (stable or expanding population, may be introduced species); Mount Lyell salamander, *Hydromantes platycephalus* (species of special concern); Owens Valley web-toed salamander, *Hydromantes* spp. (species of special concern); Yosemite toad, *Bufo canorus* (endangered); Mountain yellow-legged frog (threatened); and Northern leopard frog, *Rana pipiens* (threatened) [SNEP, Vol. II, Ch. 31: Table 31.1, p. 924; Table 31.3, p. 943].

INVERTEBRATES

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> Based on current information, the Owens Valley in Inyo County is the site of highest endemicity of terrestrial insects in the Sierra Nevada region. Insect species there appear to have been isolated for a considerable period from both the rest of the Sierran species to the west, by the precipitous eastern slope and the Great Basin species to the east, by the White Mountains (SNEP, p. 739). Clearly, water is an issue of importance on the east side of the Sierra Nevada and particularly for the Owens Valley. Drastically changing drainage and flow patterns in this habitat

clearly changes the suitability of the area for many of these endemic species (SNEP, Vol. II, Ch. 26, p. 739).

Figure 26. 1 on p. 740 of the SNEP documents (Vol. II, Ch. 26) identifies 6 insect species that are found only in the Mono Basin.

The middle elevation Sierra Nevada has one of the richest butterfly faunas in temperate North America; its only close competitor is the Colorado Front Range. The Sierran fauna is overwhelmingly adapted to successional and edaphic, nonforest habitats (meadows, barrens, riparian corridors and alpine fell fields). Most of the Sierra is forested, yet most of its butterfly diversity is not found in the forest (SNEP, p. 743). Many species, however, are confined either to the west (Californian biotic province) or east (Artemisian) slope ... the east slope ones are high plains--high desert--steppe species such as *Colias alexandra*, *Satyrium behrii* and *Pontia beckerii* (SNEP, Vol. II, Ch. 27, pp. 745-746).

Anthocharis lanceolata is predominantly a western slope specie (also in the Coast Range and northwestern California) that, however, also occurs locally on the east slope, for example, in the Carson Range, in canyons east of Monitor Pass and in southern Inyo County (SNEP, Vol. II, Ch. 27, p. 746).

Aquatic invertebrates are rarely considered or evaluated in environmental impact assessments in the Sierra. Major changes have occurred in aquatic and terrestrial habitats in the Sierra over the last 200 years: we must logically assume that corresponding changes have occurred in aquatic invertebrate assemblages (SNEP, Vol. II, Ch. 35, p. 987). A species of brine shrimp, *Artemia monica*, is endemic to Mono Lake.... the brine shrimp and alkali fly of Mono Lake provide food for thousands of migrating waterfowl... Decreasing fresh water and increasing salinity in Mono Lake led to decreases in the alkali fly *Ephydra hians* prior to restoration of inflows to the lake ... (SNEP, Vol. II, Ch. 35, p. 993).

TABLE 49
INVERTEBRATES KNOWN OR EXPECTED TO OCCUR IN MONO COUNTY

Scientific Name	Common Name	Location	Condition	Special Status[a]
Acroneuria Californica	Stone fly	Convict Creek	Unknown	
Acroneuria Pacifica	Stone fly	Convict Creek	Unknown	
Agraylea sp.	Stone fly	Convict Creek	Unknown	
Alloperla Pacifica	Stone fly	Convict Creek	Unknown	
Ameletus sp.	May fly	Convict Creek	Unknown	
Antocha Monticola	True fly	Convict Creek	Unknown	
Arctopsyche	Caddis fly	Convict Creek	Unknown	
Artemesia monica	Brine shrimp	Mono Lake		
Sensitive to increased salinity and alkalinity in Mono Lake.				
Baetis Diablus	May fly	Convict Creek	Unknown	
Baetis sp.	May fly	Convict Creek	Unknown	
Bezzia sp.	True fly	Convict Creek	Unknown	
Brachycentrus	Caddis fly	Convict Creek	Unknown	
Brachycentrus Americanus	Caddis fly	Convict Creek	Unknown	
Brachycentrus Occidentalis	Caddis fly	Convict Creek	Unknown	
Callisbaetis sp.	May fly	Convict Creek	Unknown	
Capina Elongata	Stone fly	Convict Creek	Unknown	
Chironomus Stigmaterus	True fly	Convict Creek	Unknown	
Chironomus Utahensis	True fly	Convict Creek	Unknown	
Chrysops sp.	Deer-fly larvae	Mono Lake	Unknown	
Cricotopus sp.	True fly	Convict Creek	Unknown	
Cryptolabis Sica/Mixa	True fly	Convict Creek	Unknown	
Culicoides ocidentallis	Biting midge	Mono Lake	Unknown	
Deuterophlebia Nielsoni	True fly	Convict Creek	Unknown	
Diamesa (N. sp.)	True fly	Convict Creek	Unknown	
Dicosmoecus Pallicornis	Caddis fly	Convict Creek	Unknown	
Dicranota sp.	True fly	Convict Creek	Unknown	
Dolophiloides sp.	Caddis fly	Convict Creek	Unknown	
Dorylaimus sp.	Nematode	Convict Creek	Unknown	
Dugesia sp.	Planaria	Convict Creek	Unknown	
Epeorus Longimanus	May fly	Convict Creek	Unknown	
Epeorus sp.	May fly	Convict Creek	Unknown	
Ephemerella heterocaudata	May fly	Convict Creek	Unknown	
Ephemerella Hystrix	May fly	Convict Creek	Unknown	
Ephemerella Flavilinea	May fly	Convict Creek	Unknown	
Ephemerella Infrequens	May fly	Convict Creek	Unknown	
Ephemerella Levis	May fly	Convict Creek	Unknown	
Ephemerella Pelosa	May fly	Convict Creek	Unknown	
Ephemerella Teresa	May fly	Convict Creek	Unknown	
Ephydra	Alkali fly	Mono Lake		
Of major concern since it is a productive food source for birds at Mono Lake and is sensitive to salinity and low lake levels.				
Ephydra Hians	Alkali fly	Mono Lake	Same as above	
Eukiefferielwa (n.sp.)	True fly	Convict Creek	Unknown	
Eyphilotec enoptes langstoni	Langston's blue butterfly	Six miles south of Sherwin Summit	Unknown	

TABLE 49 (continued)

Scientific Name	Common Name	Location	Condition	Special Status[a]
Euphydryas editha Monoensis	Mono checker-spot butterfly	West shore of Mono Lake; various mountainous areas as along Hwy.395.	Unknown	
Glossosoma Califica	Caddis fly	Convict Creek	Unknown	
Gyraulus similaris	Snail	Convict Creek	Unknown	
Helicopsyche Borealis	Caddis fly	Convict Creek	Unknown	
Heterlimnius Corpulentus	May fly	Convict Creek	Unknown	
Hermerodromia sp.	True fly	Convict Creek	Unknown	
Hexatoma sp.	True fly	Convict Creek	Unknown	
Hydropsyche Californica	Caddis fly	Convict Creek	Unknown	
Hydropsyche Oslari	Caddis fly	Convict Creek	Unknown	
Hydatostega	Stone fly	Mono Lake		
Formally known as species <u>Hydrophorus plumbeus</u>; could be rare but further taxonomic and distributional work is necessary.				
Hydromermis sp.	Nematodes	Convict Creek	Unknown	
Hygrotus fontinalis	See below	Travertine Hot Springs		Yes
Travertine band-thigh diving beetle. Runoff pools and shallow marshy pools have been modified for bathing to the detriment of the beetle.				
Ilyodrilus Tetraedus	Aquatic earthworm	Convict Creek	Unknown	
Lara sp.	Beetle	Convict Creek	Unknown	
Lepidostoma cascadense	Caddis fly	Convict Creek	Unknown	
Lepidostoma Rayneri	Caddis fly	Convict Creek	Unknown	
Lepidostoma sp. (2)	Caddis fly	Convict Creek	Unknown	
Leuctra Occidentalis	Stone fly	Convict Creek	Unknown	
Leuctra Sara	Stone fly	Convict Creek	Unknown	
Limnephilus Productus	Caddis fly	Convict Creek	Unknown	
Lymnaea Palustris Haydeni	Snail	Convict Creek	Unknown	
Mesomermis sp.	Nematode	Convict Creek	Unknown	
Micraesema Aspila	Caddis fly	Convict Creek	Unknown	
Nemotellus sp.	-----	Mono Lake	Unknown	
Nemoura Cinctipes	Stone fly	Convict Creek	Unknown	
Nemoura Oregonensis	Stone fly	Convict Creek	Unknown	
Neohermes Californicus	-----	Convict Creek	Unknown	
Neophylax Occidentis	Caddis fly	Convict Creek	Unknown	
Neophylax Richeri	Caddis fly	Convict Creek	Unknown	
Pyrgulopsis sp. "A"[b]	Spring-snail			
Located along eastern escarpment of Sierra Nevada from Little Lake to Owens Gorge; along western side of Owens Valley from French Spring to Marble Creek and in Long Valley, Adobe Valley and Deep Springs Valley. Most areas are near pristine though sites on the north and east tend to be considerably disturbed.				
Prygulopsis sp. "B"[b]	Spring-snail	Bramlette Ranch in Benton Valley		
Spring heavily impacted by diversion apparatus and livestock degradation of channelized stream section.				

TABLE 49 (continued)

Scientific Name	Common Name	Location	Condition	Special Status[a]
Pyrgulopsis sp. "C" [b]	Spring-snail	Warm Springs along western flank of White Mt. Small section of upflow habitat in good condition, but smaller spring to north unfenced and highly trampled by livestock and vehicle traffic.		
Pyrgulopsis sp. "D" [b]	Spring-snail	Indian Wells Valley, east. slope Sierra Nevada Impoundment on Sage Canyon stream of controlling streamflow just above site where snails collect; Sand Canyon used by livestock and streambed appears trampled and polluted.		
Pyrgulopsis sp. "E" [b]	Spring-snail	East side of Owens Valley along escarpment of Northern Inyo and White Mountains. Most of the localities for this snail have been disturbed.		
Pyrgulopsis sp. "F" [b]	Spring-snail	Fish Slough in 3 of 4 main springs Habitat affected by impoundments to create pool habitat for Owens pupfish, livestock disturbance (unfenced), human recreational activities and possibly by earthquakes.		
Odontomyia Catatsina sp.	_____	Mono Lake	Unknown	
Odontomyia Odontomyia sp.	_____	Mono Lake	Unknown	
Oxyenthira sp.	Caddis fly	Convict Creek	Unknown	
Paraleptophlebia Pallipes	May fly	Convict Creek	Unknown	
Paraleptophlebia sp.	May fly	Convict Creek	Unknown	
Paracymus Subceprens	Beatle	Convict Creek	Unknown	
Pepicia sp.	True fly	Convict Creek	Unknown	
Physa Anatina	Snail	Convict Creek	Unknown	
Pisidium Casertanum	Clam	Convict Center	Unknown	
Polycelis sp.	Planaria	Convict Creek	Unknown	
Polycentropus Halidus	Caddis fly	Convict Creek	Unknown	
Procladtus Freemani	True fly	Convict Creek	Unknown	
Protopila sp.	Caddis fly	Convict Creek	Unknown	
Psectrocladius (n. sp.)	True fly	Convict Creek	Unknown	
Pteronarcys Princeps	Stone fly	Convict Creek	Unknown	
Pteronarcella Regularis	Stone fly	Convict Creek	Unknown	
Rhyacophia Vao	Caddis fly	Convict Creek	Unknown	
Rhyacophila Bifila	Caddis fly	Convict Creek	Unknown	
Rhyacophia Vaccua	Caddis fly	Convict Creek	Unknown	
Rhyacophia Acropedes	Caddis fly	Convict Creek	Unknown	
Rhyacophila Vuzana	Caddis fly	Convict Creek	Unknown	
Simulium Arcticum	True fly	Convict Creek	Unknown	
Simulium Argtus	True fly	Convict Creek	Unknown	
Simulium Aureum	True fly	Convict Creek	Unknown	
Simulium Canadense	True fly	Convict Creek	Unknown	
Simulium Jacumbae	True fly	Convict Creek	Unknown	
Simulium Piperi	True fly	Convict Creek	Unknown	
Simulium Tuberosum	True fly	Convict Creek	Unknown	
Simulium Venustum	True fly	Convict Creek	Unknown	
Siphlonurus Occidentalis	May fly	Convict Creek	Unknown	
Smittia Sterrima	True fly	Convict Creek	Unknown	
Tanytarsus sp.	True fly	Convict Creek	Unknown	
Tipula Dorsolineata	True fly	Convict Creek	Unknown	
Tipula Kennedyana (n.sp.)	True fly	Convict Creek	Unknown	

TABLE 49 (continued)

Scientific Name	Common Name	Location	Condition	Special Status[a]
Tipula Mono	True fly	Convict Creek	Unknown	
Tryonia protea	Spring-snail	Hot Creek in Long Valley		
Relatively pristine area apart from human recreational activity.				
Wiedemannia	True fly	Convict Creek	Unknown	
Wormaldia Gabriella	Caddis fly	Convict Creek	Unknown	

NOTES:
a. Considered to be special status species by California Department of Fish and Game, U.S. Fish and Wildlife Service, or the scientific community.
b. "A" to "F" species letters reflect Robert Hershler's designations.

SOURCE: CNDDB, 2000; USFWS, 1988; Robert Hershler, Draft Status Survey of Hydrobiidae in Owens River Drainage; D.B. Herbst, 1988.

FISHERIES AND OTHER AQUATIC RESOURCES

The waters of California are managed by the California Department of Fish and Game (CDFG). Fish known or expected to occur in Mono County are listed in Table 50. Several creeks in Mono County are managed or proposed for the maintenance or reintroduction of threatened and endangered species such as the Paiute cutthroat trout in Cottonwood and Cabin creeks; and the Lahontan cutthroat trout in Slinkard, Mill, Silver, Wolf, By-Day, O'Harrel and Glass creeks. Other important management areas include Hot Creek Springs, Owens Gorge and Fish Slough for the endangered Owens tui chub. The Owens pupfish and Owens dace are found in Fish Slough (CDFG, 1988). The Owens dace is being considered for special status listing with the CDFG. The Owens dace is supported by specialized habitats. An inventory of Owens dace is currently being conducted at Crowley Lake; however, no complete survey of these habitats of Owens dace has been done in Mono County (CDFG, 1989).

CDFG also manages "special waters." Catch-and-release waters, one type of special waters where anglers use flies or lures with barbless hooks and release fish back into the stream, include East Walker River, Hot Creek, Owens River and Crowley Lake. Hot Creek is a premier trout fishing stream in California. Crowley Lake is especially important because it contains particularly big fish. If the water level in Crowley Lake were raised, important spawning areas on tributary creeks would be inundated and the increased area of shallow water could result in more water quality problems in the lake (Wong, 1988). Lower Rush Creek and Mammoth Creek have been suggested for designation as catch-and-release streams. Other "special waters" are Roosevelt, Lane and Poore lakes. Junction Lake is crucial because it serves as a Kamloops rainbow trout brood stock lake for Hot Creek Hatchery, which operates year-round and provides trout for all of eastern California.

Although the above-mentioned streams, rivers and lakes have been given special management attention, all perennial streams in Mono County provide important spawning habitat to wild trout species. Especially important spawning areas for the Crowley Lake trout population are Owens River, McGee Creek and Convict Creek. In addition, CDFG manages special biological resources alongside water courses.

Draft studies are available which describe various endemic snail species dependent upon springs with minor thermal components. No studies of invertebrate populations that are supported by geothermal habitats have been conducted. Surveys of riparian environments along eastern Sierra streams are being conducted to document salamander habitat areas (Wong, 1988). However, no complete aquatic survey for invertebrate species has been done in Mono County. Fragmentary information is available from individual collectors.

One study being proposed is for a comprehensive study of desert waters in all of Mono County (Herbst, 1988). Table 49 lists invertebrate species that have been identified by CDFG and U.S. Fish and Wildlife Service (USFWS) and species that have received recent research attention.

Other related issues concerning CDFG are the effects on stream, river and lake water quality and on riparian vegetation from overgrazing and water diversions. Many of the streams of Mono County experience some level of water diversion. For example, 88% of the stream mileage of the Owens River Drainage and Mono Basin has been affected by water diversions, with nearly 38% experiencing a 50% and greater diversion level of the undiverted flow. Twenty percent of the total stream mileage has been impacted by diversions of 100% (CDFG, 1985).

Water diversions occur all year long. Winter water diversions present a particular hardship on native trout species since monthly water availability in eastern Sierra streams is less evenly distributed than on western Sierra slopes (CDFG, 1988). Unlike the western slope of the Sierra Nevada that experiences lowest flow levels during the summer months (July through October), the Eastern Sierra's period of lowest flows occurs during the winter from November through March. Unlike regions of California that have greater rainfall, monthly stream flows in the Eastern Sierra almost totally depend upon the annual snowpack. As a result, streams exhibit two distinct flow periods: a relatively brief snow runoff period (May through August) a lengthy low-flow period of 34% of the mean annual water yield (September through April) maintained primarily by groundwater, lake or glacier outflow.

Little information exists to determine the amount of stream flow that is needed during the winter months to sustain the existing trout populations. CDFG, however, recognizes that winter water diversions only increase the naturally high levels of trout mortality in the winter (CDFG, 1988). Needham et al. (1945) reported that the over-winter losses of all sizes of brown trout ranged from 26% to 85% and averaged 60% over four years in Convict Creek. Winter losses of the larger trout (four inches and longer) were higher, ranging from 48% to 91% and averaging 80% over four years. Decreased water levels from winter diversions reduce the availability of aquatic food organisms and increase the amount of ice formation to further escalate naturally high winter mortality rates (CDFG, 1988).

Water diversions at any time of the year affect the vitality of riparian vegetation. CDFG estimates that 14% to 25% of riparian vegetation may have already been lost along the creeks of the Owens River and Mono Basin drainage system (Federal Energy Regulatory Commission, 1986). In addition to direct loss of riparian vegetation from varying levels of water diversion, riparian vegetation on diverted reaches has also become more susceptible to flood flow damage (Taylor, 1984). Continued stress over long periods of time may lead to decreased growth, increased mortality and reduced seed production and viability which may lead to changes in species diversity and community structure (Taylor, 1982).

STATUS OF AQUATIC HABITAT TYPES

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> The decline of native fishes, amphibians and aquatic vertebrates in the Sierra Nevada ... reflects, to a large extent, the deterioration in the quality of the range's aquatic habitats. Factors contributing to this deterioration are multiple, cumulative and synergistic. They include changes in the amount and timing of stream flows, changes in water quality, reduction in structural complexity (from loss of riparian trees, channelization and other factors), changes in stream channels, siltation and invasions of non-native species.... (SNEP, Vol. II, Ch. 32, p. 945).
>
> The classification system of Moyle and Ellison (1991) was expanded and revised according to new knowledge obtained from personal observations, various forest management plans, consultation with other biologists and other sources. Each habitat type was then rated by the author in three categories: rarity, degree of disturbance and existing protection (Table 32.1). Rarity is essentially a rating of the frequency of the habitat type in the Sierra Nevada. Some habitat types, such as Mono Lake, are one of a kind; others are naturally rare (e.g., sphagnum bogs); others are widespread (e.g., alpine lakes) (SNEP, Vol. II, Ch. 32, p. 946).
>
> Nine of the aquatic habitat types were unique or extremely rare, which automatically gave them at least special concern status. This is appropriate because such habitat types tend to contain endemic organisms and to be subject to degradation. Examples include large lakes such as ... Mono Lake ... (SNEP, Vol. II, Ch. 32, p. 948).

STATUS OF FISH AND FISHERIES

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> Native fishes of the Sierra Nevada were found in four distinct zoogeographic regions, which shared surprisingly few species among them: 1) the Sacramento-San Joaquin drainage; 2) the Lahontan drainage, consisting of the Susan, Truckee, Carson and Walker rivers; 3) the Eagle Lake drainage; and 4) the Owens drainage. Each of these regions had assemblages (communities) of fish species that characterized different environments within the drainage (Moyle 1976) (SNEP, Vol. II, Ch. 33, p. 954).
>
> The Owens drainage ... has its own distinct fish fauna of four endemic species, mostly confined to the Owens River itself. It was separated from the Lahontan drainage by the fishless Mono Lake basin. All four of the major fish faunal regions shared a common trait with the Mono Lake basin: they were fishless at high elevations. The high-elevation regions were largely fishless because of the combination of extensive glaciation during the Pleistocene (which created most of the lakes) and steep topography (which created many barriers to natural fish invasions). In streams, the highest elevations reached naturally by fish (ca 3,000 m [9,800 ft]) occur either in unglaciated areas in the southern portion of the range (Kern River) or in the more accessible mountain streams on the east side. Only

about 20 lakes naturally contained fish (e.g., Convict), which is considerably less than 1% of the total. All such lakes were closely associated with streams containing fish and had no barriers to invasion (SNEP, Vol. II, Ch. 33, p. 954).

In the eastern Sierra Nevada, the highest elevations were reached by Lahontan cutthroat trout (more than 3,000 m [9,800 ft]) and Paiute cutthroat trout (2,500 m [8,200 ft]). However, in the Carson, Walker and Truckee drainages it was not unusual to find nontrout species (Paiute sculpin, Tahoe sucker, speckled dace, Lahontan redside) above 2,000 m (6,600 ft).... Fish were completely absent from the Mono Lake basin (including all streams) and the Owens River watershed did not historically contain trout. Of the four fishes native to the Owens River basin, only the Owens sucker was found above 1,500 m (4,900 ft), reaching Convict Lake (2,300 m [7,500 ft]), the only lake in the southeastern Sierra Nevada that naturally contained fish (SNEP, Vol. II, Ch. 33, p. 954).

The range [of rainbow trout] was greatly expanded by the transplanting of fish above barriers and the widespread stocking of hatchery fish both into fishless areas and throughout the eastern Sierra Nevada (SNEP, Vol. II, Ch. 33, p. 957). It is worth noting that one of the side effects of indiscriminate planting of trout throughout the Sierra Nevada was the introduction of other species of fish either as "contaminants" in the water used for transporting the trout, or as bait released by anglers. As a result, threespine stickleback, Owens sucker and tui chub are present in the Mono Lake basin (SNEP, Vol. II, Ch. 33, p. 966).

Presumably, most streams large enough to support trout contain them, especially if they are downstream of lakes containing trout or immediately upstream of such lakes. In a 1992 survey of 20 km (12.5 mi) of streams in the upper Lee Vining and Mill Creek watersheds (Mono Lake basin), Knapp (1996 [SNEP, Vol. III, Ch. 8]) found only 2 km (1.25 mi) without fish. It is likely that, as in the case of lakes, more than 90% of stream habitat suitable for trout now supports populations of them (SNEP, Vol. II, Ch. 33, p. 967).

BIOTIC INTEGRITY OF WATERSHEDS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

The biological health of Sierra Nevada watersheds can be measured using a broad-scale Index of Biotic Integrity (IBI). Indices of biotic integrity are measures of the health of streams and have been developed as an alternative to physical and chemical measures of water quality.... The basic idea is to combine a number of measures of the structure and function of fish communities into an index, on the assumption that the responses of an integrated community of fishes to changes in the environment would reflect both major environmental insults (e.g., a pesticide spill) and more subtle long-term effects, such as chronic non-point source pollution and changes in land use ... Biotic integrity is defined as "the ability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity and functional organization comparable to that of the natural habitat of the region (Karr and Dudley, 1981). An IBI is a method of measuring this complex idea and IBIs can be developed independently for different regions or streams (SNEP, Vol. II, Ch. 34, p. 975).

The following selected values for streams in Mono Count are taken from Appendix 34.1 (SNEP, Vol. II, Ch. 34, p. 984-85):

Name	Area (ha)	IBI	Storage (Acre Fee)	% Roads	% Roadless	% Fishless
Mono	174,723	36	87,670	4.57	67.5	86.1
Upper Owens	382,669	36	42,842	5.33	76.0	30.1
Mammoth Cr.	98,451	40	183,570	13.59	46.7	47.4
L.E. Fk. Walker	36,162	52	0	5.12	78.1	12.7
Slinkard Cr.	7,836	52	0	5.00	80.9	0
L.W. Walker	32,886	56	0	5.38	71.8	2.2
U.E. Fk. Walker	40,652	64	3,500	2.27	92.1	23.4
U.E. Fk. Walker	15,867	64	0	5.39	78.4	46.2
U. W. Walker	58,923	64	1,385	4.32	83.0	47.0

POTENTIAL AQUATIC DIVERSITY MANAGEMENT AREAS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

Aquatic ecosystems in the Sierra Nevada have been highly altered as the result of dams and diversions, watershed alterations and introductions of non-native species. The native aquatic biota has declined in diversity and abundance as a result. Reversing this trend requires appropriate, systematic management of watersheds throughout the range. Assuming that maintenance of some basic set of the native biota is desirable, a number of options for watershed management are possible, ranging from biodiversity-oriented management of all watersheds to simply reacting to the need to keep species from becoming extinct. A middle series of options, presented here, focuses on designating 42 watersheds as Aquatic Diversity Management Areas (ADMAs), whose first goal of management is the protection of aquatic biodiversity. The watersheds were chosen on the basis of size (greater than 50 km^2 [19 mi^2]), natural hydrologic regime, presence of native fish and amphibians and representativeness (SNEP, Vol. II, Ch. 57, p. 1493).

Suggested ADMAs in Mono County include Buckeye Creek, the West Walker River, Mono Basin, the Owens River above Crowley Reservoir and Convict Creek (SNEP, Vol. II, Ch. 57, Table 57.2). SNEP, Vol. III, Ch. 9 catalogs the potential ADMA watersheds and describes each watershed to indicate why it has been chosen for inclusion in the ADMA watershed system....

The Mono Lake watershed is recommended as an ADMA watershed, despite the fact that the streams are regulated and dominated by exotic trout, because Mono Lake itself is a unique ecosystem. It also has high scientific value in that it has been studied intensively for years and such long-term ecological studies can give us insights into what is happening to the Sierran environment on a much larger scale. Such scientific values are among the principal reasons for also singling out Sagehen Creek and Convict Creek for inclusion as ADMA watersheds, despite their relatively small drainage areas (SNEP, Vol. II, Ch. 57, p. 1495).

The term Significant Natural Area (SNA) is used by the California Department of Fish and Game (CDFG) to indicate areas with unusual biological value, usually as habitat for rare or endangered species or communities. Such areas are typically small and localized. SNAs designated by the CDFG have no formal protection but can form the basis for preserves. Here the term is used to designate aquatic habitats or ecosystems that contain unusual biotic elements but that are too small to be included as ADMA watersheds. Aquatic SNAs usually need special protection because they contain especially fragile species (e.g., spring-dwelling caddisflies) and/or because they are not contained in an ADMA watershed. Because of their small size and sensitivity to disturbance, aquatic SNAs will typically have to be treated as preserves if they are to continue to maintain their unusual elements; that is, they will have to be actively protected from heavy human use. A system of protected aquatic SNAs would supplement a system of ADMA watersheds, helping to ensure that all native species and natural communities in the Sierra Nevada can persist. Examples of aquatic SNAs include small, isolated streams that contain remnant populations of Lahontan cutthroat trout (e.g., By-Day Creek, Mono County).... (SNEP, Vol, II, Ch. 57, p. 1495-1496).

Examples of potential aquatic Significant Natural Areas in Mono County include:

- Silver King Creek (Upper) in the Carson-Iceberg Wilderness Area, which contains Paiute cutthroat trout;
- White Cliff Lake in the Carson-Iceberg Wilderness Area, which is an isolated cirque lake with native frogs;
- Headwaters of the Little Walker River in the Hoover Wilderness Area, which contains Lahontan cutthroat trout;
- Big Dry Creek Mono in the Humboldt-Toiyabe National Forest, which contains Lahontan cutthroat trout;
- Harvey Monroe Hall Research Natural Area in the Humboldt-Toiyabe National Forest, which contains amphibians and fishless lakes.

(SNEP, Vol. II, Ch. 57, Table 57.3).

TABLE 50
FISH KNOWN OR EXPECTED TO OCCUR IN MONO COUNTY

Scientific Name	Common Name	Special Status[a]
Archoplites interruptus	Sacramento perch	
Catostomus fumeiventris	Owens sucker	
Catostomus platyrhynchus	Mountain sucker	
Catostomus tahoensis	Tahoe sucker	
Cottus beldingi	Piute sculpin	
Cyprinodon nevadensis amargosae	Amargosa pupfish	
Cyprinodon radiosus	Owens pupfish	CA endangered
Cyprinus carpio	Carp	
Gambusia affinis	Mosquitofish	
Gasterosteus aculeatus	Threespine stickleback	
Gila bicolor snyderi	Owens tui chub	CA endangered
Ictaluras melas	Black bullhead	
Ictalurus nebulosus	Brown bullhead	
Ictalurus punctatus	Channel catfish	
Lepomis macrochirus	Bluegill	
Lepomis microlophus	Redear sunfish	
Micropterus dolomieui	Smallmouth bass	
Micropterus salmoides	Largemouth bass	
Oncorhynchus nerka	Sockeye salmon (kokanee)	
Prosopium williamsoni	Mountain whitefish	
Rhinichthys osculus	Owens speckled dace	
Richardsonius egregius	Lahontan redside	
Oncorhynchus aquabonita	Golden trout	
Oncorhynchus clarki henshawi	Lahontan cutthroat trout	
Oncorhynchus clarkii seleniris	Paiute cutthroat trout	
Oncorhynchus inykiss	Rainbow trout	
Salmo trutta	Brown trout	
Salvelinus fontinalis	Eastern brook trout /Brook trout	
Salvelinus namaycush	Lake trout	

NOTES:
a. As noted by the California Natural Diversity Data Base for Mono County, 2000.

SOURCES: Peter Moyle, Inland Fishes of California; James H. Roberts Associates, Preliminary Natural Resource Baseline and Environmental Sensitivity Analysis for Mammoth; Environmental Science Associates, Inc.

SPECIAL HABITATS

The CNDDB identified 10 known locations of important natural communities. The occurrence of these natural communities, listed in Table 51, is due to special circumstances such as pumice flats, natural springs, alkali marshes, geothermal vents or geothermally altered soils (USFS, 1981; Taylor and Buckberg, 1987; CDFG, 1988). Wetlands are also special natural communities because of their importance to wildlife. Potential wetlands throughout Mono County were identified in a Wetlands Study prepared for Mono County by EIP Associates in 1992 and by reference incorporated herein. The special habitats, including potential wetlands, are shown in Figure 28 (see Appendix A).

RIPARIAN AREAS AND WETLANDS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> Riparian habitats are especially important in semiarid regions, where the availability of moisture and a cool, shaded microclimate gives these habitats an ecological importance disproportionate to their areal extent. For example, in the Inyo National Forest, riparian areas constitute less than 0.4% of the land area but are essential for at least one phase of life for about 75% of local wildlife species (Kondolf et al. 1987). In this forest, many recreational activities for its annual 7 million visitors are also concentrated in riparian zones (SNEP, Vol. II, Ch. 36, p. 1009).
>
> Land-management agencies have conducted studies of riparian areas as a component of other assessments or planning studies. Mono County is conducting detailed mapping of wetlands, including riparian areas (R. Curry, University of California, Santa Cruz, 1995). Riparian areas along streams tributary to Mono Lake have been studied by a National Academy of Sciences committee ..., on behalf of parties to litigation over flow requirements for resident trout (Stromberg and Patten, 1990), in support of a water rights adjudication ... and in related studies (Kondolf and Vorster, 1993) (SNEP, Vol. II, Ch. 36, p. 1010).
>
> Where reservoir water is exported from the basin, base flows can be reduced. On Rush Creek, the principal tributary to Mono Lake, no regular base flow releases were made from Grant Lake Reservoir from 1941 to 1981 and a massive die-off of woody riparian vegetation ensued (Stine et al., 1984) (SNEP, Vol. II, Ch. 36, p. 1014-1015).
>
> Excess irrigation water can support riparian vegetation in artificially created wetlands, fed either by surface flows or groundwater recharged by excess irrigation waters. Along Rush Creek in Mono Basin, excess irrigation water infiltrated into permeable bedrock and reemerged downstream as springs. This process maintained high water tables, reestablished perennial flow and thereby supported riparian vegetation even when diversion had completely dried the channel upstream (Kondolf and Vorster 1993) (SNEP, Vol. II, Ch. 36, p. 1015).
>
> SNEP, Volume III, Chapter 1, "Management of Riparian Areas in the Sierra Nevada," does not specifically address Mono County but does present management options for riparian protection.
>
> Riparian areas are the focal point of many resource conflicts in the Sierra Nevada because they are a critical ecological link between land and water. Although scarcity of quantitative information and unaltered reference sites currently limit the development of quantitative conclusions about riparian health across the entire Sierra Nevada, a few generalities emerged from this assessment. Riparian areas have been changed by human activities to varying degrees throughout much of the range. The basic functions of riparian systems, such as providing shade, stability and organic matter to streams and habitat for avian and terrestrial wildlife, still remain in most places although often in impaired form. These functions have been largely lost in thousands of localities. The loss of functions is particularly evident in mountain meadows throughout the Sierra Nevada. A survey of riparian cover from aerial photographs showed that fragmentation is common along most riparian

corridors. Riparian areas lacking vegetative cover identified in the aerial photograph analysis were usually associated with vehicular access. Roads and urban development have converted riparian areas to impermeable surfaces and channelized streams. Stream crossings by roads impact riparian areas at thousands of places and are the main current impact associated with timber harvesting. ... Overgrazing has altered riparian communities throughout much of the Sierra Nevada. Impacts from overgrazing vary from subtle changes in plant vigor to conversion of wet meadows into sparsely vegetated and eroding landscapes. Besides these continuing impacts, future risks to riparian areas include accelerated urban development and additional water development. There are thousands of opportunities for restoration of locally degraded riparian areas. Streamside vegetation has remarkable ability to recover from disturbance, but artificial disturbances need to be removed or relaxed to give the natural recovery processes a chance (SNEP, Vol. III, Ch. 5, p. 203).

Riparian width has decreased dramatically in many eastern Sierra Nevada streams on alluvial fans (Taylor, 1982). Riparian communities along stream reaches that lose water through seepage into their bed or banks are at particular risk from diversions (Jones and Stokes Associates, 1989; Kondolf, 1989). About one-third of all stream reaches in Inyo and Mono counties have been dewatered with severe consequences for riparian environments (Taylor, 1983). Riparian vegetation has essentially disappeared where no water is permitted to flow in the natural channel (e.g., segments of Rush Creek in the Mono basin [Stine, 1991]). In channels depleted of riparian vegetation, floods have caused severe bank erosion, channel migration and road failures (Vorster and Kondolf, 1989). The loss of riparian vegetation contributed substantially to the instability of the channels (Vorster and Kondolf, 1989). ... Augmentation of flows at the receiving end of trans-basin diversion has widened channels and has pushed back riparian vegetation, as in the case of the upper Owens River (Stromberg and Patten, 1991) (SNEP, Vol. III, Ch. 5, p. 217).

Recent legal developments regarding water management in the eastern Sierra Nevada have led to the restoration of several stream segments that have been dewatered for decades. In 1994, the State Water Resources Control Board amended the water rights licenses on streams tributary to Mono Lake to increase flows and require restoration of the channels and associated habitat (Los Angeles Department of Water and Power, 1995). Restoration work completed between 1991 and 1995 focused on physical habitat improvements for fish and reestablishing riparian vegetation (e.g., Trihey and English, 1991; Stine, 1994). The next phase of restoration proposes to return large flows to the channels and allow natural stream dynamics to control the redevelopment of these long-dry channels (Ridenhour et al. 1995). Re-establishment of riparian vegetation would also be part of the continuing program, but considerable controversy surrounds the potential role of channel maintenance and flushing flows (Los Angeles Department of Water and Power 1995) (SNEP, Vol. III, Ch. 5, p. 234).

Wetlands in mountain areas have received much less attention than their counterparts in lowlands and coastal areas. Detailed investigations of wetlands in Mono County began in 1991 with a study of the Bridgeport Valley (Curry, 1992). Mono County and the Lahontan Regional Water Quality Control Board continue to advance wetland mapping and planning with another field effort in 1995 by Curry and his associates. Initial results include discovery of a variety of unusual types of wetlands and their associated floras. One particular wetland in southern Mono County, Fish Slough, has attracted attention for at least 40 years because of its value as a refuge for rare fish and plants (Pister and Kerbavaz 1984; Odion et al. 1992) (SNEP, Vol. III, Ch. 5, p. 236).

Almost every water project results in a break in the continuity of the riparian vegetation. The overall effects of this fragmentation are unknown. Regulation and diversion of streamflow have markedly altered riparian vegetation over thousands of kilometers. Where streams have been totally or seasonally dewatered, such as lower Rush and Parker creeks in the Mono Basin until a few years ago, riparian vegetation died out. In streams with diminished volumes, the riparian area becomes thinner as groundwater recharge from the stream is not as great as before diversion. In streams below dams that reduce flood peaks, the riparian vegetation usually encroaches upon the channel (SNEP, Vol. III, Ch. 5, p. 239).

There is tremendous potential for rehabilitation of degraded riparian areas. Some riparian vegetation tends to become reestablished rapidly once a chronic disturbance is removed, provided adequate water is available. Often, the chronic disturbance simply is the lack of water below a diversion. Even when streams have been completely dewatered for decades, resumption of streamflow rapidly returns life to the riparian area. Rewatering of long-diverted streams in the Mono Basin and the Owens Gorge below Crowley Lake has had dramatic results in just a few years. Geomorphic and wildlife recovery will require decades, but the reestablishment of a basic vegetation canopy is a fundamental step to ecosystem recovery (SNEP, Vol. III, Ch. 5, p. 241).

WILDLIFE USE AREAS

Throughout Mono County there are also wildlife use areas. These areas are designated for the unique role they play for wildlife species in breeding, raising young, wintering, summering and migrating. In Mono County, there are important deer migratory routes, summer and winter ranges and holding areas that are included in recent studies of the major herds of the county; sage grouse leks and general use areas; pronghorn antelope and bighorn sheep use areas; and more general use areas by water-fowl and raptors. Non-native feral goat and wild horse and burro areas are also shown. Non-native species have the potential to adversely impact native species in the struggle to meet food and habitat requirements. Figures 30 through 33 (in Appendix A) show these wildlife use areas.

In addition, Mono Lake is an important area for migrating birds. In 1991, Mono Lake was designated as an Internation Reserve in the Western Hemisphere Shorebird Reserve Network, primarily for its role in the annual migration of the Wilson's Phalarope.

The Inyo and Toiyabe National Forest Land and Resource Management Plans designate specific Management Areas that emphasize wildlife use and enhancement.

BIOLOGICAL RESEARCH AREAS

Within Mono County, there are areas that lend themselves to various biological studies due to their unique on-site resources. To encourage ongoing research in these locations, agencies have declared these sites research areas. Table 52 lists these areas and describes their specific locations, sizes and major resources.

TABLE 51
MONO COUNTY SPECIAL HABITATS

Map No. [a]	Name of Area	Special Values
44	Lahontan Conifer Forest Stream	The site offers riparian cover of willow and aspen. River bottom cobble and gravel. Habitat for brook trout downstream.
45	Lahontan Cutthroat Trout Stream	Excellent overall habitat for *Oncorhynchus clarkii henshawi* with the exception of spawning gravel. The area is impacted from grazing.
46	Lahontan Fishless Glacial Lake	Small lake in succession to meadow. Lake is eutrophic with water lilies and other emergent vegetation surrounded by meadow and conifer forest.
47	Lahontan Great Basin Scrub Perennial Pool	Area with thermal springs allowing for thermophillic algae to grow and invertebrates to live in patches of cooler outflow.
48	Mono Pumice Flat	Several locations catering to plant assemblages of *chrysothamnus parryivulcanicus--stipa elmeri. Lupinus duranii* and *astragalus monoensis,* both with federal candidate status, are frequently present on site.
49	Owens Mojave Helocrene	The site offers a low gradient stream lined with bulrush, a silt bottom and spring pools. Habitat for the native hydrobiid snail, exotic gambusia and crayfish.
50	Owens Mojave Limnocrene	The site contains springs with a population of *gila bicolor snyderi.* Exotic rainbow and brown trout are also present. Aquatic vegetation is abundant.
51	Owens Mojave Desert Perennial Pool	Site provides habitat for native hydrobiid snail, physa and lymnaea. Some bulrush along stream and pond. Livestock grazing on surrounding land without impact to site.
52	Owens Mojave Perennial Playa Lake	Rare salt lake. *Artemia monica* and *Ephydra hians* are the main species on the site. Island within lake constitutes an important bird nesting area. The lowering of lake levels presents a serious threat to imperil shrimp and nesting bird populations.
53	Transmontane Alkali Marsh	*Districhlis spicata, Scirpus* sp., *Typha* sp., *Distichlis* sp., *Carex* sp. and *Juncus* sp. occur within the site.
54	Wetlands	Wetlands provide important habitat for wildlife; improve water quality by filtering out unwanted nutrients, sediments and toxins; provide shoreline erosion control; and support the beginning of the food chain.

NOTES: a) Refer to Figure 28. SOURCE: California Natural Diversity Data Base.

Insert Bio Area Table 52

TABLE 52 (continued)

Name	Location	Size (Acres)	Agency	Major Features
Whippoorwill Flat Research Natural Area	Basin Ranges, eastern slope of Inyo Mtn., northeast slope of Waucoba Mtn., southeast side of Squaw Peak	3,328	USFS	This area contains a remarkably dense forest of pinon pine along with the plant association typical of the middle and upper elevation regions of the southwestern Great Basin. It also contains plants endemic to or rare in the Inyo Mountains.
Fish Slough Area of Critical Environmental Concern	Tri-Valley area, about four miles north of Bishop	35,926	BLM	Site of an unusual aquifer containing a lush riparian zone. The slough supports several unique species of flora and fauna, including the endangered Owens pupfish, Owens dace and Owens tui chub.
Travertine Hot Springs Area of Critical Environmental Concern	South of Bridgeport	40	BLM	The area has extremely unusual rock formations.
Mono Lake Tufa Reserve	Surrounding Mono Lake	17,000	State Parks	Site provides native grassland, marshes and tufa.
Mono Basin National Forest Scenic Area	Surrounding Mono Lake	118,300	USFS	Site provides native grassland, marshes and tufa. Site for ongoing wildlife research.
Slinkard-Little Antelope Wildlife Area	Monitor Pass, west of Coleville, two connected valleys	1,620	DFG	Site for ongoing wildlife research. The area provides deer winter range. Slinkard and Mill creeks are potential reintroduction sites for Lahontan cutthroat trout.
By-Day Creek Ecological Reserve	Northwest of Bridgeport	160	DFG	Site for enhancement of Lahontan cutthroat trout population.

TABLE 52 (continued)

Name	Location	Size (Acres)	Agency	Major Features
Hot Creek Hatchery	East of Mammoth Lakes, about six miles	137	DFG	Site for raising various trout species. Owens tui chub in some nearby pools.

SOURCES:
US Forest Service, Draft Environmental Impact Statement, Inyo National Forest; US Bureau of Land Management, Areas of Critical Environmental Concern; California Department of Fish and Game, Preston Johns, Lands Program Coordinator; California Department of Parks and Recreation, Art Fong, Associate State Park Resource Ecologist.

SPECIAL-STATUS SPECIES

California is well known for the diversity of its natural resources. The CDFG recognized the need to identify special species and habitats and to develop plans to preserve and maintain them. To help accomplish this goal, they established the California Natural Diversity Data Base (CNDDB), which inventories special-status species that are officially listed (state and federal) endangered, threatened and rare; plants listed by the California Native Plant Society (CNPS) as rare and endangered; and species considered by the scientific and conservation communities to be deserving of such listing (e.g., federal candidates species, agency sensitive species, etc.). The database is designed to function as a single source of information on the locations of special-status plants and animals, thus increasing the potential for species identification early in the planning process to avoid potential problems and establish effective mitigation measures. Database information, however, does not constitute a final assessment of special-status plants and animals in a given area. Accordingly, the U.S. Forest Service, BLM, U.S. Fish and Wildlife Service and the California Native Plant Society have provided information included in Table 53 listing special-status plant and animal species known or expected to occur in Mono County. Special-status species and special habitats registered with the CNDDB – and identified by the BLM and USGS – have been mapped in Figure 32 (see Appendix A).

In addition to the special-status plant, animal and habitat information received from CNDDB, the database identified three additional species for which specific habitat information is unavailable and unmapped: the Northern goshawk (*Accipiter gentilis*), Prairie falcon (*Falco mexicanos*) and spotted owl (*Strix occidentalis lucida*). The goshawk requires large trees with large branches to support the nest and therefore depends upon large, old growth trees. It breeds in montane areas with conifer forest, but can be found in eastside pine, black oak, pinon-juniper and lowland riparian vegetation types. The falcon requires cliffs with ledges for nesting and occurs throughout (and beyond) Mono County, using grasslands and other barrier areas as hunting sites. The spotted owl is known in Mono County from three responses to taped calls over a 10-year survey period. This low frequency of responses suggests that occasionally individuals may pass through the Eastern Sierra, but that they probably do not breed here (Hargis, 1989). Further studies should accompany any proposed development plans in areas that offer potential habitat for these species.

The Federal Endangered Species Act requires federal agencies to conduct formal Section 7 consultation with the U.S. Fish and Wildlife Service if a project under its review has the potential to impact a federally listed specie. For state-listed species, CEQA requires a lead agency to obtain a written jeopardy opinion from CDFG during preparation of the EIR.

TABLE 53
SPECIAL STATUS SPECIES KNOWN TO OCCUR IN MONO COUNTY

Map No. [a]	Scientific Name	Common Name	CDFG	Status [b] USFWS	CNPS	Other
	PLANTS					
	Abronia alpina			C1		X
	Angelica scabrinda	Charleston Angelica		C1		X
	Antennaria soliceps	Charleston pussytoes		C1		X
	Arabis bodiensis	Rock cress			2	
	Arabis cobrensis	Rock cress			2	
	Arabis ligniferia	Rock cress			3	
	Arabis microphylla var. microphylla	Small-leaved rock cress			4	
	Arabis ophira					X
	Arabis pinzliae	Pinzl's rock cress		C2		X
1	*Arabis tiehmii*	Congdon's rock cress			2	
	Arctostaphylos uva-ursi ssp. monoensis	Mono manzanita		C2	3	
	Arenaria stenomeres			C3c		X
	Asclepias cryptoceras ssp. cryptoceras	Milkweed			3	
	Asclepias eastwoodiana	Eastwood milkweed		C2		X
	Astragalus aequalis	Clokey milk-vetch			2	
	Astragalus geyeri var. geyeri	Milk-vetch			2	
2	*Astragalus Hohannis Howellii*	Long Valley milk-vetch	R	C3c	1B	
	Astragalus kentro-phyta var. panaus	Sweetwater mountains Milk-vetch			4	

TABLE 53 (continued)

Map No. [a]	Scientific Name	Common Name	CDFG	Status [b] USFWS	CNPS	Other
3	*Astragalus lentiginosus var. pisciensis*	Fish Slough milk-vetch			C1	1B
	Astragalus mohavensis var. hemigyrus	Half-ring pop milk-vetch		C2		X
4	*Astagalus monoensis var. monoensis*	Mono milk-vetch	R	C2	1B	X
	Astragalus oophorus var. clokeyanus	Lee Vining Canyon milk-vetch		C1		
	Astragalus oophorus var. lavinii	Milk-vetch			3	
5	*Astragalus pseudiodanthus*	Tonopah milk-vetch		C3c	1B	
	Astragalus ravenii	Milk-vetch		C2		X
	Astragalus remotas	Milk-vetch		C2		X
	Blepharidachne kingii	Hack			2	
6	*Calcochortus excavatus*	Inyo star-tulip		C2		
	Clayatonia megarhiza var. bellidifolia	Spring beauty		C3c	2	
	Caulostramina jaegeri	Jaeger's caulostramina		C2		X
	Centaurium namophilum var. nevadensis	Centaury			4	
	Cryptantha hoffmannii	Hoffman's cryptantha		C2		
	Cryptantha Roosiorum	Bristlecone catseye	R	C2		X
	Cryptantha Tumulosa	Mojave cryptantha		C3c		X
	Crymopterus Goodrichii	Goodrich spring parsley		C2		X
7	*Dedeckera eurekensis*	July gold	R	C2	1B	X
	Draba Arida			C2		X

TABLE 53 (continued)

Map No. [a]	Scientific Name	Common Name	CDFG	Status [b] USFWS	CNPS	Other
8	*Draba asterophora*	Tahoe draba var. aserpohora		C3c		X
9	*Draba cana*	Hoary draba			2	
	Draba crassifolia var. Nevadensis	Arc dome draba		C3c		X
	Draba cruciata var. integrifolia	Whitney Draba				
	Draba Douglassii var. crockeri	Draba		C3c	4	
	Draba jaegeri	Jaeger draba		C2		X
	Draba lemmonii var. incrassata	Sweetwater Mountains draba		C3c	4	
	Cymopterus Goodrichii	Goodrich spring parsely		C2		X
7	*Dedeckera eurekensis*	July gold	R	C2	1B	X
	Draba arida			C2		X
8	*Draba asterophora*	Tahoe draba var. asterophora		C3c		X
9	*Draba cana*	Hoary draba			2	
	Draba crassifolia var. Mevademsos	Arc dome draba		C3c		X
	Draba cruciata var. integrifolia	Whitney Draba				
	Draba Douglassii var. crockeri	Draba		C3c	4	
	Draba jaegeri	Jaeger draba		C2		X
	Draba lemmonii var. incrassata	Sweet Mountain draba		C3c	4	
	Draba paucifucta	Charleston draba		C2		X
10	*Draba quadricostata*	Bodie Hills draba		C3c	1B	X

TABLE 53 (continued)

Map No. [a]	Scientific Name	Common Name	CDFG	Status [b] USFWS	CNPS	Other
	Draba stenoloba var. ramosa	Blanched draba		C3c	4	
	Elymus scribneri	Rye grass			2	
11	*Eriogonum apmullaceum*	Mono buckwheat		C2	1B	X
12	*Eriogonum beatleyae*	Beatley's buckwheat		C3c	3	
	Eriogonum kearneyi var. kearney	Wild buckwheat			3	
	Eriogonum nutans var. nutans	Wild buckwheat			2	
	Eriogonum wrightii var.	Olanche peak wild buckwheat				
	Eolanchense			C3c		X
	Epilobium nevadense	Nevada willo-herb		C3c		X
	Ferocaatus acanathodes var. acanthodes	Ferocactus		C2		X
	Festuca arizonica	Fescue			2	
	Fimbristylis spadicea			C3c	2	
	Frasera pahutensis	Pahute frasera		C2		X
	Gentiana prostrata	Pigmy gentian			2	
	Glyceria grandis	Manna grass			2	
13	*Hackelia brevicula*	Poison Canyon stickseed		C2	1B	X
	Hackelia sharsmithii					
	Halimolobos virgata			C3c	2	
	Haplopappus alpinus	Alpine golden-rod		C2		X
	Heuchera duranii	Duran's heuchera		C3c	2	
14	*Horkelia hispidula*	White Mountains horkelia			4	

TABLE 53 (continued)

Map No. [a]	Scientific Name	Common Name	CDFG	Status [b] USFWS	CNPS	Other
	Hulea vestita ssp. inyoensis	Inyo Hulsea		C3c	2	
	Ivesia aperta					X
	Ivesia cryptocaulis	Charleston ivesia		C2		X
	Ivesia sericoleuca					X
	Ivesia Webberi	Webber iesia				X
	Juncus abjectus	Wire-grass			2	
15	*Kobresia myosuroides*	Kobresia			2	
	Lily calochortus excavatus	Inyo County mariposa		C2	1B	
16	*Lupinus duranii*	Mono Lake lupine		C2		X
	Lupinus padre-crowleyi	Dedecker's lupine	R	C2		X
17	*Lupinus sublanatus*	Mono County lupine			3	X
18	*Mimulus glabratus ssp. utahensis*	Utah monkeyflower			2	
	Oryzopsis micrantha	Ricegrass			2	
19	*Pedicularis crenulata*	Scallop-leaved lousewort			2	X
	Penstemon arenarius	Dune penstemon		C2		X
	Penstemon bicolor ssp. biocolor	Bicolored beard tongue		C2		X
	Penstemon bicolor ssp. roseus	Rose-colored beard tongue		C2		X
	Penstemon papillatus	Inyo penstemon		C3c	4	
	Phacelia inyoensis				4	
	Phacelia nashiana					X
20	*Phacelia monoensis*	Mono County phacelia		C2	1B	X
	Pinus aristata	Bristlecone pine			4	

TABLE 53 (continued)

Map No. [a]	Scientific Name	Common Name	CDFG	Status [b] USFWS	CNPS	Other
	Podistrera nevadensis	Sierra podistera			4	
	Polemonium	Mason's sky pilot		C3c	4	
	Rorippa subumbellata	Tahoe yellow-cress	E	C1		X
	Salix brachycarpa	Willow			2	
	Salix nivalis	Willow			2	
	Scirpus clementis	Yosemite bulrush			4	
	Scirpus Rollandii	Bulrush			2	
	Sclerocactus polyancistrus	Mojave fishhook cactus		C3c		X
	Sedum pinetorum	Pine City stonecrop		C2		
	Senecio Pattersonensis	Mono butterweed			4	
	Silene clokeyi	Clokey silene		C2		X
	Silene invisia			C3c		X
	Spartina gracilis	Alkali cordgrass			4	
	Sphaeromeria compacta	Low sagebrush		C1		
	Sphenopholis obtusata var. obtusata	Wedge Grass			2	
21	*Streptanthus oliganthus*	Masonic Mountain flower jewel		C3c	1B	X
	Synthyris ranuncululina	Charleston kittentails	E	C1		X
	Townsendia Jonesii var. tumulosa	Charleston ground daisy		C2		X
	Trifolium andersonii ssp. beatleyae	Beatley's five-leaf clover		C3c	2	
	Trifolium dedeckerae	Dedecker clover		C3c		X
	Viola purpurea va.charles tunensis	Charleston Mountain Viola		C3c		X
	Yosemite scripus	Bulrush clementis			4	

TABLE 53 (continued)

Common Name	Scientific Name	State Listing	# of Occurrences
Amargosa Pupfish	*Cyprinodon Nevadensis Amargosae*	None	1
Bald Eagle	*Haliaeetus Leucocephalus* (Nesting)	Endangered	1
Bank Swallow	*Riparia Riparia* (Nesting)	Threatened	5
Benton Valley Springsnail	*Pyrgulopsis Aardahli*	None	1
California Bighorn Sheep	*Ovis Canadensis Californiana*	Endangered	1
California Gull	*Larus Californicus* (Nesting Colony)	None	2
Fish Slough Springsnail	*Pyrgulopsis Perturbata*	None	3
Golden Eagle	*Aquila Chrysaetos* (Nesting/Wintering)	None	1
Great Grey Owl	*Strix Nebulosa* (Nesting)	Endangered	2
Lahontan Cutthroat Trout	*Oncorhynchus Clarki Henshawi*	None	6
Long-Eared Owl	*Asio Otus* (Nesting)	None	1
Mono Brine Shrimp	*Artemia Monica*	None	1
Mount Lyell Salamander	*Hydromantes Platycephalus*	None	2
Mountain Yellow-Legged Frog	*Rana Muscosa*	None	5
Nelson's Bighorn Sheep	*Ovis Canadensis Nelsoni*	None	1
Northern Goshawk	*Accipiter Gentilis* (Nesting)	None	31
Osprey	*Pandion Haliaetus* (Nesting)	None	1
Owens Pupfish	*Cyprinodon Radiosus*	Endangered	3
Owens Speckled Dace	*Rhinichthys Osculus SSP 2*	None	10
Owens Sucker	*Catostomus Fumeiventris*	None	9
Owens Tui Chub	*Gila Bicolor Synderi*	Endangered	6
Owens Valley Springsnail	*Pyrgulopsis Owensensis*	None	2
Owens Valley Vole	*Microtus Californicus Vallicola*	None	1
Pacific Fisher	*Martes Pennanti Pacifica*	None	3
Paiute Cutthroat Trout	*Oncorhynchus Clarki Seleniris*	None	2
Prairie Falcon	*Falco Mexicanus* (Nesting)	None	16
Sierra Nevada Mt. Beaver	*Aplodontia Rufa Californica*	None	2
Sierra Nevada Red Fox	*Vulpes Vulpes Necator*	Threatened	5
Swainson's Hawk	*Buteo Swainsoni* (Nesting)	Threatened	3
Travertine Band-Thigh Diving Beetle	*Hygrotus Fontinalis*	None	4
Virginia's Warbler	*Vermivora Virginiae* (Nesting)	None	1
Willow Flycatcher	*Empidonax Traillii* (Nesting)	Endangered	4
Wong's Springsnail	*Pyrgulopsis Wongi*	None	5
Yellow Warbler	*Dendroica Petechia Brewsteri* (Nesting)	None	2
Yosemite Toad	*Bufo Canorus*	None	5

TABLE 53 (continued)

Notes: a. See Figure 32 in Appendix A for map locations of the above species.

b. CDFG: California Department of Fish & Game Status (California Endangered Species Act) – T=threatened; E=endangered; R=rare; FP=fully protected; CSSC=Species of Special Concern (CDFG, 1988).

USFWS: U.S. Fish & Wildlife Status (Endangered Species Act)--E=endangered; C1=sufficient data to support listing; C2=candidate list 2, data being sought--current data are insufficient to support listing; C3c=too widespread and/or not threatened (Federal Register 50:39526-39583).

CNPS: California Native Plant Society--1A=presumed extinct in California; 1B=plants rare and endangered in California and elsewhere.

Other: Species considered biologically rare or restricted in distribution by agency or conservation group (e.g., U.S. Forest Service and Bureau of Land Management Sensitive Species, Audubon Society Blue List).

Source: California Natural Diversity Database, 2000.

PUBLIC HEALTH AND SAFETY*

EMERGENCY RESPONSE

Police
The Mono County Sheriff's Office has substations in Bridgeport and Mammoth Lakes. The Town has a Police Department. The California Highway Patrol has offices in Bridgeport and operates throughout the county.

Hospitals and Emergency Services
Mammoth Hospital in Mammoth Lakes, Mono General Hospital in Bridgeport and Northern Inyo Hospital in Bishop serve Mono County residents. People suffering from severe illnesses or injuries are taken to Reno or Los Angeles for treatment.

Emergency services operate out of Bishop (in Inyo County), Benton, Bridgeport, Coleville/Walker, June Lake and Mammoth Lakes. Mono County Paramedics operate the Coleville/Walker, June Lake and Mammoth Lakes services.

Fire Control
The U.S. Forest Service and the Bureau of Land Management have responsibility for fire control on their lands. Local volunteer fire protection districts serve community areas. The California Department of Forestry provides fire control services for private property that is outside a fire protection district. Undeveloped land in national forests is served mostly by volunteer firefighters who use natural water sources like streams and ponds instead of piped water systems. Most piped water systems are located in urbanized areas served by the California Department of Forestry and local volunteer fire protection districts, but the Forest Service does have some piped water systems in heavily used recreation areas. Fire protection services are discussed in greater detail in Chapter 4, "Community Services and Facilities," in this MEA.

IMMOBILE POPULATIONS
Populations of people who cannot be moved or evacuated easily in case of an emergency are generally located within community areas. Facilities that house immobile populations in Mono County include schools, medical facilities, senior centers and community centers (see Table 54).

PUBLIC GATHERING PLACES
Resident populations in Mono County cluster in the community areas. Since outdoor recreation provides the major economic base of Mono County, the recreation facilities discussed elsewhere in this document are the major gathering places outside communities for both visitor and resident populations. The largest public gathering place during winter months is the Mammoth Mountain Ski Area, which attracts large numbers of skiers annually. During summer months, use of recreation facilities is more dispersed among the numerous recreation sites, but recreation visitor days more than triple.

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*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific information on public health and safety.

TABLE 54
LOCATIONS AND TYPES OF IMMOBILE POPULATIONS

<u>Benton</u>
Edna Beaman Elementary School
Benton Senior Citizens Center

<u>Bridgeport</u>
Bridgeport Elementary School
Bridgeport Pilgrims School
Mono General Hospital and Mono Clinic
Bridgeport Memorial Hall
Senior Citizen Services

<u>Chalfant</u>
Chalfant Community Center

<u>Coleville</u>
Coleville Elementary School
Coleville High School

<u>Crowley Lake</u>
Mountain Montessori Preschool
Crowley Christian Elementary School

<u>June Lake</u>
June Lake Mothers Co-op
June Lake Mothers Nursery Child Care Center
Mountain Learning Center
June Lake Community Center

<u>Lee Vining</u>
Lee Vining Elementary School
Lee Vining High School

<u>Mammoth Lakes</u>
Mammoth Lakes Christian Preschool
Mammoth Lakes Lutheran Church Preschool
Mountain Montessori
Mammoth Elementary School
Mammoth High School
Mammoth Hospital
Mammoth Lakes Community Center

<u>Walker</u>
Walker Community Center
Walker Senior Citizens Center

HAZARDOUS WASTES

The Mono County Health Department has been certified by the California Environmental Protection Agency as the Certified Unified Program Agency (CUPA) for implementing the six program elements of the hazardous materials program.

CURRENT WASTE GENERATION

Waste Shipped Off Site

Mono County has produced minimum hazardous waste that has been recorded through DHS' Hazardous Waste Manifest system. There are no commercial Treatment Storage Disposal (TSD) facilities in the county. Small amounts of waste oil, waste solvents and used antifreeze are collected by a route-service hauler and waste-oil recycler.

Waste Managed On Site

Little hazardous waste is managed on site in Mono County.

Geothermal

Mammoth Pacific I, the operating geothermal plant in Mono County, produces a minimal amount of geothermal scale. The maintenance of equipment and facilities may require solvents, lubricants, or paints that may generate hazardous wastes.

Contaminated Sites

There are no contaminated sites listed on the federal superfund list. The State Water Quality Control Board maintains a list of sites contaminated from leaking underground storage tanks.

Solid Waste

There are six solid-waste landfill sites in Mono County and seven transfer stations. At this time it cannot be determined whether cleanup of any of these sites might contribute to wastes generated from future contaminated site cleanups.

Designated Hazardous Wastes Going to Nonhazardous Waste Facilities

There are no data to indicate that designated or hazardous wastes generated in Mono County are being transported to nonhazardous waste facilities.

Wastes Imported and Exported

There are no facilities that treat or dispose of hazardous waste in Mono County.

PROJECTED WASTE GENERATION

Large Hazardous Waste Generation

There are no large hazardous waste generators in Mono County. There are no long-range plans to indicate the development of new waste streams in Mono County.

Contaminated Sites

Approximately 90 underground storage tanks (USTs) have been identified in Mono County. Most of these contain vehicle or heating fuels; three or four contain waste oil.

PROJECTED COMMERCIAL TSD CAPACITY

TSD Facility Inventory

There are currently no plans to develop and operate commercial TSD facilities in Mono County. The transport of hazardous waste out of the county by waste-hauling services will continue. All medical waste is transported to TSD facilities outside Mono County.

There are no existing commercial or on-site hazardous waste treatment facilities in Mono County. It is likely that, except for the waste oil shipped out of the county for recycling, the remainder of the county's hazardous waste is disposed of at an approved TSD facility.

Used waste oil is picked up by either Reno Drain Oil or Crane's Waste Oil and transported to licensed TSD facilities.

HAZARDOUS WASTE REDUCTION

Mono County has identified a program for waste reduction in the Solid Waste Management Plan. Waste reduction includes "on-site practices that reduce, avoid or eliminate the need for off-site hazardous waste facilities. It involves source reduction, recycling and treatment." The principal sources of hazardous waste generation in Mono County are SQGs and households. The Hazardous Waste Management Element of the General Plan provides objectives, policies and potential actions to implement a hazardous waste management and reduction program for county generators.

EXISTING HAZARDOUS WASTE, MATERIALS TRANSPORTATION & SPILLS RESPONSE

Reno Drain Oil Service and Crane's Waste Oil are the principal hazardous waste transporters in Mono County. These companies transport hazardous waste oil about once a month, largely from Mono County generators to an oil recycling facility. U.S. 395 is the main transportation route.

Hazardous materials are also transported in the county. Up to 50 large vehicles containing hazardous materials may pass through the county daily. These materials run the full range of substances classified as hazardous. U.S. Highways 395 and 6 and State Routes 120, 108, 167 and 158 are all identified in the Mono County Emergency Plan as routes on which such materials are or may be hauled. Other local roads such as the Owens Road are also identified in that plan (Mono County, undated).

Caltrans and the California Highway Patrol (CHP) are the primary agencies responsible for response to a hazardous materials spill on major highways during transportation. Caltrans maintains a Hazardous Materials Response Trailer in Bishop, Inyo County.

PRESENT POLICIES AND PROGRAMS

Emergency Response Procedures

Mono County's Emergency Plan describes general emergency response procedures and responsibilities. An Emergency Response Plan and Inventory Program is administered by the Office of Emergency Services, Mono County's Sheriff's Department. The County's Hazardous Materials Response Release Plan describes this program.

Storage Regulations

Mono County has implemented an Underground Storage Tank (UST) Program, which is administered by the Mono County Health Department, Environmental Health. Above-ground storage is regulated under the County's Hazardous Materials Release Response Plan. Underground storage tanks are inspected annually.

Contaminated Sites

The Mono County CUPA is printing a list of contaminated sites.

Small Quantity Generators

Small quantity generators are inventoried and regulated under the Hazardous Waste Program Element by the Mono County CUPA.

Household Hazardous Wastes

Household hazardous waste is managed by the Department of Public Works. Household hazardous waste, including oil, paint and batteries, is collected at County-operated CUPA facilities.

HAZARDOUS MATERIALS

In addition to the hazardous wastes described in the preceding section, there are hazardous materials present in the county. These materials do not normally produce hazardous waste; nevertheless, these materials have the potential to create hazardous conditions. "The county's major hazardous materials vulnerability arises from the transport of solids, liquids and gases of hazardous nature that are trucked over state highways. Volumes of such materials can only be estimated: [California Highway Patrol] CHP experience indicates that up to 50 large vehicles containing hazardous materials may pass through the county daily. These materials run the full range of substances classified as hazardous.... Class A explosives, toxic chemicals, liquid petroleum and other gases, gasoline and diesel, acids and even some nuclear waste. In addition, there seems to be an increasing transport of mixed goods (e.g., chlorine bleach and soaps, fertilizers and diesel oils). These are packaged separately in commercial freight trucks and are not extremely hazardous in themselves but can combine to be deadly in case of a transportation accident" (Mono County, undated).

Smaller amounts of hazardous materials located in the county are:

- dynamite and other blasting products at Caltrans maintenance yards and ski resorts;
- liquefied petroleum gas (LPG) storage tanks near major communities, used by distributors;
- fuel storage tanks at service stations, airports and public agency storage at County, U.S. Forest Service, CHP, Caltrans facilities and Town of Mammoth Lakes;
- private, above-ground storage tanks of gasoline, diesel and LPG at homes and ranches. Individual tank volumes range from 100 to 1,000 gallons. Total volumes in the county exceed 250,000 gallons;
- working fluid in the heat exchange system of the Mammoth Pacific binary power plant, about 100,000 gallons of isobutane;
- geothermal brines used to generate power at the Mammoth Pacific power plant;
- limited amounts of pesticides, herbicides, paint products; and
- limited amounts of hazardous materials to include compressed chlorine gas, acetylene, oxygen, argon and nitrogen.

CHAPTER 19
NATURAL HAZARDS*

SEISMIC HAZARDS

Earthquakes
Mono County covers an area that is relatively young by geologic standards. It is located at a stress point where the earth's crustal plates are exerting opposite pressures against each other. This combination creates both "tectonic" earthquakes (e.g., land mass movement) and volcanic activity that can trigger earth shaking (e.g., magma chamber movement and lava dyke formations). Up-to-date information concerning earthquakes in the county is available on the U.S. Geological Survey website, www.usgs.gov.

Fault Movement
Earthquakes are usually caused by sudden movement along geologic faults. The California Department of Conservation, Division of Mines and Geology (DMG), has evaluated potentially and recently active faults in the Antelope Valley, Benton Valley, Bridgeport Valley, East Antelope Valley, Fish Slough, Hartley Springs, Mono Lake, Round Valley, Silver Lake, Slinkard Valley, Volcanic Tablelands, West Walker River and White Mountain areas of Mono County. Based upon these DMG studies, fault hazard zones (Alquist-Priolo Special Studies Zones) have been designated for the county (see Figure 34 in Appendix A). For additional current information on earthquakes and fault movement in the county, see the U.S. Geological Survey website, www.usgs.gov.

Groundshaking
The primary seismic hazard in the county is strong to severe groundshaking generated by movement along active faults. The entire county, except for a small portion of the Sierra crest, is in an area where intense groundshaking is possible. This area has been designated as a Seismic Zone 4, the zone of greatest hazard defined in the Uniform Building Code.

In addition to tectonic movement, the Long Valley-Mammoth Lakes region has experienced numerous earthquakes caused by the movement of magma below the earth's surface. The oval shaped Long Valley Caldera spans an area approximately 10 by 20 miles, and is among the largest volcanoes in the continental United States. For additional current information on the Long Valley caldera, see the USGS website, www.usgs.gov.

Ground Failure
Ground failure induced by groundshaking includes liquefaction, lateral spreading, lurching and differential settlement, all of which usually occur in soft, fine-grained, water-saturated sediments typically found in valleys. Areas at high risk are shown in Figure 35 (see Appendix A). During the 1980 Mammoth Lakes earthquake sequence, ground failure was prevalent at Little Antelope Valley, along margins of the Owens River in upper Long Valley, along the northwest margins of Lake Crowley and along Hot Creek meadow.

All of Mono County is situated within Seismic Zone 4, and consequently new construction in the county must comply with stringent engineering and building requirements. In addition, existing buildings that may be subject to seismic hazards must comply with new requirements of the unreinforced masonry building law (Government Code Section 8875).

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*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific information on natural hazards.

GEOLOGIC HAZARDS

Rockfall, Mudflow and Landslide Hazards

Rockfalls and landslides are particularly common along the very steep slopes of the eastern scarp of the Sierra Nevada, where talus slopes provide evidence of abundant past rockfalls. During the winter and spring months, rockfalls lubricated with snow and ice can become extremely fast moving and destructive. The May 1980 earthquakes triggered numerous rockfalls, especially at Convict Lake and in McGee Canyon (Bryant, 1980), and "spectacular rockfalls " were observed in Chidago Canyon and the White Mountains during the July 21, 1986, earthquake in Chalfant Valley (Smith, 1987). Landslides in areas of hilly and mountainous terrain can be triggered by groundshaking, heavy rains or human activities such as road cuts, grading, construction removal of vegetation, and changes in drainage.

Mudflows involve very rapid downslope movement of saturated soil, sub-soil and weathered bedrock. Large mudflows, such as the one that occurred in 1989 in the Tri-Valley area, can be destructive, particularly at the mouths of canyons. The movement of soil and debris by mudflow and other landslides over time is evident in the large alluvial fans at the edges of valley areas.

Subsidence

Subsidence is caused by tectonic movement of the earth; by withdrawal of fluids such as water or oil; by compaction that occurs when copious water is applied to an arid area; or by severe loading, such as when large bodies of water are impounded. The most dramatic tectonic subsidence occurs during earthquakes, when areas can drop suddenly. During the May 1980 sequence of earthquakes near Mammoth Lakes, there were several locations near the Hilton Creek Fault where the ground surface dropped about four inches on the northeast side of fractures. Along the "Mammoth Airport fault zone," up to 12 inches of vertical offset on the east side of ruptures was observed (Taylor and Bryant, 1980). Another tectonic change in ground elevation that occurs in Mono County is associated with the movement of magma beneath Long Valley Caldera. This has caused bulging of the resurgent dome centered on the Casa Diablo area by almost 20 inches since 1979 (Rundle et al., 1986). Most of the uplift occurred between 1980 and 1983; the rate of deformation has decreased since the January 1983 earthquake swarm (Linker et al., 1986)

No subsidence has been observed in Mono County due to fluid withdrawal, hydrocompaction or water impoundment. All major groundwater basins (see Figure 12) have been identified by the Division of Mines and Geology as areas where subsidence could occur if excessive groundwater pumping were done (CDMG, 1971).

Volcanic Hazards

Evidence of volcanic activity is abundant in Mono County and reaches from Black Point at Mono Lake to the extensive deposits of Bishop Tuff in the southern part of the county. Ages of volcanic features show that during the past 2,000 years, volcanic eruptions have occurred at an average rate of one per century (Rinehart and Smith, 1982). On May 25, 1982, the U.S. Geological Survey (USGS) issued a "Notice of Potential Volcanic Hazard" warning for the Long Valley area and established volcanic hazard zones around Inyo-Mono Craters and Long Valley Caldera because of activity in the magma chamber underlying the resurgent dome in Long Valley (Miller et al., 1982). In February 1984, the USGS notification system was changed from a three-phase to a one-phase warning system, and the Long Valley warning was rescinded (Mader and Blair, 1987). In July 1984, the USGS reported that the likelihood of a volcanic eruption had decreased, but stated that "...the area must be recognized as having the potential for volcanic activity." The volcanic hazards mapped in Figure 22 include explosive blasts; hot, flowing material; and ash fall.

For additional information on volcanic hazards, see the section on "Geologic Structure and Faulting" in Chapter 12, Geology and Soils. For additional current information on volcanic-related activity and impacts in Mono County, see the U.S. Geological Survey website, www.usgs.gov.

AVALANCHE HAZARDS

Thousands of snow avalanches occur in the Sierra Nevada each year. The U.S. Forest Service "Avalanche Handbook" defines avalanche to mean "a mass of snow that sometimes contains rocks, soil and ice moving rapidly downslope." Numerous factors contribute to unstable snow conditions, including snowpack structure, snow density, temperature fluctuations, wind speed and direction, precipitation intensity, etc. Most avalanches go undetected and pose no risk to man or his activities. Avalanches become hazardous to man when they cause impacts on human activities, such as:

- recreational backcountry use
- exposure on highways or railroads
- construction or maintenance activities
- resort activities such as ski areas
- emergency services (exposure to rescue teams, etc.)
- exposure to fixed facilities (homes, businesses, etc.)

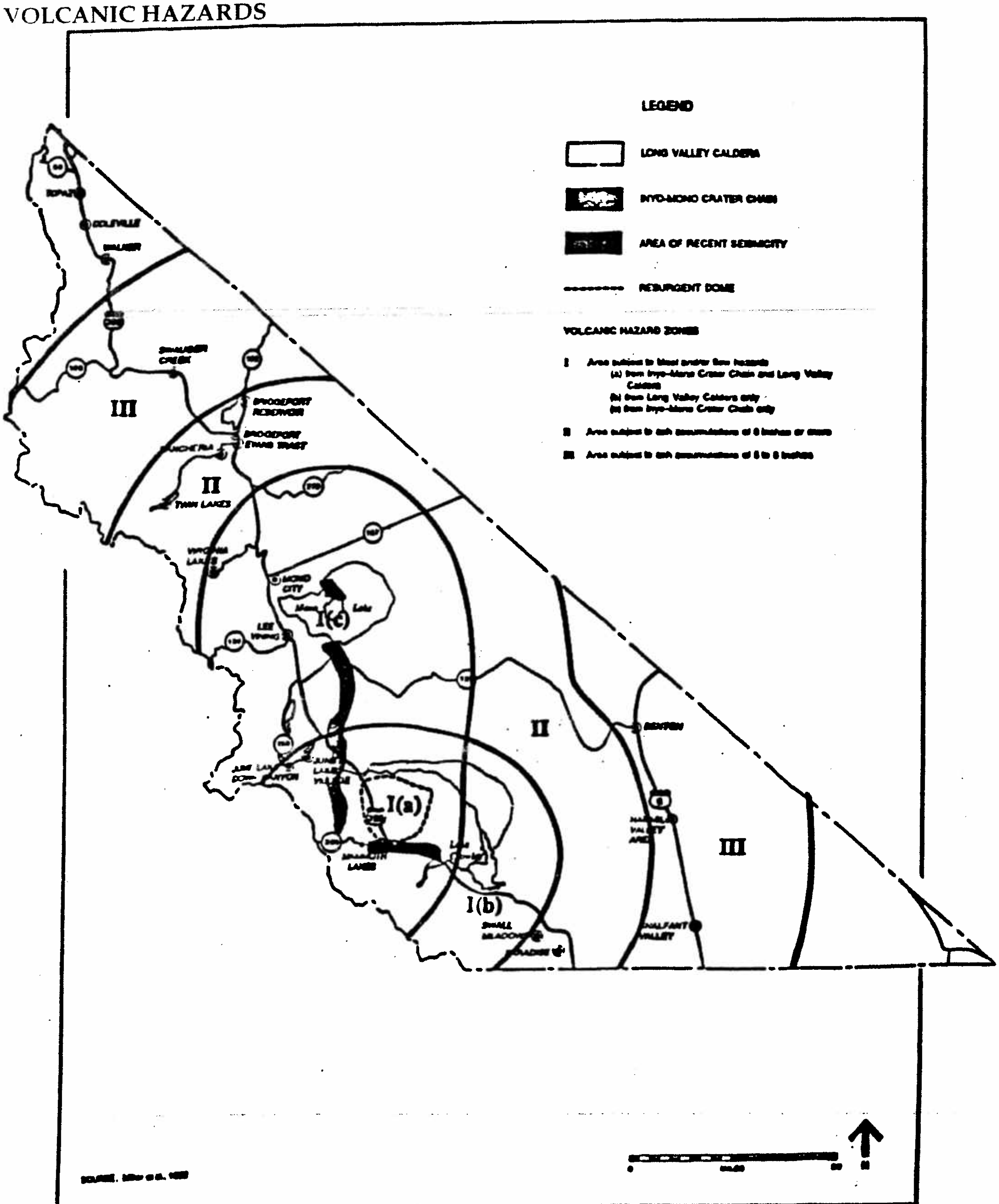
Most avalanches in Mono County occur in the backcountry, on USFS lands in the western portion of the county. A number of community areas, situated at the base of the eastern slope of the Sierra Nevada, have experienced recent avalanche activity. Both property damage (approximately 40 properties since 1969) and loss of life have resulted from avalanches in Mono County--most recently during the winter of 1985-86. Community areas influenced by avalanche hazards include Swauger Creek, Twin Lakes, Virginia Lake, Lundy Lake, June Lake, Long Valley/McGee Creek and Wheeler Crest (Swall Meadows). In addition, roadway sections threatened by potential avalanches include portions of Lower Rock Creek Road; U.S. 395 at Long Valley, Wilson Butte and just north of Lee Vining; Hwy. 158 entering the June Lake Loop; and several county roads entering eastern-slope community areas.

Avalanche Studies and Maps

In accordance with state law, avalanche hazard maps have been developed to illustrate areas of known avalanche occurrences (see Figure 37 in Appendix A). Several avalanche hazard analysis studies have also been prepared for the county that project potential avalanche runout areas. Through a number of public workshops, meetings and hearings, it has become evident that local residents and landowners are unwilling to accept "projected" runout areas as a basis for land use decisions. As an alternative and preferred option, local avalanche committees appointed by the Board of Supervisors have compiled historical runout maps. As the maps indicate, the amount and quality of avalanche historical data varies from community to community, and consequently, in some instances, the high hazard avalanche area projected in prior avalanche studies has been utilized to supplement local historical data. All pertinent information concerning the work of the five appointed committees and the avalanche policy formulation process--including committee recommendations and position papers, together with prior avalanche studies--are on file in the County Planning Department.

Without exception, all avalanches threatening developed community areas in Mono County originate on Forest Service lands. The Land and Resource Management Plan of the Humboldt-Toiyabe National Forest includes a policy to pursue land acquisitions in avalanche areas, and the Inyo National Forest has indicated support for exchanging certain privately owned hazards in the June Lake Area.

FIGURE 22
VOLCANIC HAZARDS



Avalanche Monitoring and Evacuation
The Inyo National Forest operates a backcountry avalanche monitoring program out of Mammoth Mountain facilities. This monitoring program issues avalanche hazard warnings during periods of high avalanche danger in the backcountry. The County Sheriff's Department keeps in contact with the Forest Service and should a hazardous situation develop, personally advises those within the hazard-prone area of the critical nature of the hazard.

FLOOD HAZARDS
Flooding is a potential risk to private properties situated in the vicinity of several waterways within the county. The Federal Emergency Management Agency (FEMA) has prepared Flood Insurance Rate Maps illustrating 100-year flood hazard areas for several streams. The community areas most likely to be impacted by a 100-year flood include properties along the East and West Walker Rivers, Reversed Creek and Spring Canyon Creek. Areas in these high hazard zones include Antelope Valley, Bridgeport Valley, the June Lake Loop and the Tri-Valley area. Floods in these areas have a 1% probability of occurring in any given year (i.e., the 100-year flood). The FEMA maps lack information regarding the base flood elevation and are therefore of limited use for planning purposes. The maps also lack information concerning local alluvial fan and mud-flow hazards. There is a significant need to update the flood hazard maps of community areas, particularly those for the Antelope Valley, June Lake and the Tri-Valley areas, where development pressures are the greatest.

Table 55 indicates the number of residential, commercial and outbuilding structures in Mono County that are located within flood zones identified by the Federal Emergency Management Agency. Figure 38 (see Appendix A) shows flood hazard areas.

Dam Failure
The Mono County Multi-Hazard Functional Plan (MHFP) prepared by the Office of Emergency Services indicates that 18 dams are located in Mono County. The lower and Upper Twin Lakes, Lundy Lake, Long Valley/Crowley Lake, Rush Creek Meadows and Saddlebag dams are identified as presenting some threat to downstream developed areas if dam failure were to occur. Regarding the risk of dam failure in Mono County, the MHFP concludes that "Mono County's dams are not major threats."

Figure 38 (see Appendix A) illustrates the areas subject to flood hazards and dam failure inundation, as well as the area that would be inundated if the dam at Crowley Lake were raised an additional 20 feet to provide an increased storage area.

Seiches
Seiches are earthquake-generated waves within enclosed or restricted bodies of water such as lakes and reservoirs. Similar to the sloshing of water in a bowl or a bucket when it is shaken or jarred, seiches can overtop dams and pose a hazard to people and property within their reach. There is no available evidence that seiches have occurred in Mono County lakes and reservoirs.

TABLE 55
STRUCTURES IN FLOOD ZONES

AREA	Residential	Outbuilding	Commercial	Total
Antelope Valley	123	40	8	171
Bridgeport Valley--Twin Lakes	37	19	13	69
June Lake	20	9	6	35
Tri-Valley	36	36	0	72
Mammoth Vicinity	0	0	5	5
TOTAL	216	104	32	352

SOURCE: Jim Kirby, Code Enforcement Officer, 1990 Flood Hazard Survey.
(This table will be updated as soon as new information becomes available--2001.)

FIRE HAZARDS

Wildland Fire and Fuels

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> Presettlement fire strongly influenced the structure, composition and dynamics of most Sierra Nevada ecosystems. Many species and most communities show clear evidence of adaptation to recurrent fire, further demonstrating that fire has long been a regular and frequent occurrence. This is particularly true in the chaparral and mixed conifer communities, where many plant species take advantage of or depend on fire for their reproduction or as a means of competing with other biota (SNEP, Vol. I, Ch. 4, p. 63).
>
> The variable nature of presettlement fire helped create diverse landscapes and variable forest conditions. In many areas frequent surface fires are thought to have minimized fuel accumulation, keeping understories relatively free of trees and other vegetation that could form fuel ladders to carry fire into the main canopy. The effects of frequent surface fires would largely explain the reports and photographs of those early observers who described Sierran forests as typically "open and parklike." However, such descriptions must be tempered by other early observations emphasizing dense, impenetrable stands of brush and young trees (SNEP, Vol. I, Ch. 4, p. 63).
>
> Periodic fires performed a number of ecological functions. Fire damaged or killed some plants, setting the stage for regeneration and vegetation succession. Many plants evolved fire-adapted traits, such as thick bark and fire-stimulated flowering, sprouting, seed release and/or germination. Fire influenced many processes in the soil and forest floor, including the organisms therein, by consuming organic matter and by inducing thermal and chemical changes. And it affected the dynamics of biomass accumulation and nutrient cycling and generated vegetation mosaics at a variety of spatial scales (SNEP, Vol. I, Ch. 4, p. 64).

East-Slope Sierran Ecosystems and Fire

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> The literature on east-slope Sierran ecosystems is sparse. There are several vegetation types on the east slope, including pinon-juniper, sage-bitterbrush, and east-side lodgepole ... and east-side pine and mixed conifers. But of these various types, only the east-side pine forests have received enough study to be comprehensively reviewed here (SNEP, Vol. II, Ch. 39, p. 1091).
>
> Generally, the east-side pine forest is roughly defined by the region dominated by various pine species east of the Sierra Nevada crest (McDonald 1983). Because the east-side pines have not been widely studied, they are poorly described both geographically and ecologically. In the northeastern California region, they fall in the elevation range of 1,220-1,980 m (4,000-6,500 ft) (McDonald 1983). Ponderosa and Jeffrey pines (*Pinus ponderosa, P. jeffreyi*) are the dominant species, and white fir (*Abies concolor*), incense cedar (*Libocedrus decurrens*), and, on pooper site, juniper (*Juniper* spp.) are commonly found associates (Andrews, 1994). Fire is an important factor in maintaining this vegetation type (Sweeney, 1968), but because the rate of the biotic processes is slow, the system is less resilient and requires a longer recovery period after fire than the west-side vegetation types (Andrews 1994) (SNEP, Vol. II, Ch. 39, pp. 1091-1092).
>
> The plant succession sequence following severe fires in this type generally proceeds from herbs, to shrubs, to pine, to fir (Sweeney, 1968). For the Inyo area, the postfire sequence proceeds from herbs to a shrub and pine mix (Millar personal communication). Succession of western juniper is usually a function of disturbance: after severe fire, western juniper is usually reduced greatly in abundance, sometimes almost to elimination, and perennial grasses increase both in abundance and productivity (Andrews, 1994) (SNEP, Vol. II, Ch. 39, p. 1092).
>
> Concerning biodiversity, east-side pine forests have low species diversity when compared to their west-side counterparts (Andrews, 1994). Understory grasses and herbaceous vegetation were thought to be generally abundant historically, because of the frequent fire and open canopy conditions in the past. Although many junipers are believed to germinate better after fire (Millar personal communication), western junipers are thought to be susceptible to fire and would decrease with fire (Andrews, 1994). A major regeneration pulse of white fir (*A. concolor*), shrubs, western juniper (*Juniperus occidentalis*), whitebark pine (*P. albicaulis*), ponderosa pine (*P. ponderosa*), and Jeffrey pine (*P. jeffreyi*) was observed for the early 1900s (before 1930), but the driving forces behind these changes are largely unknown. Suggested candidates include the cessation of sheep grazing, logging of large trees, fire suppression, and a concurrent wet climatic period (SNEP, Vol. II, Ch. 39, p. 1092).
>
> Fire exclusion and selective logging have been suggested to have caused the observed shift toward shade-tolerant conifers, especially white fir and, in some places, incense cedar. Andrews (1994) has suggested that high-severity fires may benefit species adapted to such fires (e.g., deer brush [*Ceanothus* spp.] and manzanita [*Arctostaphylos* spp]), introduced herbaceous species (e.g., cheat grass [*Bromus secalinus*]), and persistent herbaceous species (e.g., mule ear [*Wyethia glabra*]) (SNEP, Vol. II, Ch. 39, p. 1092).
>
> Historically, tree canopies in this area were characteristically open and exhibited a high degree of horizontal diversity but relatively low vertical diversity. There was a diverse mosaic of seral stages and slow-growing, long-lived tree species. In the recent past, vertical diversity in this area has increased, and horizontal diversity has decreased. It has also been observed that the small patches of older, large trees have been lost from the system extensively (Andrews, 1994) (SNEP, Vol. II, Ch. 39, p. 1092).

Because of the dry climate, the rates of both fuel accumulation and decay are slower on the east slope than on the west. Before European settlement, fuel structure was thought to consist mostly of low levels of small, woody fuels, litter and duff. Coarse, woody debris was thought to have been patchy. Snags were thought to have stood longer than they do now, but exactly how long is unknown (Andrews 1994). Fire suppression is thought to have greatly changed the fuel complex to more small, surface fuels, more vertical fuel distribution favoring crown fires, and greater fuel loading overall. Together, these changes increase the probability of large, high-severity fires (Andrews, 1994) (SNEP, Vol. II, Ch. 39, p. 1092).

Fires in this region were primarily of low severity, with patches of high severity corresponding mostly to areas with heavy fuel accumulations or dense patches of small tress. More mesic sites burned less often, but fires were somewhat more severe when they did occur. Such fire patterns resulted in a mosaic of diverse, small, even (or similar) aged (or sized) patches, which exhibited little vertical diversity. Such "fine-grained" forest mosaic was occasionally fragmented into more "coarse-grained" mosaic by a number of landscape elements common to the east-side pine type, including sagebrush flats, low sites, rock outcrops and scarps, meadows, springs, cold-air pockets, brush fields, lava flows and occasional large, high-severity burns. Large, intense fires create large patches that remain for a long time in early- and mid-seral stages (Andrews 1994) (SNEP, Vol. II, Ch. 39, p. 1092).

East-side pine forests are characterized by low levels of stocking, productivity and growth rates, and nutrient cycling and decomposition are slow. Fire seems to help increase the rate of nutrient cycling. There has been a significant loss of soil productivity, and Andrews (1994) has suggested that the large, high-severity fires and earlier impacts from logging and harsh mechanical site preparation are the major causes (SNEP, Vol. II, Ch. 39, p. 1092).

Wildland Fires in Mono County

The combination of highly flammable fuel, long dry summers and steep slopes creates a significant natural hazard of wildland fire potential in most of Mono County. Wildland fires can result in death, injury, economic loss and significant public investment in fire fighting efforts. Woodlands and other natural vegetation can be destroyed resulting in a loss of timber, wildlife habitat, scenic quality and recreational resources. Soil erosion, sedimentation of fisheries and reservoirs, and downstream flooding can also result.

The Inyo National Forest, the Humboldt-Toiyabe National Forest, the Bureau of Land Management (BLM) and the California Department of Forestry (CDF) use similar ratings systems to assess fire hazards throughout the county. The rating systems take into account the economic value of the resources on the land, the potential rate of spread due to fuel type and the resistance to fire control. The BLM has not rated the land it manages in Mono County for fire hazards. Much of the Forest Service land is rated as moderate to high fire hazard (see Figure 23).

On national forest lands, a high rating is applied to areas with the most continuous fuel. These areas also tend to be the most heavily used recreational areas. Areas of extreme/high hazard also include steeply sloped terrain subject to frequent critical fire weather (i.e., more than eight critical fire days per year) and/or heavy to medium fuel loading (i.e., woods, brushwood, or scrub). The areas that are rated medium are lands with less recreation demand and lower economic value to the forest. The areas rated low typically have little fuel to burn and little, if any, recreation demand.

Fire hazard severity has been mapped for most of the privately owned land in Mono County by the California Department of Forestry (CDF). All areas except the Bridgeport Valley and Antelope Valley have been rated as having a very high fire hazard. The Bridgeport Valley has a moderate fire hazard rating, and the Antelope Valley has not been rated. With the exception of the Antelope Valley, all privately owned lands in Mono County are within the State Responsibility Area (SRA).

The State of California recently adopted wildland protection regulations for future development in the SRA. These regulations address emergency access, signing and building numbering, private water supply reserves for emergency fire use, and vegetation modification; Mono County has adopted a local ordinance that has the same practical effect as the CDF regulations (Fire Safe Regulations, Chapter 22 of the Mono County Land Development Regulations).

Fire Management Policies and Programs
The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section. For a discussion of the air quality impacts of prescribed burning see "Fire and Fire Suppression Activities" under Air Quality in Chapter 11, Physical Features.

> For most of this century the goal of fire management in the Sierra was to control fire. The policy was aggressively and successfully applied, substantially reducing annual acres burned. This goal was based on a fire policy that emphasized keeping wildland fires as small and inexpensive as possible. As the role of fire in maintaining Sierran ecosystems has been recognized, fire has been reintroduced through the application of planned prescribed fire and prescribed natural fire. Despite changes in fire-management policy that have allowed expanded use of fire, relatively few acres have been managed using fire in the Sierra Nevada (SNEP, Vol. II, Ch. 40, p. 1101).
>
> The forest plans for the Inyo, Tahoe and Lassen national forests and the Lake Tahoe Basin Management Unit allow use of ASR (appropriate suppression response--ASR implies that the most cost-effective response might deviate from a suppression policy that emphasizes keeping all fires small) on all fires on forest land (SNEP, p. 1104). Thirty-five (35) percent of all wildfires through 1994 on the Inyo National Forest used confine and/or contain fire suppression strategies; sixty-five (65) percent used control fire suppression strategies (SNEP, Vol. II, Ch. 40, Table 40.1, p. 1104).
>
> All forests use MIST in wilderness areas. [Minimum impact suppression tactics are those fire-suppression tactics that use the minimum tools needed to do the job. They also accomplish the fire suppression using methods that produce the least visual impact. Techniques include flush cutting of stumps, use of natural barriers or roads as firelines, retention of snags, narrow firelines and other techniques that minimize the impacts of fire suppression.] In addition, the El Dorado and Inyo national forests and the Lake Tahoe Basin apply MIST whenever possible outside wilderness areas. Several fire managers mentioned the cost savings in reduced rehabilitation through implementing these tactics (SNEP, Vol. II, Ch. 40, p. 1105).
>
> In 1993 and 1994, the Inyo National Forest planned prescribed fires on 800 acres each year; in 1993, 165 acres were burned; in 1994, 365 acres were burned (SNEP, Table 40.5, p. 1111). In 1995, the estimated per acre cost of prescribed burns on the Inyo National Forest was 53-111 dollars for burning hand and machine piles (SNEP, Vol. II, Ch. 40, Table 40.6, p. 1112).
>
> Fuel treatments are necessary in many vegetated areas of the Sierra Nevada to mitigate the effects of decades of fire suppression and land-management activities on fuel accumulations and understory canopies. Treating fuels will reduce the severity of wildfires and, as a result, the threat to human lives, the destruction of property and valuable resources, and the

alteration of natural fire regimes.... It was obvious from the simulations that fuel breaks alone do not halt the spread of wildfire. Prescribed burning appears to be the most effective treatment for reducing a fire's rate of spread, fireline intensity, flame length and heat per unit of area. A management scheme that includes a combination of fuel treatments in conjunction with other land-management scenarios should be successful in reducing the size and intensity of wildfires (SNEP, Vol. II, Ch. 43, p. 1155).

Landscape Level Strategies for Forest Fuel Management

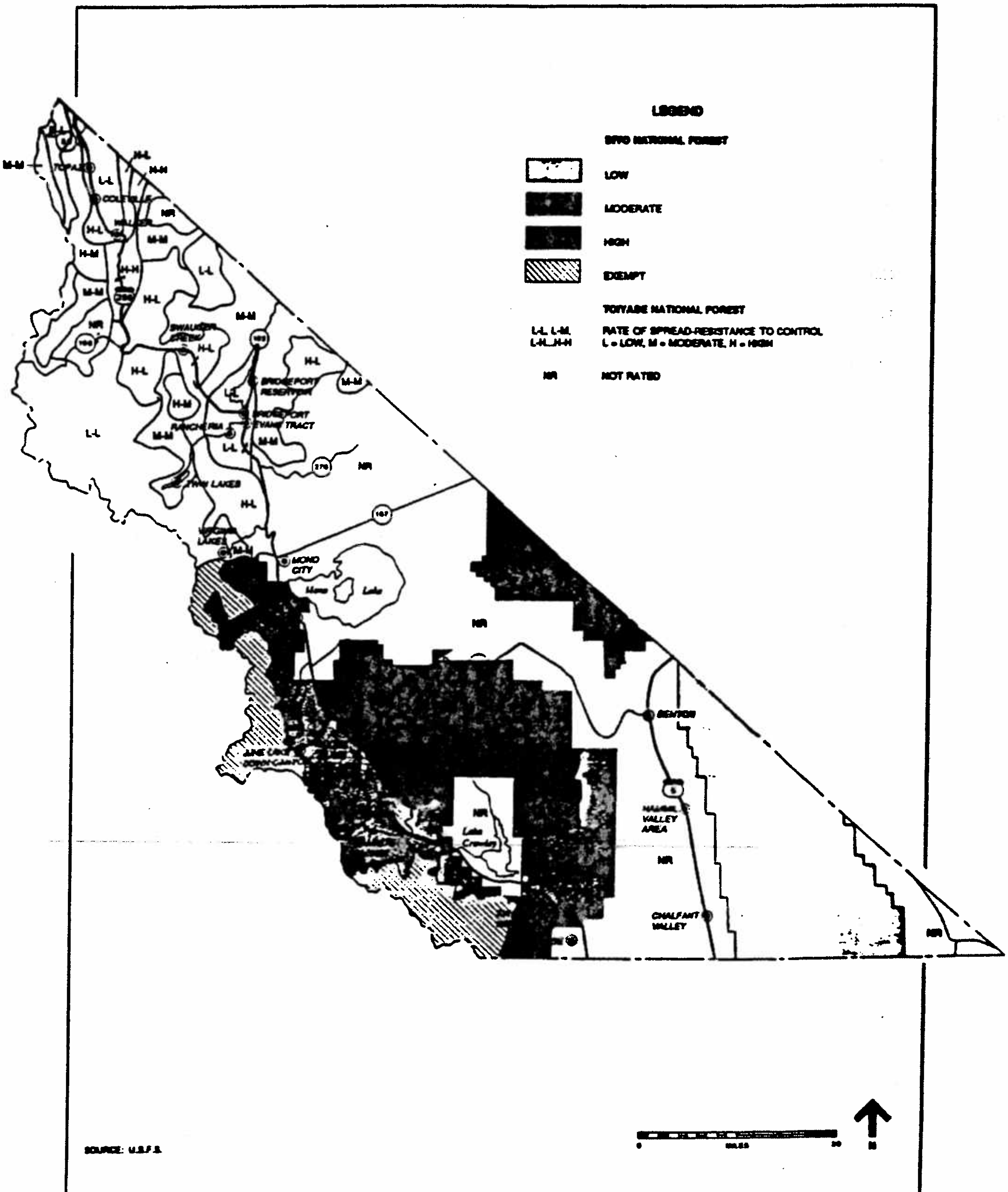
The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

The strategy has three general goals, ranging from short to long term and from relatively narrow to broad. Each goal can be viewed as nesting within the following one. The first goal--the immediate need from a fire-management standpoint--is to reduce substantially the area and average size burned by large, severe wildfires in the Sierra Nevada. ... A second, longer-term goal should be to restore more of the ecosystem functions of frequent low- to moderate-severity fire. A third, overarching goal is to improve the health, integrity and sustainability of the Sierra Nevada ecosystems (SNEP, Vol. II, Ch. 56, p. 1479).

The strategy we discuss here has three basic components: (1) networks of defensible fuel profile zones (DFPZs) ... created and maintained in high-priority locations; (2) enhanced use of fire for restoring natural processes and meeting other ecosystem management goals; and (3) expansion of fuel treatments to other appropriate areas of the landscape, consistent with desired ecosystem conditions (SNEP, Vol. II, Ch. 56, p. 1480).

Multiple benefits of DFPZs may include (1) reducing severity of wildfires within treated areas (as with any fuel-management treatment), (2) providing broad zones within which firefighters can conduct suppression operations more safely and more efficiently, (3) effectively breaking up the continuity of hazardous fuels across a landscape, (4) providing "anchor" lines to facilitate subsequent areawide fuel treatments, and (5) providing various nonfire benefits (SNEP, Vol. II, Ch. 56, p. 1480).

FIGURE 23
FIRE HAZARDS



Urban Fires
The eleven fire protection districts in the county provide fire prevention services through activities such as education and development review. The districts also provide varying levels of fire suppression and emergency medical response services to community areas. Chapter 4 of the MEA, "Community Services and Facilities," provides a summary description of fire district service levels and capabilities. Much of the privately owned land in the county is located outside fire protection districts, and therefore lacks formal structural fire protection service.

Clearance Around Structures
Adequate clearance of flammable vegetation around individual structures and clusters of structures serves to prevent the spread of fire from the wildland to structures, and from structures to wildlands. The Mono County Fire Safe Regulations (Chapter 22 of the Land Development Regulations) require the maintenance of clearances around structures.

Peak Load Water Supplies
Water supplies for fire prevention services are provided by a variety of mutual water companies, County Water Districts, Public Utility Districts and Community Services Districts, as well as by the mobile water tenders of the local Fire Protection Districts. Chapter 4 of the MEA, "Community Services and Facilities," discusses the general capabilities and availability of local community water service in the county. Minimum water capacities for fire protection purposes are established in the Mono County Fire Safe Regulations (Chapter 22 of the Land Development Regulations).

Road Widths
Adequate road widths are necessary to ensure ready movement of fire engines, bulldozer-transport units and other heavy firefighting equipment to developed areas of the county. The Mono County Public Works Department has established road width standards that apply to new development projects. Additional road width standards are established in the Mono County Fire Safe Regulations (Chapter 22 of the Land Development Regulations).

Evacuation Routes
The Mono County Multi-Hazard Functional Plan indicates that major routes (state and county), immediate access routes to community areas, and internal community street systems could be subject to closure by avalanches, landslides, snow and fog whiteouts, and flooding. In addition, imminent hazards such as high avalanche hazard conditions could prohibit travel even along open access routes. The developed areas of Wheeler Crest, Lundy Lake, Virginia Lakes and Twin Lakes all have only one access.

The Mono County Multi-Hazard Functional Plan, which includes the Mono County Caldera Initial Response Plan, sets forth site-specific evacuation plans as well as general evacuation procedures for various emergency situations. The Wheeler Crest Area Plans also calls for development of an additional access road into the community area.

GLOSSARY

ACEC **Area of Critical Environmental Concern.** Designated by the BLM for special management to protect resources.

BLM **Bureau of Land Management.** Responsible for managing a portion of the public lands in Mono County. See www.blm.gov -- National office, www.ca.blm.gov -- California office, www.ca.blm.gov/bishop -- Bishop office.

CASP **California Aviation System Plan.** Prepared by Caltrans every five years to integrate regional aviation system planning on a statewide basis.

CDFG **California Department of Fish and Game.** Responsible for California Natural Diversity Database (CNDDB), wildlife and habitat conservation data, special status species information, wildlife habitat conservation. See www.dfg.ca.gov

CTC **California Transportation Commission.** Formulates and evaluates state policies and plans for transportation programs. Approves the RTIP, the STIP and the SHOPP.

CURES **Coalition for Unified Recreation in the Eastern Sierra.** A group composed of representatives from local, state and federal agencies in the Eastern Sierra whose goal is to coordinate activities related to recreation and tourism.

FHWA **Federal Highway Administration.** A component of the U.S. Department of Transportation, established to ensure development of an effective national road and highway transportation system. Approves federal funding for transportation projects.

FSTIP **Federal State Transportation Improvement Program.** A three-year list of transportation projects proposed for funding, developed by the State in consultation with Metropolitan Planning Organizations and local non-urbanized governments. The FSTIP includes all FTIP projects and other federally funded rural projects.

FTA **Federal Transit Administration.** A component of the U.S. Department of Transportation, responsible for administering the federal transit program under the Federal Transit Act, as amended and TEA 21.

FTIP **Federal Transportation Improvement Program.** A three-year list of all transportation projects proposed for federal funding, developed as a requirement of funding. In air quality non-attainment areas, the plan must conform to the SIP.

IIP **Interregional Improvement Program.** One of two broad programs under the STIP. Funded from 25% of the SHA revenues programmed through the STIP.

ITIP **Interregional Transportation Improvement Program.** Funds capital improvements on a statewide basis, including capacity increasing projects primarily outside urbanized areas. Projects are nominated by Caltrans and submitted to the CTC for inclusion in the STIP. Has a four-year timeframe and is updated biennially by the CTC.

ITS **Intelligent Transportation Systems.** The use of advanced sensor, computer, electronics, and communication technologies and strategies to increase the safety and efficiency of the transportation system.

LOS **Level of Service (LOS)** is a qualitative measure describing operational conditions as perceived by motorists within a traffic stream. LOS generally describes these conditions in terms such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. Current LOS conditions are based on the latest traffic counts. Projected LOS conditions are based on growth factors derived from historical growth trends.

LOS A A condition of free flow and low volumes with high speeds. Traffic density is low, with speed controlled by driver desires, speed limits, physical roadway conditions. There is little or no restriction in maneuverability due to the presence of other vehicles and little or no delay.

LOS B Stable flow exists with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their own speed and land of operation. Reductions in speed are not unreasonable with low probability of traffic flow being restricted.

LOS C Still a zone of stable flow, but speeds and maneuverability are more closely controlled by the higher volumes. Most of the drivers are restricted in their freedom to select their own speed, change lanes, or pass.

LOS D Unstable traffic flow is approaching, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions. Fluctuations in volume and temporary restrictions to flow may cause substantial drops in operating speeds.

LOS E Operation is at lower speeds than in Level "D" with volumes at or near the capacity of the highway. Flow is unstable with speeds in the neighborhood of 30 mph. There may be stoppages of momentary duration.

LOS F This is forced flow operation at low speeds where volumes are below capacity. These conditions usually result from vehicles backing up from downstream restrictions. Speeds are reduced substantially, and stoppages may occur for short or long periods of time because of downstream congestion.

LTC **Local Transportation Commission.** The Mono County LTC is the Regional Transportation Planning Authority (RTPA) for Mono County.

RIP **Regional Improvement Program.** One of two broad programs under the STIP. Funded from 75% of the STIP funds, divided by formula among fixed county shares. Each county selects the projects to be funded from its county share in the RTIP.

RTIP **Regional Transportation Improvement Program.** A list of proposed transportation projects submitted to the California Transportation Commission by the RTPAs for state funding. Has a four-year timeframe and is updated biennially by the CTC.

RTP **Regional Transportation Plan.** Plan prepared biennially by regional transportation planning agencies (e.g., Mono County Local Transportation Commission "LTC"), which describes existing and projected transportation needs, actions and financing for a 20-year period.

SHA **State Highway Account.** The primary State funding source for transportation improvements. Includes revenue from the state fuel tax, truck weight fees and federal highway funds. Provides funding for a) non-capital outlays (maintenance, operations, etc.), b) STIP, c) SHOPP, and d) local assistance.

SHOPP **State Highway Operations and Protection Program.** California state program intended to maintain the integrity of the state highway system, focusing primarily on safety and rehabilitation issues. A four-year program of projects approved by the CTC separately from the STIP cycle. For further information see www.dot.ca.gov/hq/tpp/Offices/Planning/

SIP **State Implementation Plan.** An air quality plan developed by the California Air Resources Board in cooperation with local air boards to attain and maintain Federal Clean Air Standards. See www.arb.ca.gov for further information.

STA **State Transit Assistance.** Funds derived from the Public Transportation Account. Fifty percent is allocated to Caltrans, 50% to the Regional Transportation Planning Authorities "RTPAs" (e.g., Mono County Local Transportation Commission, "LTC"). The funds allocated to the RTPAs are available for mass transit projects (50%) and transit operators (50%).

STIP **State Transportation Improvement Program.** Includes transportation programs proposed in RTIPs and ITIPs, approved for funding by the CTC. See www.dot.ca.gov/hq/tpp/Offices/Planning/ for further information.

TEA 21 **Transportation Equity Act for the 21st Century.** Contains federally mandated planning requirements and funding programs for transportation projects. See www.tea21.org for further information.

YATI **Yosemite Area Traveler Information System.** A comprehensive system for providing information to Yosemite visitors (road conditions, weather, transportation options, lodging etc.). See www.yosemite.com for further information.

YARTS **Yosemite Area Regional Transportation System.** A regional system providing scheduled service from Madera, Mariposa and Mono counties to Yosemite, connecting with the Yosemite National Park shuttle service. In Mono County, the service departs from Mammoth Lakes and Lee Vining. See www.yosemite.com for further information.

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INTERNET REFERENCE SITES

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STATE AGENCIES

California Home Page
Links to all state agencies.
www.ca.gov

California Environmental Quality Act (CEQA)
The complete statutes and guidelines, along with interpretive information.
ceres.ca.gov/ceqa

California Environmental Resources Evaluation System (CERES)
Links to and information on CEQA, SNEP, LUPIN, as well as a variety of land use planning information.
ceres.ca.gov

Air Resources Board
Air emissions inventory data. 2000 California Air Quality and Emission Almanac. information on state and federal air quality standards.
arbis.arb.ca.gov

Board of Equalization
Economic statistics.
www.boe.ca.gov

Department of Conservation, Division of Mines and Geology (DMG)
Information on mining and minerals, farmland mapping program.
www.consrv.ca.gov/dmg

Department of Conservation, Division of Oil and Gas
Information on geothermal development.
www.consrv.ca.gov/dog

Department of Conservation, Office of Mine Reclamation
Reclamation requirements and standards.
www.consrv.ca.gov/omr

Department of Finance (DOF)
Demographic Research Unit, population and socioeconomic statistics and forecasts, California Statistical Abstract.
www.dof.ca.gov

Department of Fire and Forestry (CDF)
Fire safe standards.
www.fire.ca.gov

Department of Fish and Game (DFG)
California Natural Diversity Database (CNDDB), wildlife and habitat conservation data, special status species information.
www.dfg.ca.gov

Department of Food and Agriculture
Agricultural statistics.
www.cdfa.ca.gov

Department of Housing and Community Development (HCD)
Housing policies and programs. State and Federal housing finance, rehabilitation and economic development programs.
www.hcd.ca.gov

Department of Industrial Relations
Labor statistics and Research.
www.dir.ca.gov

Department of Motor Vehicles
Vehicle registration and licensing information.
www.dmv.ca.gov

Department of Parks and Recreation
Information on state park units in Mono County.
www.cal-parks.ca.gov

Department of Transportation (Caltrans)
Planning direction and transportation data.
www.dot.ca.gov -- State office
www.dot.ca.gov/dist9-- Bishop office

Employment Development Department (EDD)

Labor market information, socio-economic data, income and poverty statistics.
www.calmis.cahwnet.gov

Highway Patrol (CHP)
Collision information and roadway statistics.
www.chp.ca.gov

Lahontan Regional Water Quality Control Board (LRWQCB)
Basin plans and compliance with water quality standards.
www.mscomm.com/~rwqcb6/lahontan

State Water Resources Control Board (SWRCB)
Compliance with water quality standards.
www.swrcb.ca.gov

FEDERAL AGENCIES

Bureau of Indian Affairs (BIA)
Information pertaining to Native American communities.
www.doi.gov/bureau-indian-affairs

Bureau of Land Management (BLM)
Policies and programs for BLM lands.
www.blm.gov -- National office
www.ca.blm.gov -- California office
www.ca.blm.gov/bishop -- Bishop office

National Resource Conservation Service (NRCS)
Policies and programs pertaining to natural resource conservation, including soil surveys, watershed surveys and planning, watershed protection and flood prevention, grazing lands conservation, wetlands reserve and many others.
www.nrcs.usda.gov

U.S. Army Corps of Engineers
Policies and programs pertaining to wetlands.
www.usace.army.mil/

U.S. Census Bureau
Population, income and poverty data.
www.census.gov

U.S. Department of Commerce, Bureau of Economic Analysis
Income, poverty and other socioeconomic data.
www.bea.gov

U.S. Fish & Wildlife Service
Policies and programs pertaining to fish and wildlife, including wetlands.
www.fws.gov

U.S. Forest Service -- Humboldt-Toiyabe National Forest
Policies and programs pertaining to Toiyabe National Forest lands.
www.fs.fed.us/htnf

U.S. Forest Service -- Inyo National Forest

Policies and programs pertaining to Inyo National Forest lands.

www.r5.pswfs.gov/inyo

U.S. Geological Survey

Data and maps on earthquakes, volcanoes, water resources and biological resources (insects, butterflies, etc.).

www.usgs.gov

LOCAL ENTITIES

Los Angeles Department of Water and Power (LADWP or DWP)

Information on DWP's land and water systems in Mono County and the Eastern Sierra.

www.ladwp.com

Mono Lake Committee

Information on Mono Lake and many links to other environmental and agency sites with information on the Eastern Sierra.

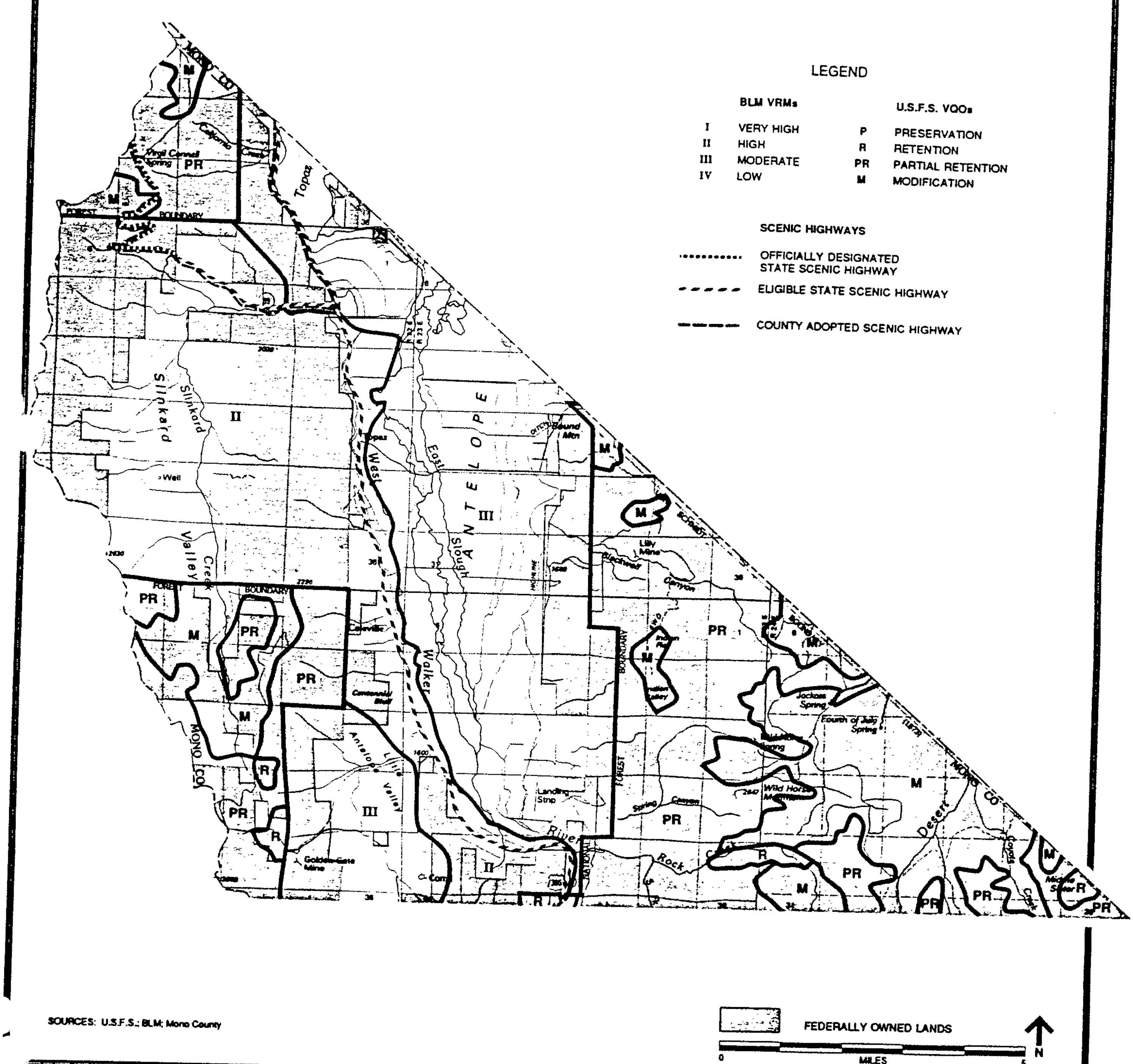
www.monolake.org

Figure 12

Visual Resources

A. Antelope Valley
B. Devil's Gate
C. East Walker
D. Bridgeport
E. Bodie
F. Mono Lake
G. Cowtrack Mountain
H. Adobe Valley / Benton
I. June Lake
J. Long Valley
K. Hammil Valley
L. Wheeler / Paradise
M. Chalfant Valley
N. Oasis

A. Antelope Valley



MONO COUNTY MEA

FIGURE 12 A
VISUAL RESOURCES

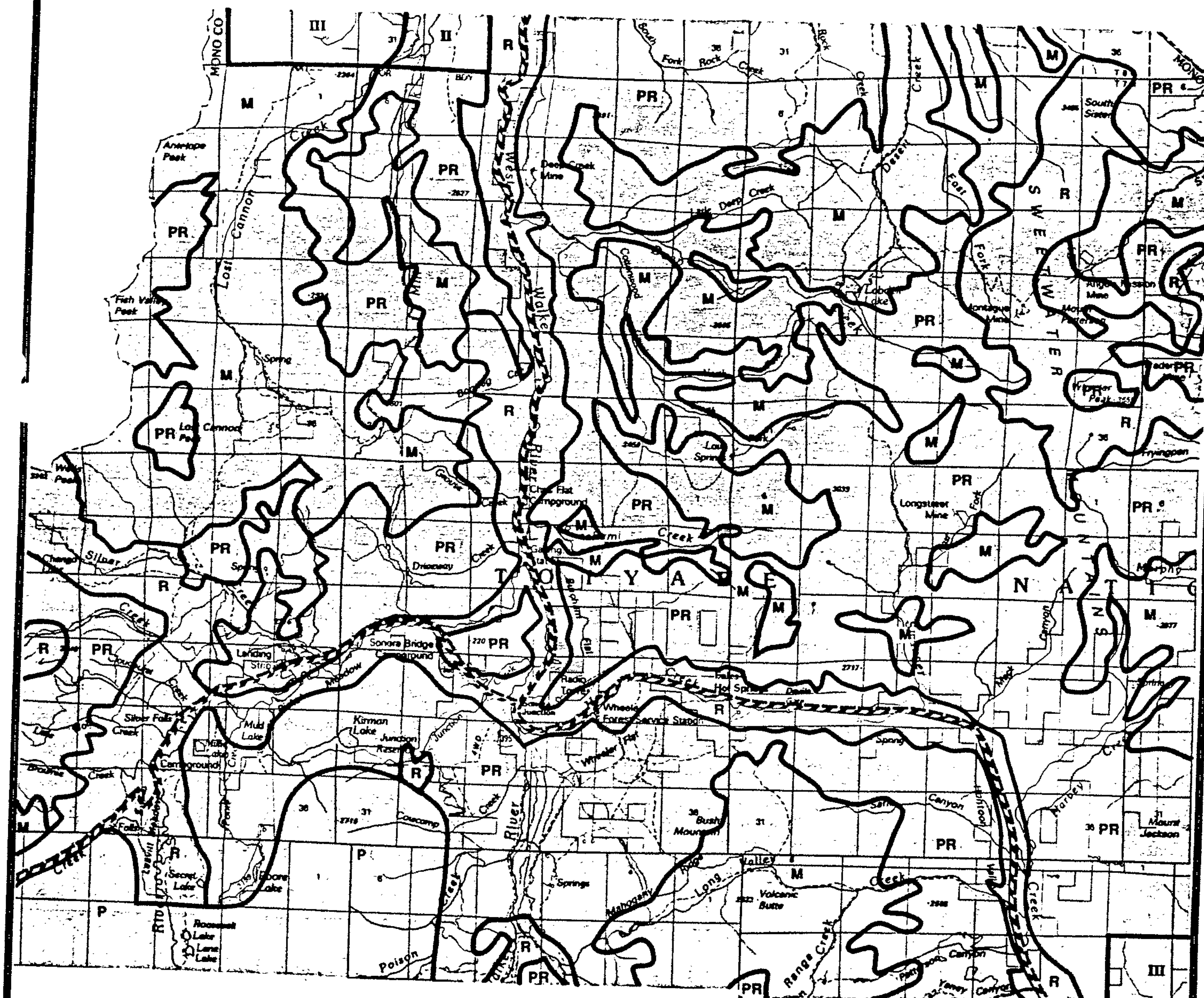
LEGEND

BLM VRMs		U.S.F.S. VQOs	
I	VERY HIGH	P	PRESERVATION
II	HIGH	R	RETENTION
III	MODERATE	PR	PARTIAL RETENTION
IV	LOW	M	MODIFICATION

B. Devil's Gate to Swauger Creek

SCENIC HIGHWAYS

- OFFICIALLY DESIGNATED STATE SCENIC HIGHWAY
- ELIGIBLE STATE SCENIC HIGHWAY
- COUNTY ADOPTED SCENIC HIGHWAY



SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

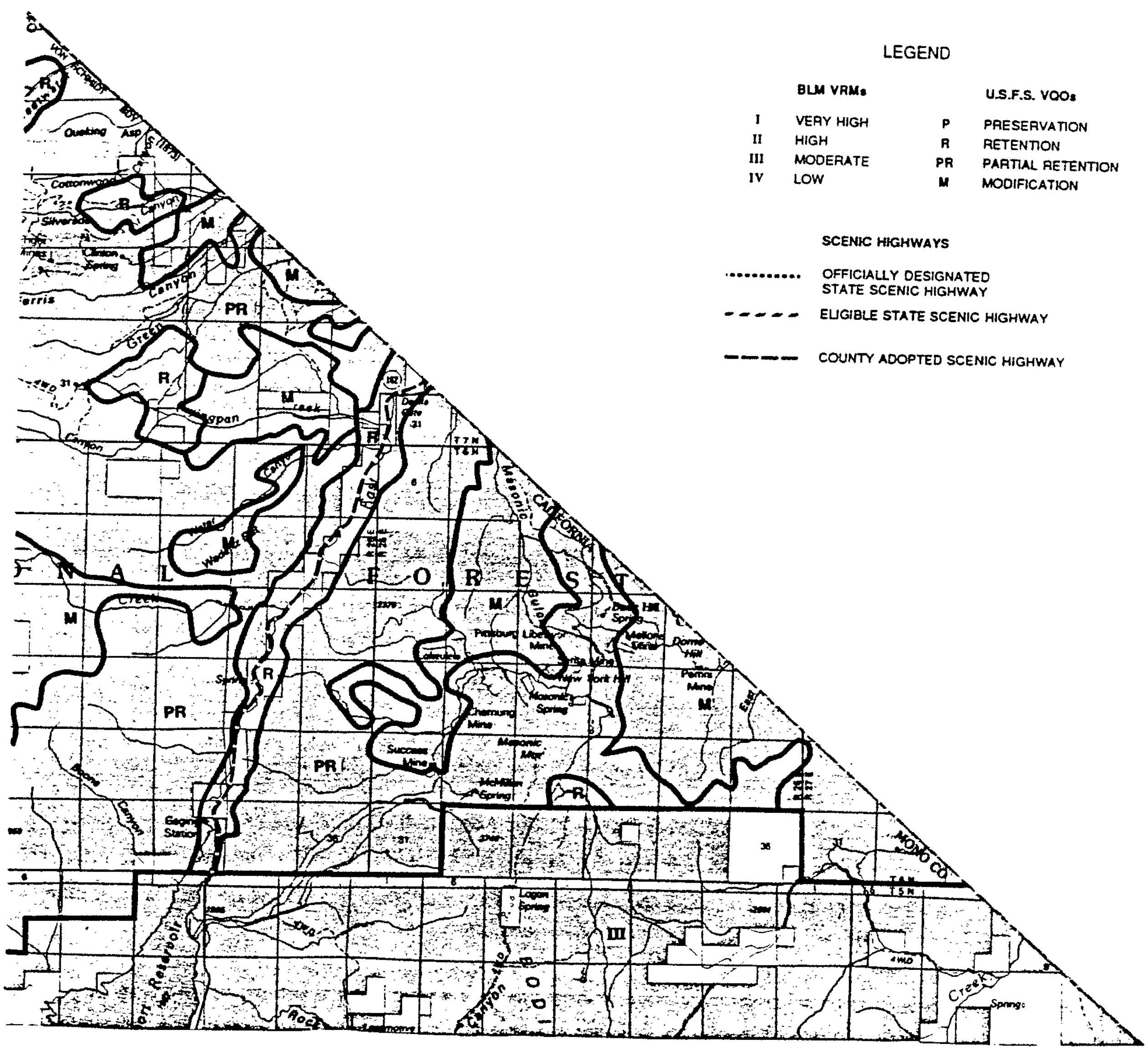
0 MILES 5

N

MONO COUNTY MEA

FIGURE 12 B
VISUAL RESOURCES

C. East Walker



SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

0 MILES 6

N

FIGURE 12 C
VISUAL RESOURCES

LEGEND

BLM VRMs		U.S.F.S. VQOs	
I	VERY HIGH	P	PRESERVATION
II	HIGH	R	RETENTION
III	MODERATE	PR	PARTIAL RETENTION
IV	LOW	M	MODIFICATION

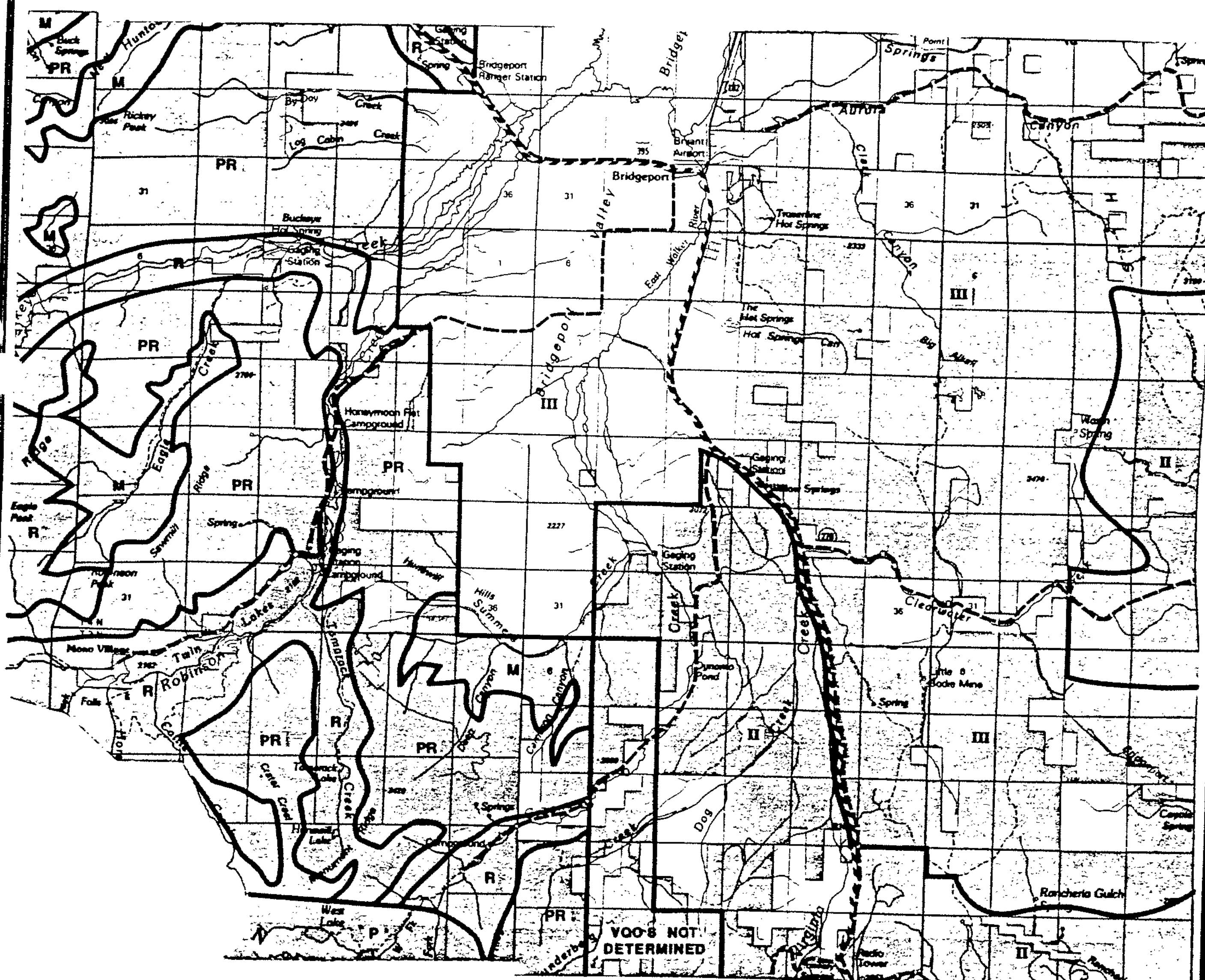
SCENIC HIGHWAYS

OFFICIALLY DESIGNATED STATE SCENIC HIGHWAY

ELIGIBLE STATE SCENIC HIGHWAY

COUNTY ADOPTED SCENIC HIGHWAY

D. Bridgeport



SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 12 D
VISUAL RESOURCES

LEGEND

BLM VRMs		U.S.F.S. VQOs	
I	VERY HIGH	P	PRESERVATION
II	HIGH	R	RETENTION
III	MODERATE	PR	PARTIAL RETENTION
IV	LOW	M	MODIFICATION

SCENIC HIGHWAYS

- OFFICIALLY DESIGNATED STATE SCENIC HIGHWAY
- ELIGIBLE STATE SCENIC HIGHWAY
- COUNTY ADOPTED SCENIC HIGHWAY

E. Bodie

SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

FIGURE 12 E
VISUAL RESOURCES

LEGEND

BLM VRMs

I	VERY HIGH
II	HIGH
III	MODERATE
IV	LOW

U.S.F.S. VQOs

P	PRESERVATION
R	RETENTION
PR	PARTIAL RETENTION
M	MODIFICATION

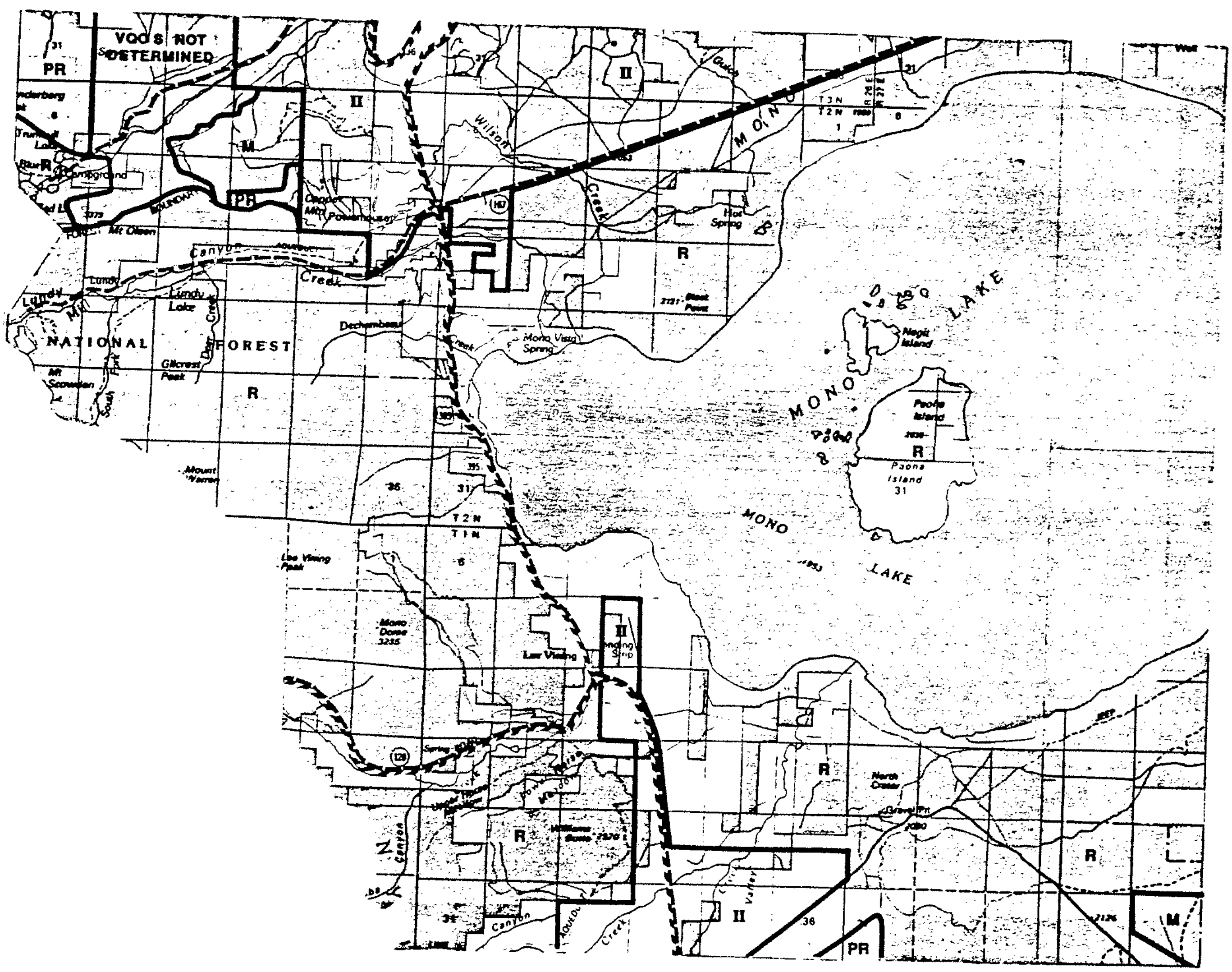
SCENIC HIGHWAYS

OFFICIALLY DESIGNATED STATE SCENIC HIGHWAY

ELIGIBLE STATE SCENIC HIGHWAY

COUNTY ADOPTED SCENIC HIGHWAY

F. Mono Lake



SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 12 F
VISUAL RESOURCES

LEGEND

BLM VRMs		U.S.F.S. VQOs	
I	VERY HIGH	P	PRESERVATION
II	HIGH	R	RETENTION
III	MODERATE	PR	PARTIAL RETENTION
IV	LOW	M	MODIFICATION

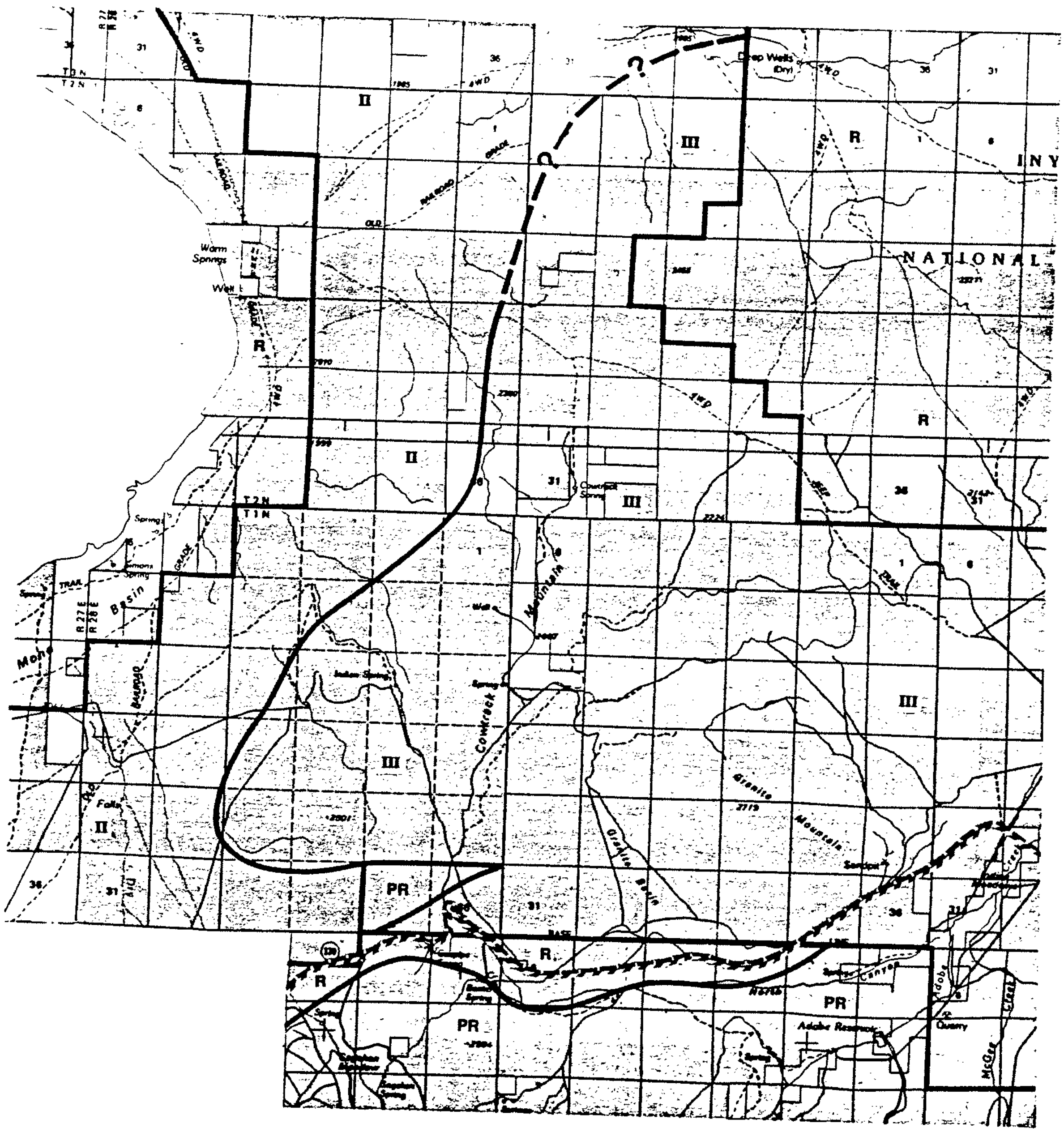
G. Cowtrack Mountain

SCENIC HIGHWAYS

OFFICIALLY DESIGNATED STATE SCENIC HIGHWAY

ELIGIBLE STATE SCENIC HIGHWAY

COUNTY ADOPTED SCENIC HIGHWAY



SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 12 G
VISUAL RESOURCES

LEGEND

BLM VRMs

I VERY HIGH
II HIGH
III MODERATE
IV LOW

U.S.F.S. VQOs

P PRESERVATION
R RETENTION
PR PARTIAL RETENTION
M MODIFICATION

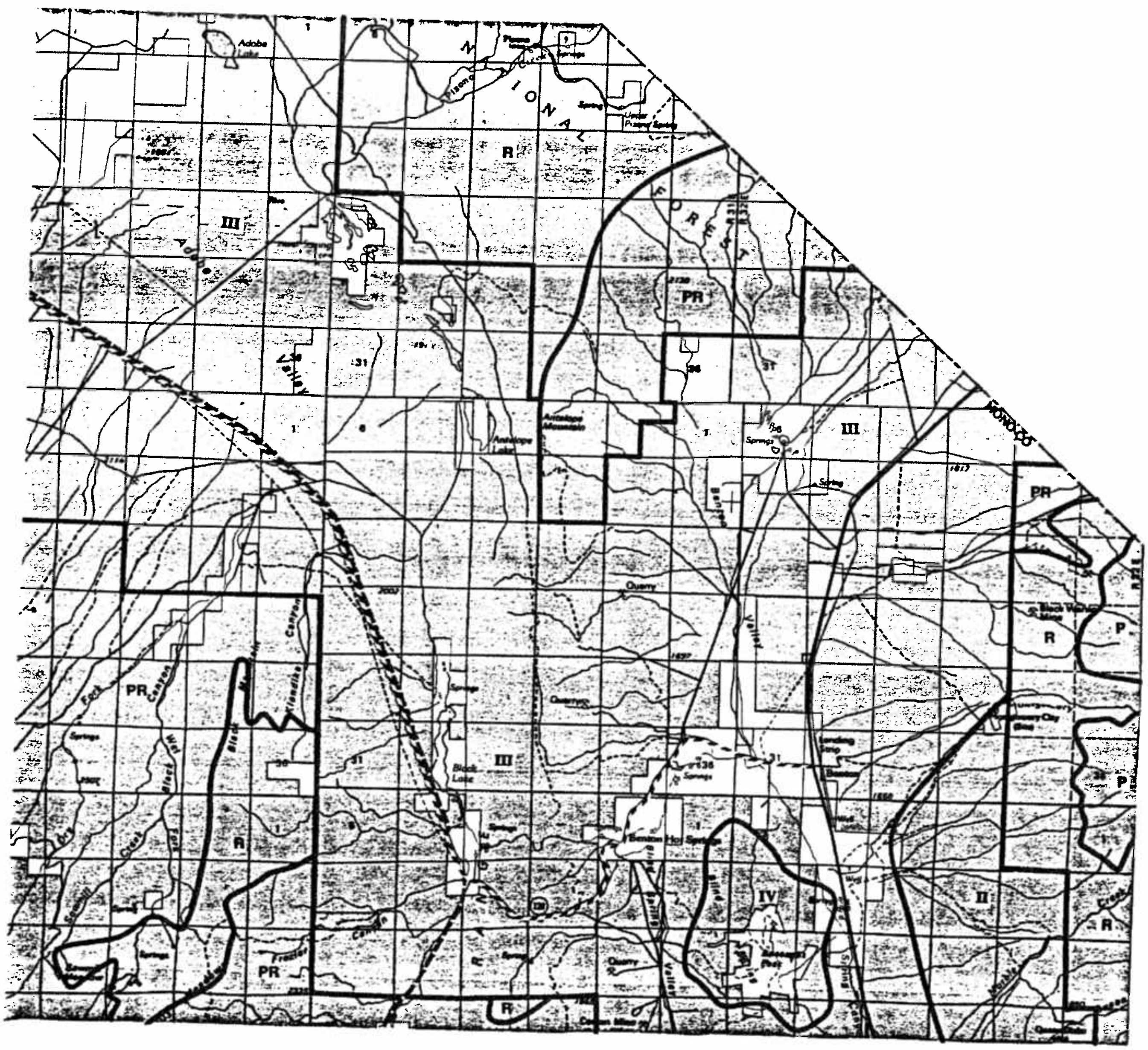
H. Adobe Valley / Benton

SCENIC HIGHWAYS

OFFICIALLY DESIGNATED STATE SCENIC HIGHWAY

ELIGIBLE STATE SCENIC HIGHWAY

COUNTY ADOPTED SCENIC HIGHWAY



SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 12 H
VISUAL RESOURCES

LEGEND

I. June Lake

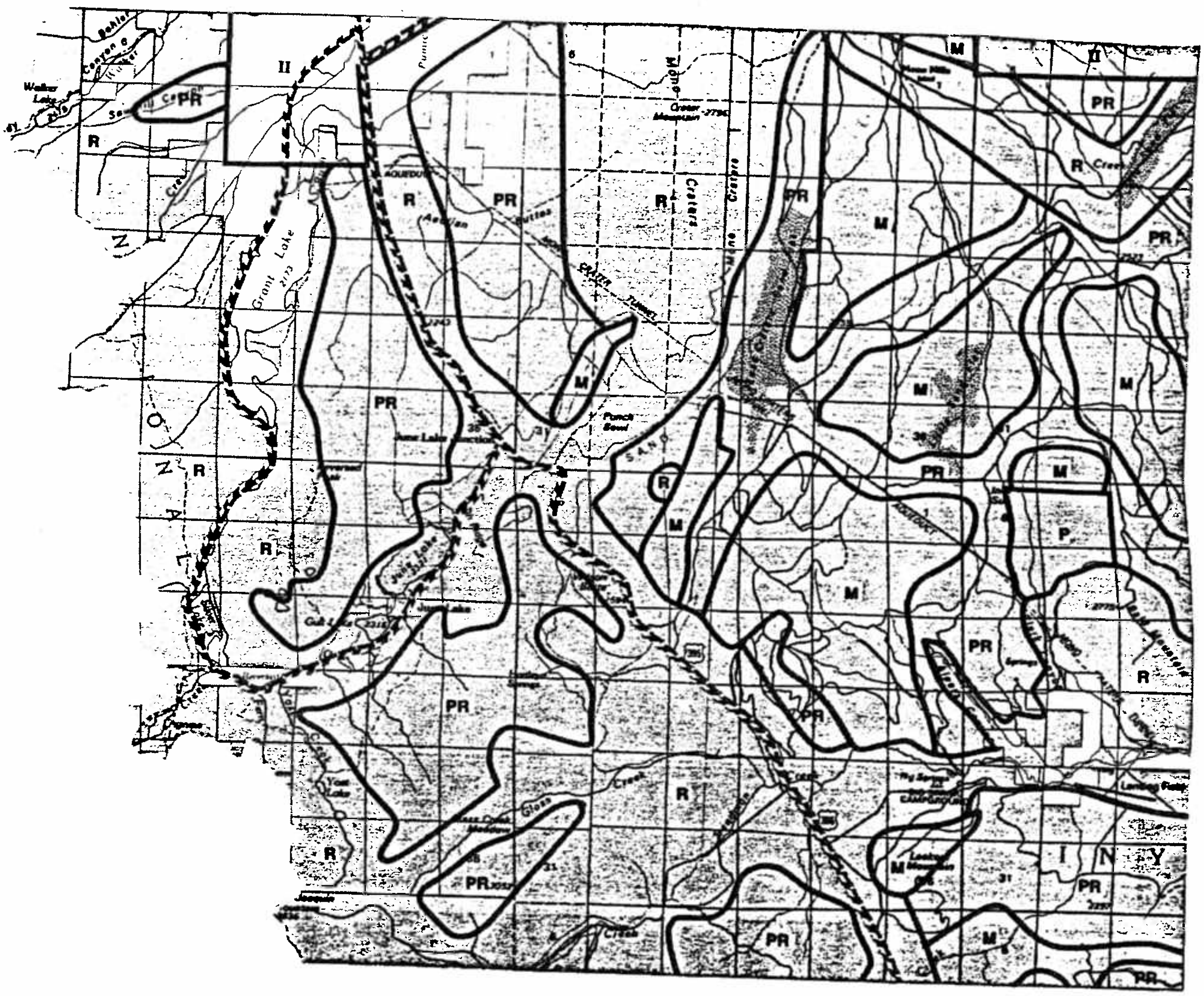
BLM VRMs		U.S.F.S. VQOs	
I	VERY HIGH	P	PRESERVATION
II	HIGH	R	RETENTION
III	MODERATE	PR	PARTIAL RETENTION
IV	LOW	M	MODIFICATION

SCENIC HIGHWAYS

OFFICIALLY DESIGNATED STATE SCENIC HIGHWAY

ELIGIBLE STATE SCENIC HIGHWAY

COUNTY ADOPTED SCENIC HIGHWAY



SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

FIGURE 12 I
VISUAL RESOURCES

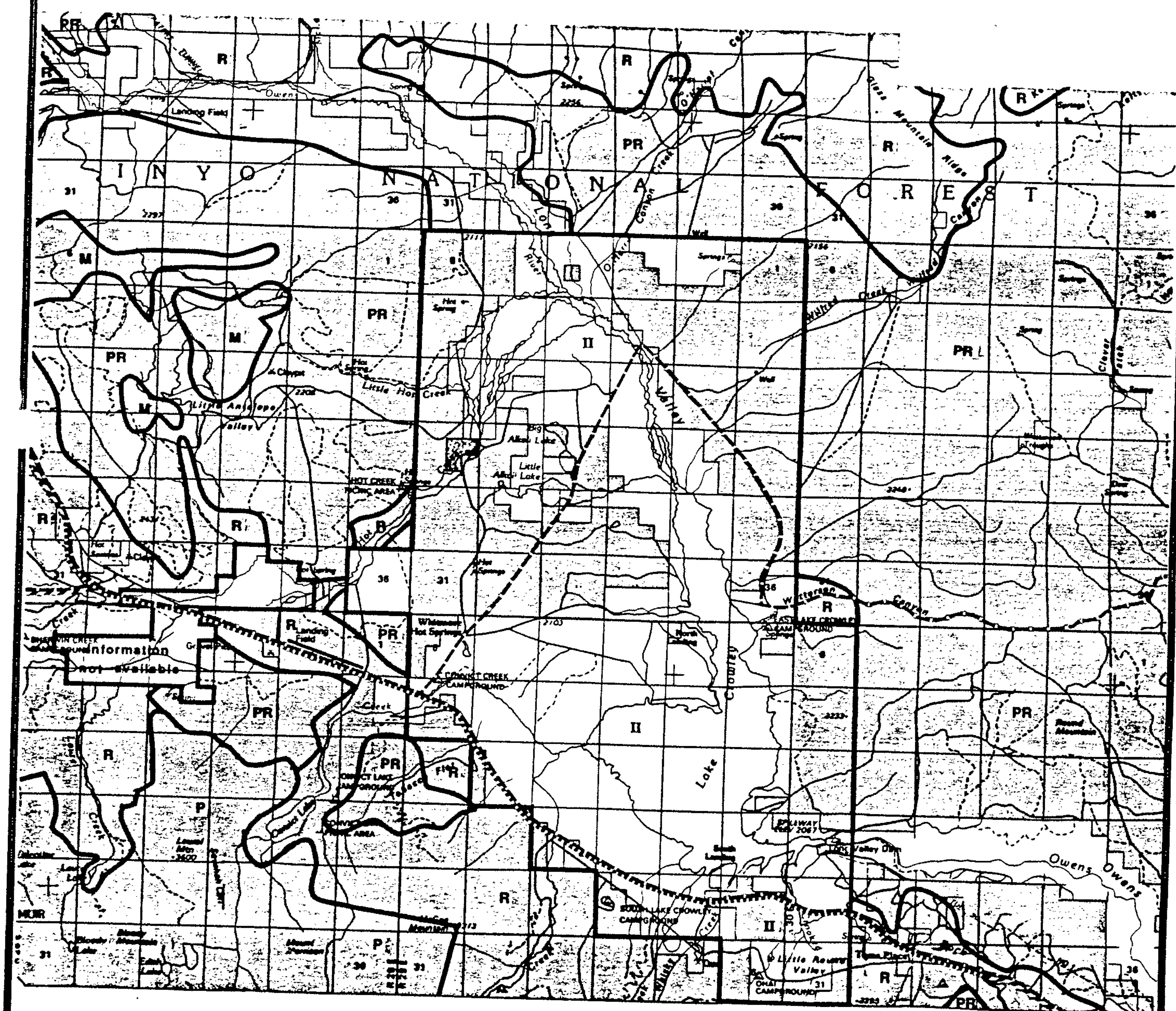
LEGEND

BLM VRMs		U.S.F.S. VQOs	
I	VERY HIGH	P	PRESERVATION
II	HIGH	R	RETENTION
III	MODERATE	PR	PARTIAL RETENTION
IV	LOW	M	MODIFICATION

SCENIC HIGHWAYS

....	OFFICIALLY DESIGNATED STATE SCENIC HIGHWAY
- - - - -	ELIGIBLE STATE SCENIC HIGHWAY
— — —	COUNTY ADOPTED SCENIC HIGHWAY

J. Long Valley



SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 12 J
VISUAL RESOURCES

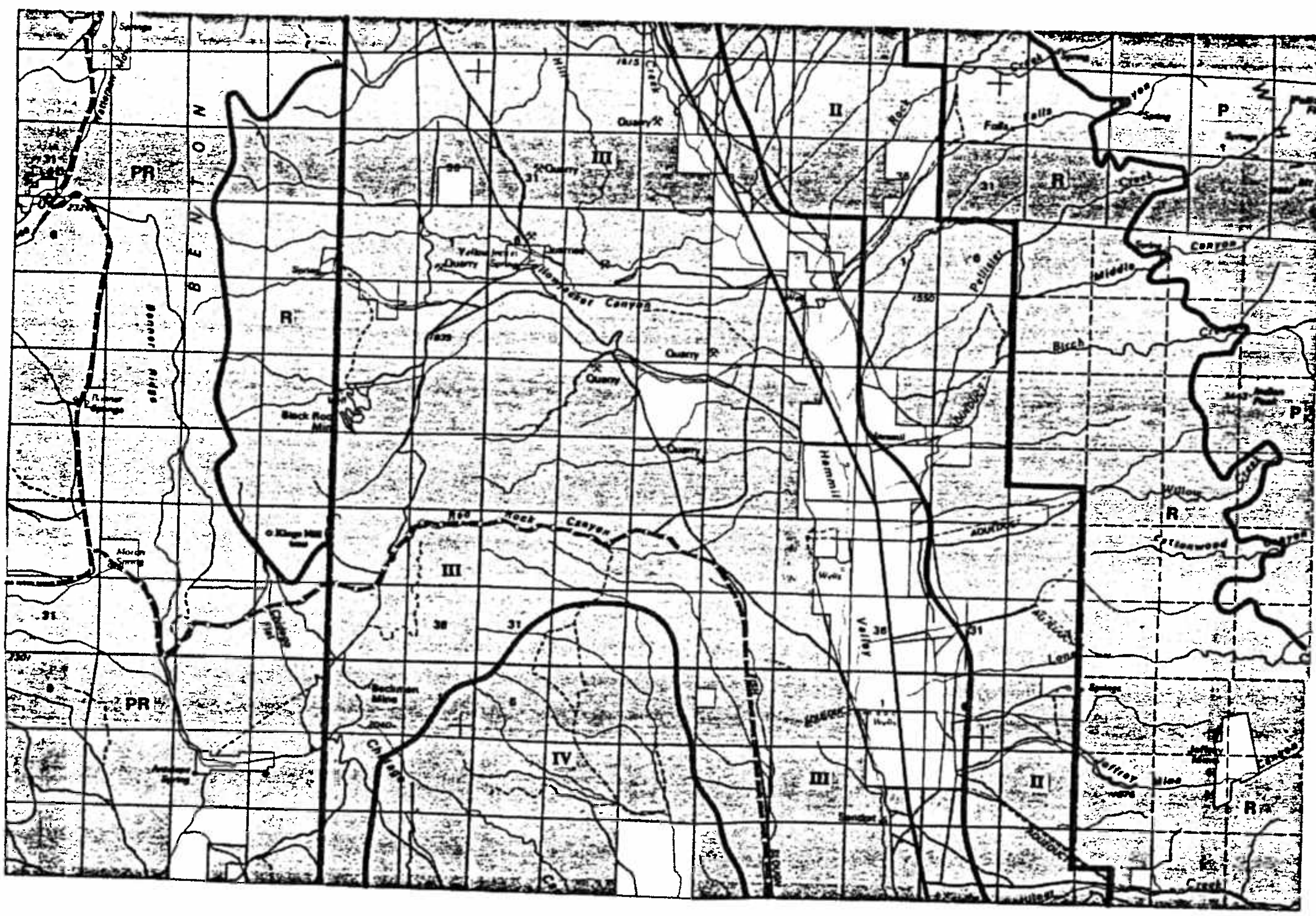
K. Hammil Valley

LEGEND

BLM VRMs		U.S.F.S. VQOs	
I	VERY HIGH	P	PRESERVATION
II	HIGH	R	RETENTION
III	MODERATE	PR	PARTIAL RETENTION
IV	LOW	M	MODIFICATION

SCENIC HIGHWAYS

- OFFICIALLY DESIGNATED STATE SCENIC HIGHWAY
- ELIGIBLE STATE SCENIC HIGHWAY
- COUNTY ADOPTED SCENIC HIGHWAY



SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

FIGURE 12 K
VISUAL RESOURCES

L. Wheeler / Paradise
M. Chalfant Valley

LEGEND

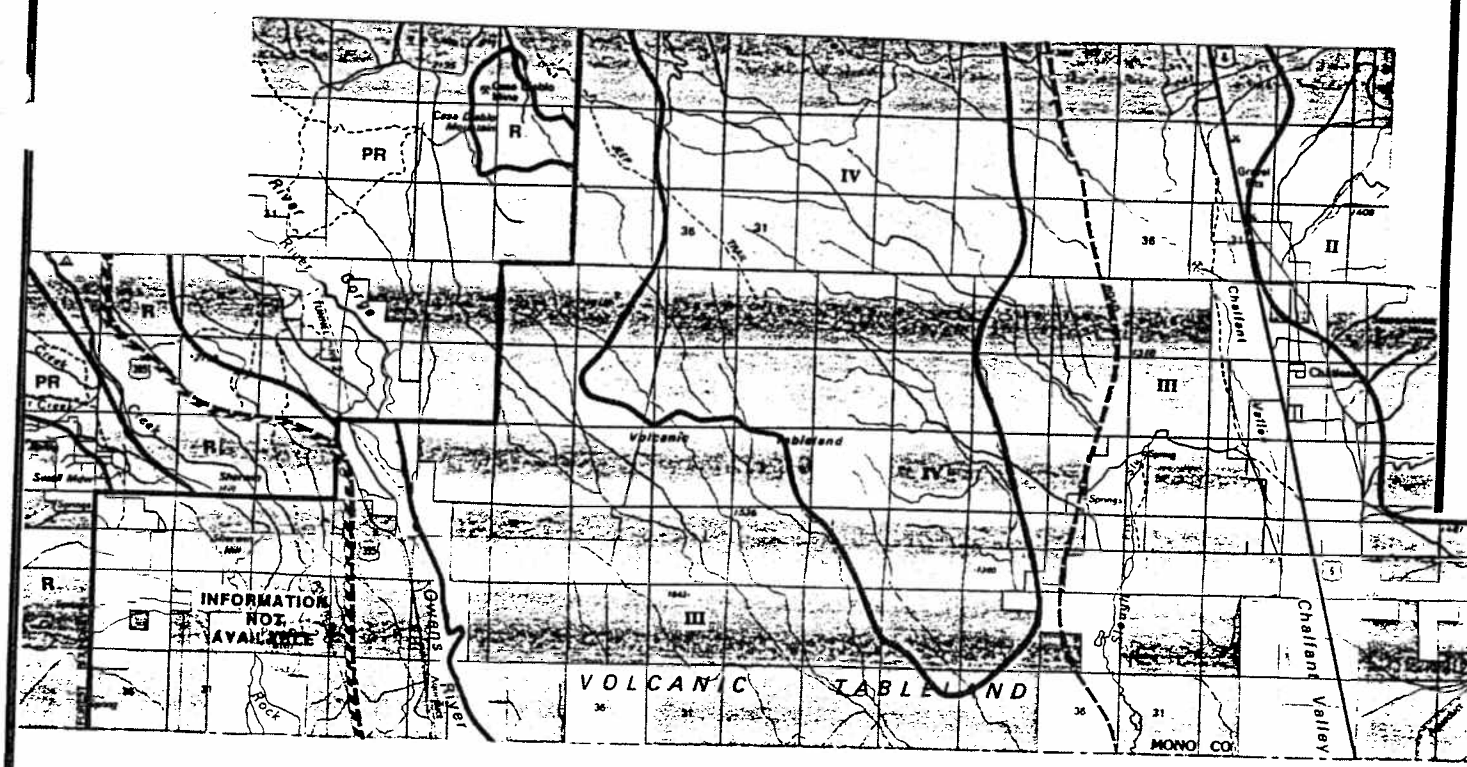
BLM VRMs		U.S.F.S. VQOs	
I	VERY HIGH	P	PRESERVATION
II	HIGH	R	RETENTION
III	MODERATE	PR	PARTIAL RETENTION
IV	LOW	M	MODIFICATION

SCENIC HIGHWAYS

OFFICIALLY DESIGNATED STATE SCENIC HIGHWAY

ELIGIBLE STATE SCENIC HIGHWAY

COUNTY ADOPTED SCENIC HIGHWAY



SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

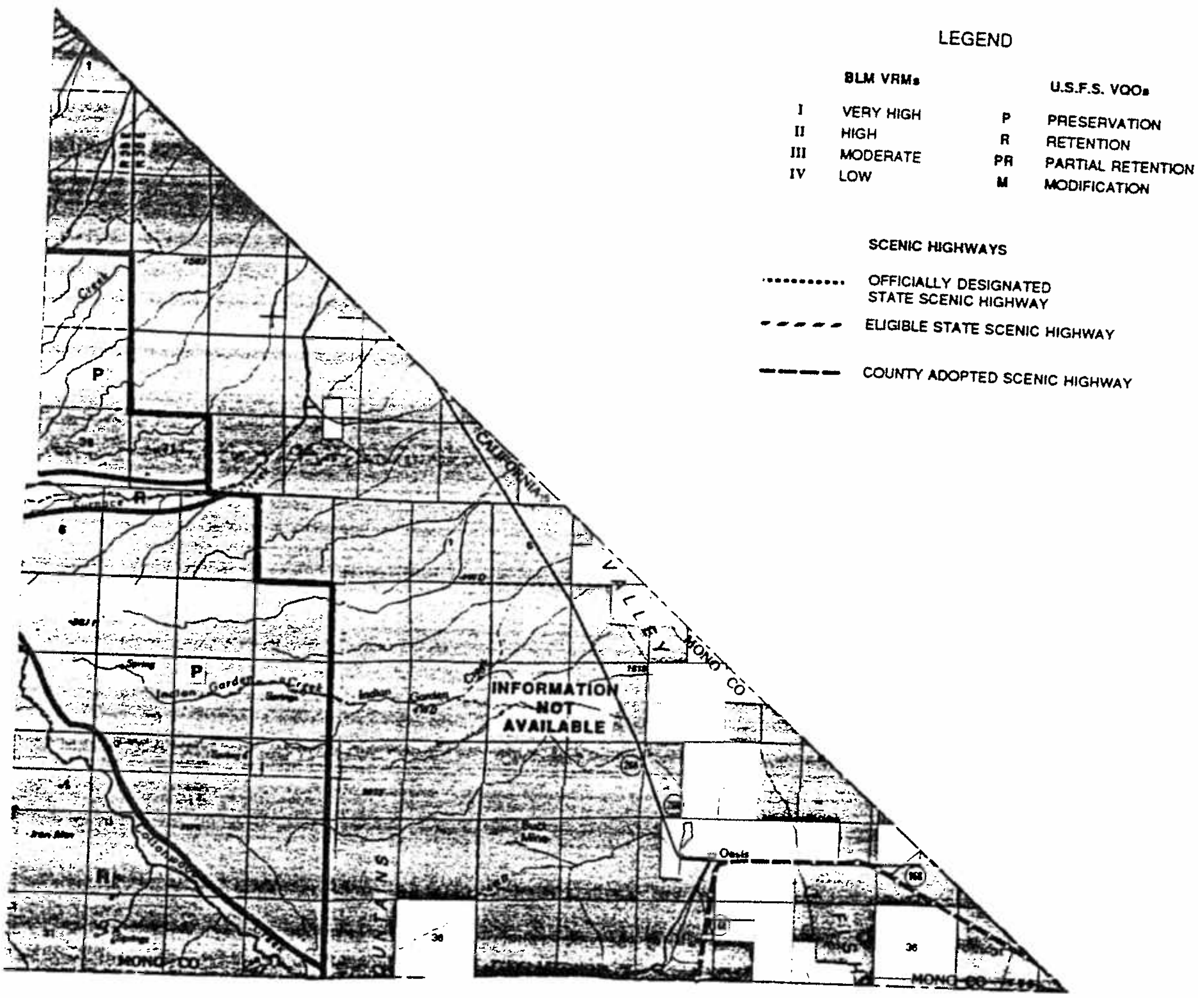
0 MILES 5

N

MONO COUNTY MEA

FIGURE 12 L & M
VISUAL RESOURCES

N. Fish Lake Valley



SOURCES: U.S.F.S.; BLM; Mono County

FEDERALLY OWNED LANDS

0 MILES 5

N

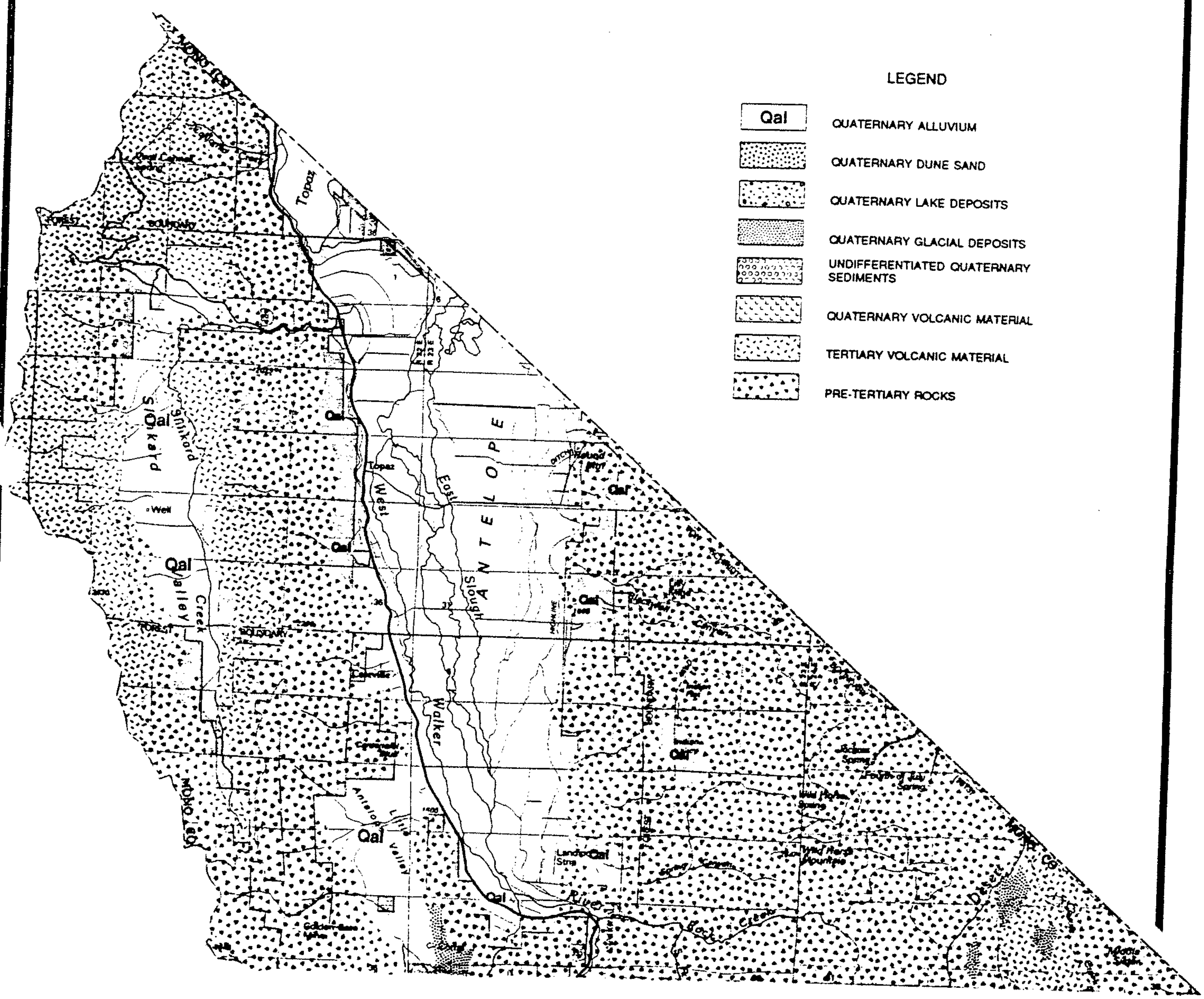
FIGURE 12 N
VISUAL RESOURCES

Figure 15

Geologic Maps

A. Antelope Valley
B. Devil's Gate
C. East Walker
D. Bridgeport
E. Bodie
F. Mono Lake
G. Cowtrack Mountain
H. Adobe Valley / Benton
I. June Lake
J. Long Valley
K. Hammil Valley
L. Wheeler / Paradise
M. Chalfant Valley
N. Oasis

A. Antelope Valley



LEGEND

Qal	QUATERNARY ALLUVIUM
	QUATERNARY DUNE SAND
	QUATERNARY LAKE DEPOSITS
	QUATERNARY GLACIAL DEPOSITS
	UNDIFFERENTIATED QUATERNARY SEDIMENTS
	QUATERNARY VOLCANIC MATERIAL
	TERTIARY VOLCANIC MATERIAL
	PRE-TERTIARY ROCKS
	FEDERALLY OWNED LANDS

0 MILES 5 N

SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

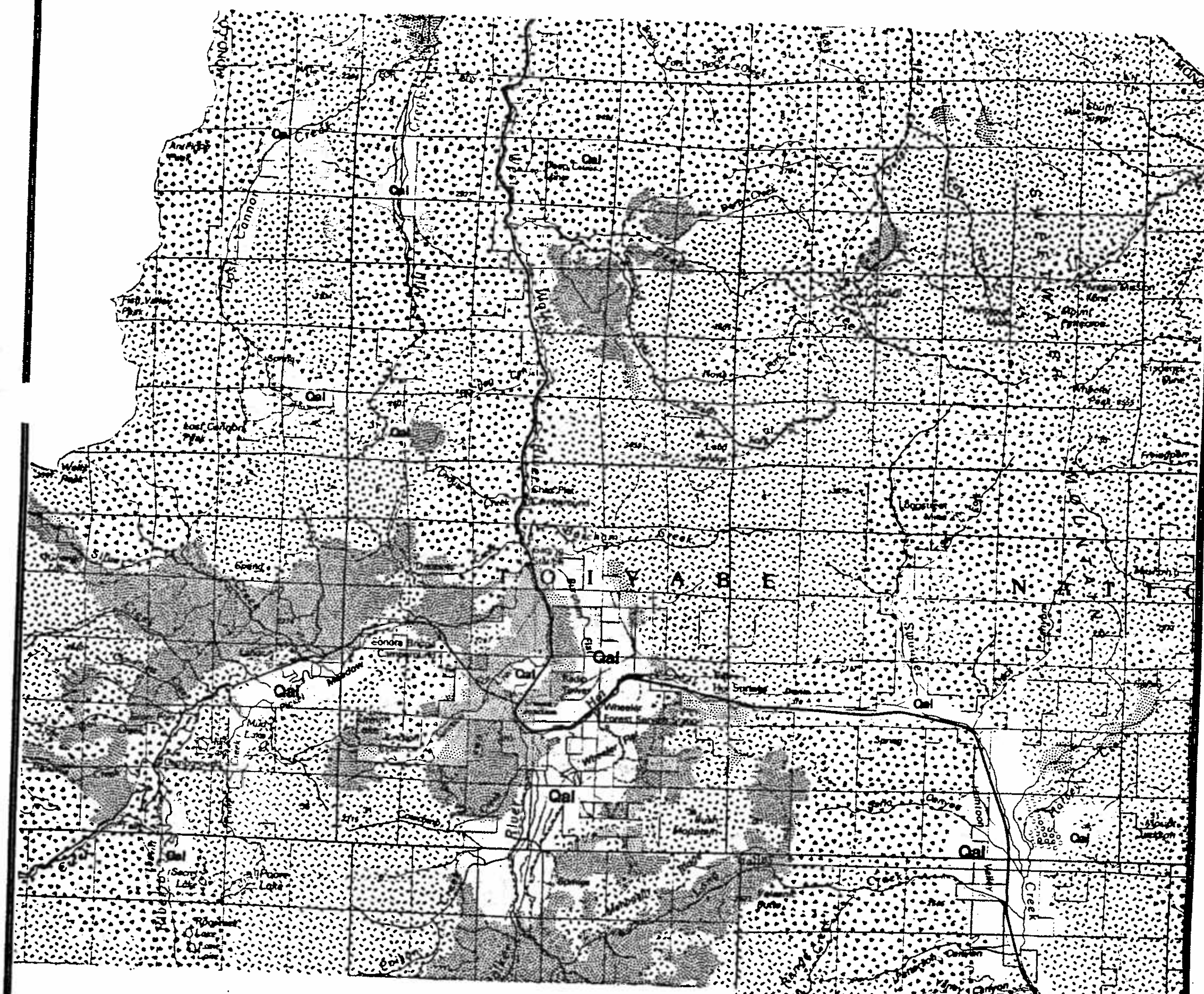
MONO COUNTY MEA

FIGURE 15 A
GEOLOGIC MAP

LEGEND

- Qal — QUATERNARY ALLUVIUM
- QUATERNARY DUNE SAND
- QUATERNARY LAKE DEPOSITS
- QUATERNARY GLACIAL DEPOSITS
- UNDIFFERENTIATED QUATERNARY SEDIMENTS
- QUATERNARY VOLCANIC MATERIAL
- TERTIARY VOLCANIC MATERIAL
- PRE-TERTIARY ROCKS

B. Devil's Gate to Swauger Creek



SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

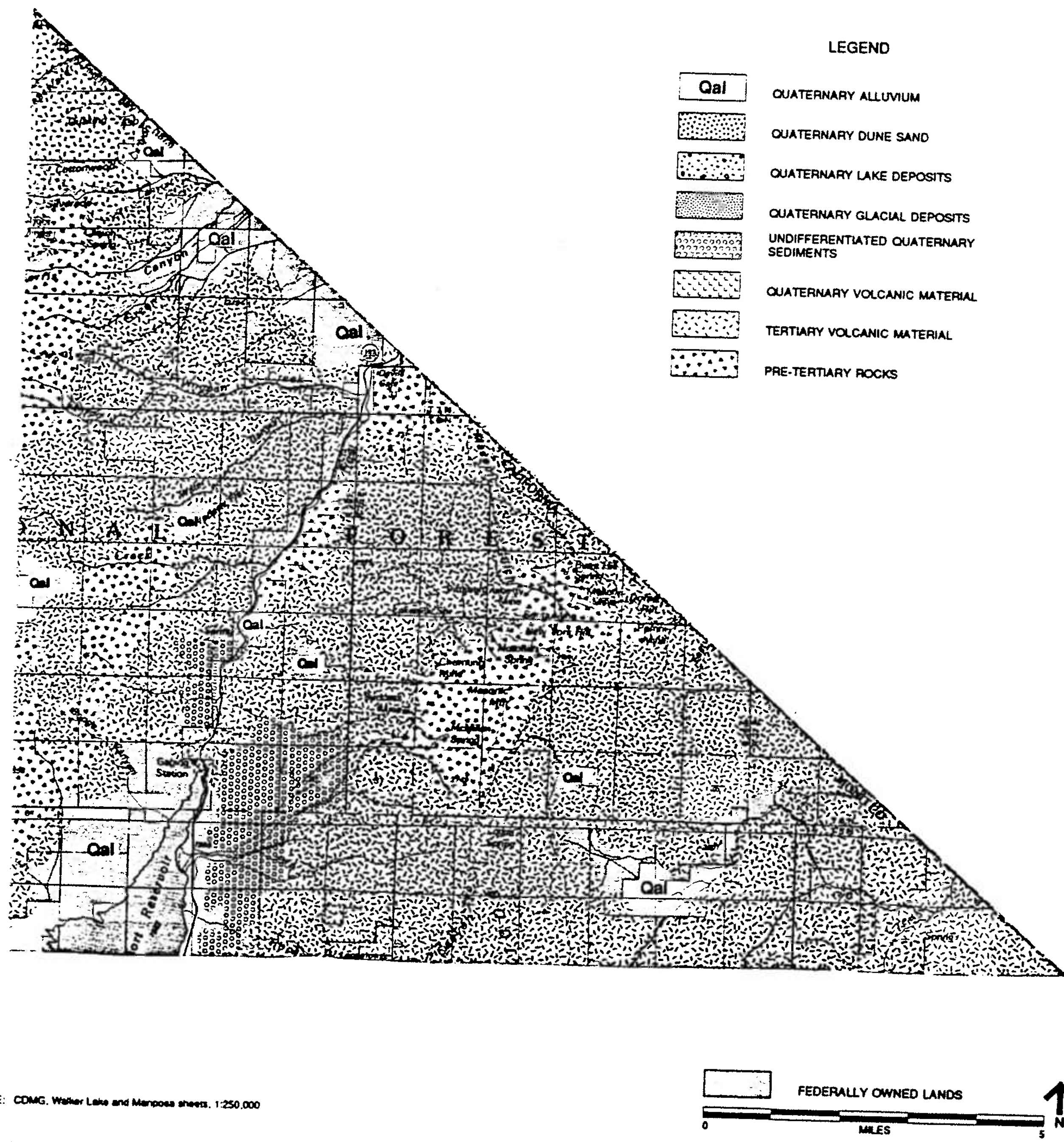
FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 15 B
GEOLOGIC MAP

C. East Walker



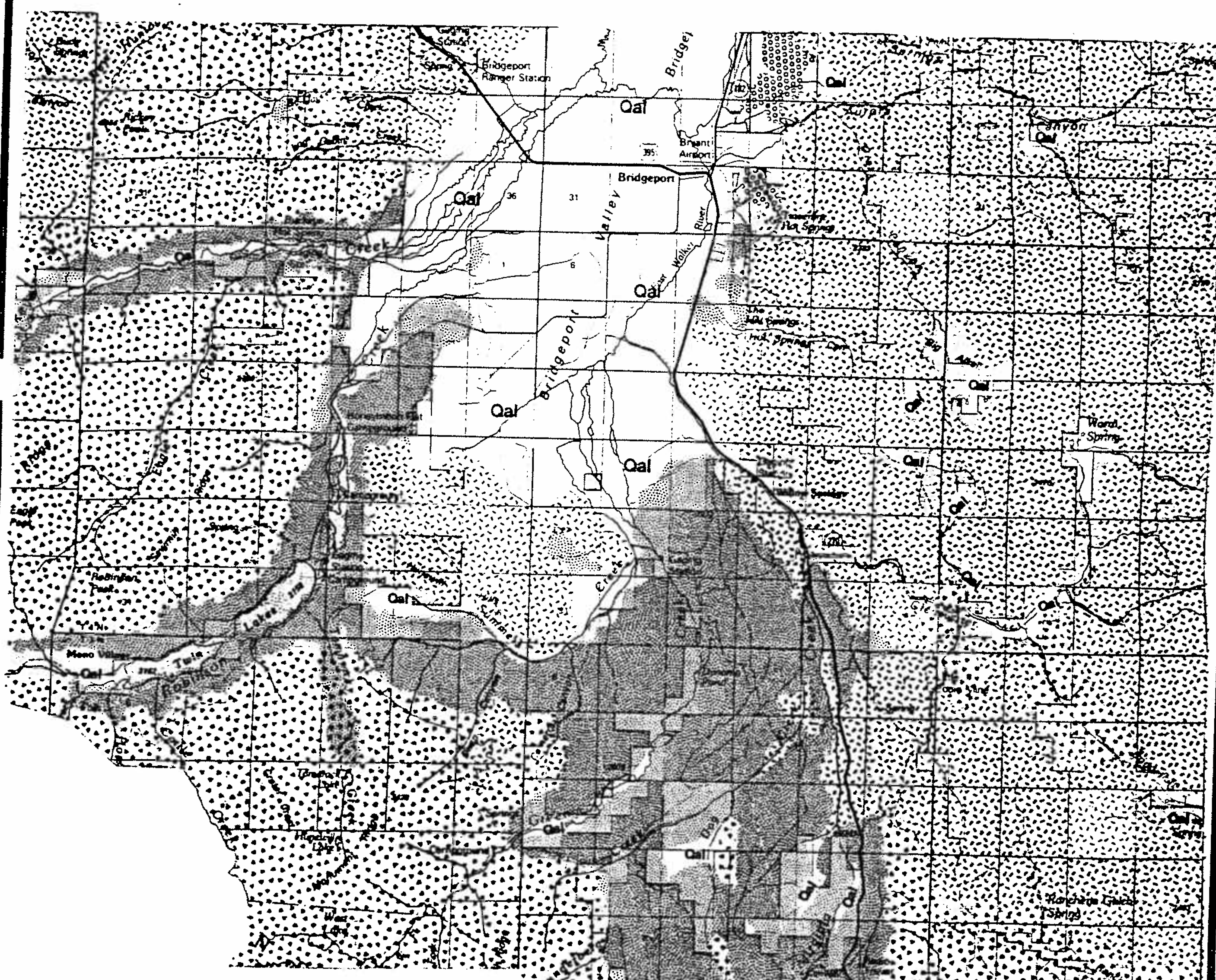
SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

FIGURE 15 C
GEOLOGIC MAP

LEGEND

Qal	QUATERNARY ALLUVIUM
	QUATERNARY DUNE SAND
	QUATERNARY LAKE DEPOSITS
	QUATERNARY GLACIAL DEPOSITS
	UNDIFFERENTIATED QUATERNARY SEDIMENTS
	QUATERNARY VOLCANIC MATERIAL
	TERTIARY VOLCANIC MATERIAL
	PRE-TERTIARY ROCKS

D. Bridgeport



SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

FEDERALLY OWNED LANDS

0 MILES 5

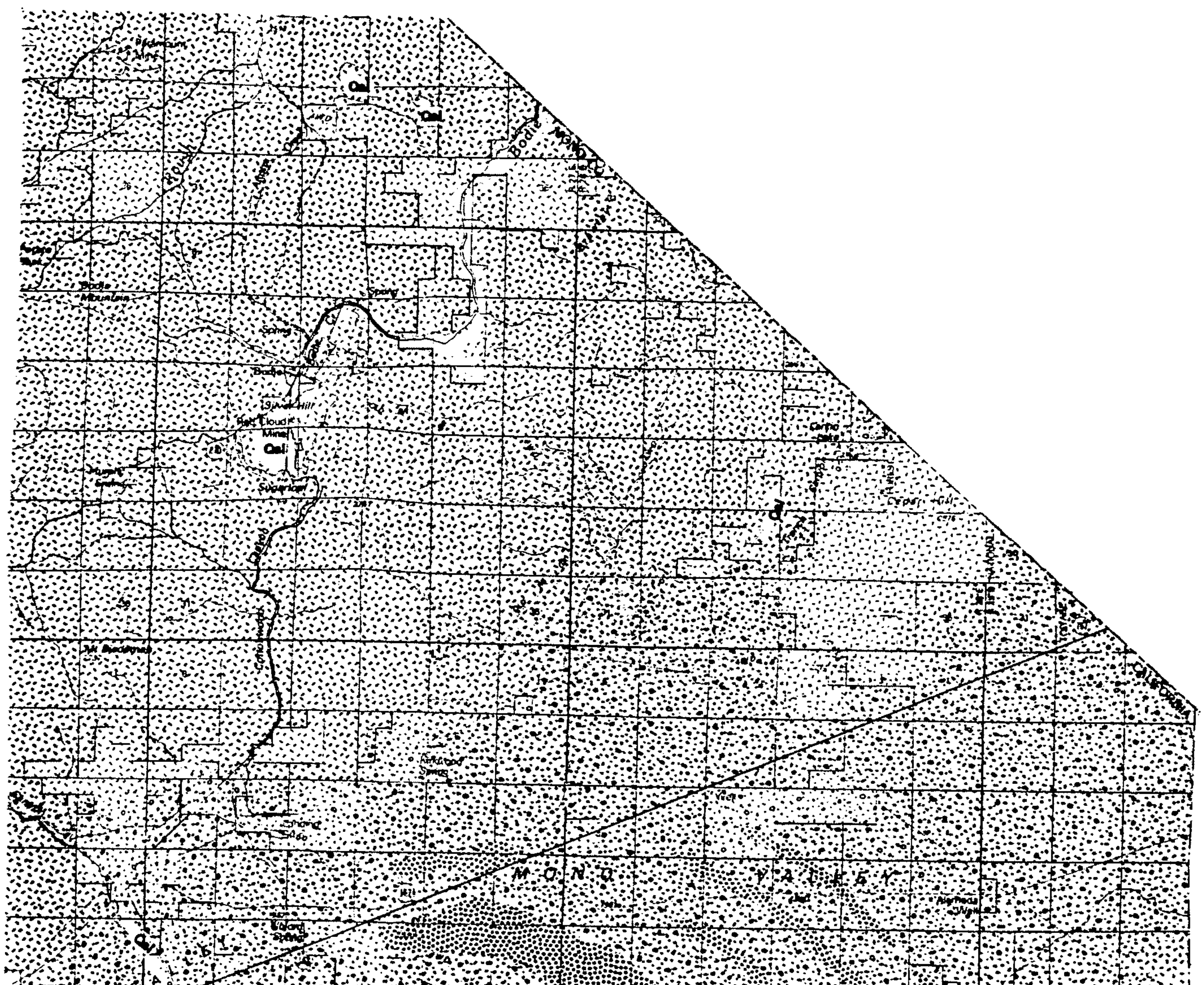
N

FIGURE 15 D
GEOLOGIC MAP

LEGEND

Qal	QUATERNARY ALLUVIUM
	QUATERNARY DUNE SAND
	QUATERNARY LAKE DEPOSITS
	QUATERNARY GLACIAL DEPOSITS
	UNDIFFERENTIATED QUATERNARY SEDIMENTS
	QUATERNARY VOLCANIC MATERIAL
	TERTIARY VOLCANIC MATERIAL
	PRE-TERTIARY ROCKS

E. Bodie



SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

FEDERALLY OWNED LANDS

0 MILES 5

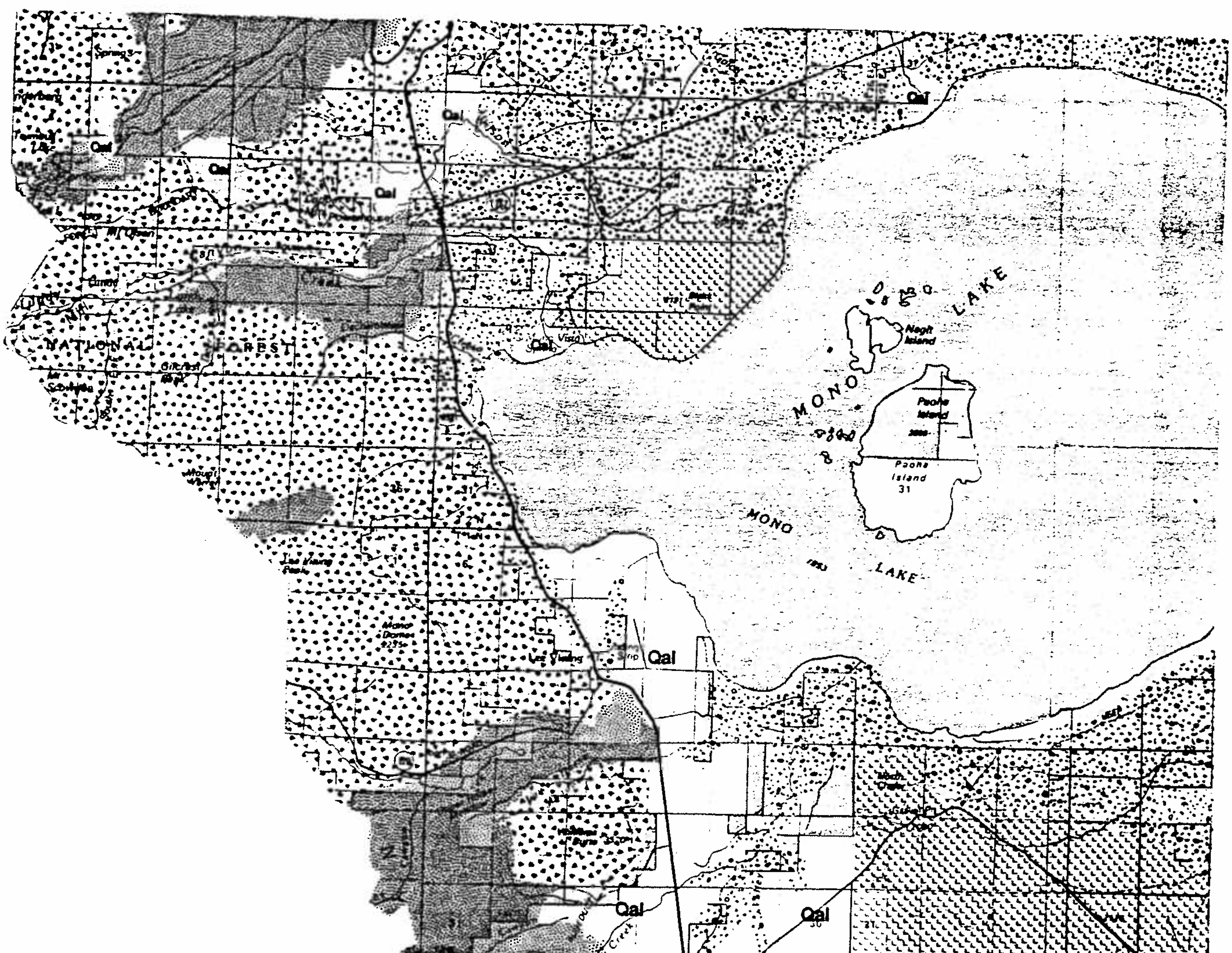
N

FIGURE 15 E
GEOLOGIC MAP

LEGEND

Qal	QUATERNARY ALLUVIUM
	QUATERNARY DUNE SAND
	QUATERNARY LAKE DEPOSITS
	QUATERNARY GLACIAL DEPOSITS
	UNDIFFERENTIATED QUATERNARY SEDIMENTS
	QUATERNARY VOLCANIC MATERIAL
	TERTIARY VOLCANIC MATERIAL
	PRE-TERTIARY ROCKS

F. Mono Lake



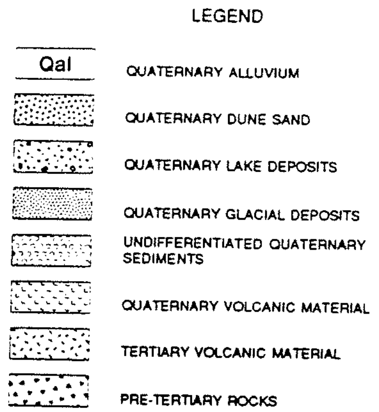
SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 15 F
GEOLOGIC MAP



G. Cowtrack Mountain

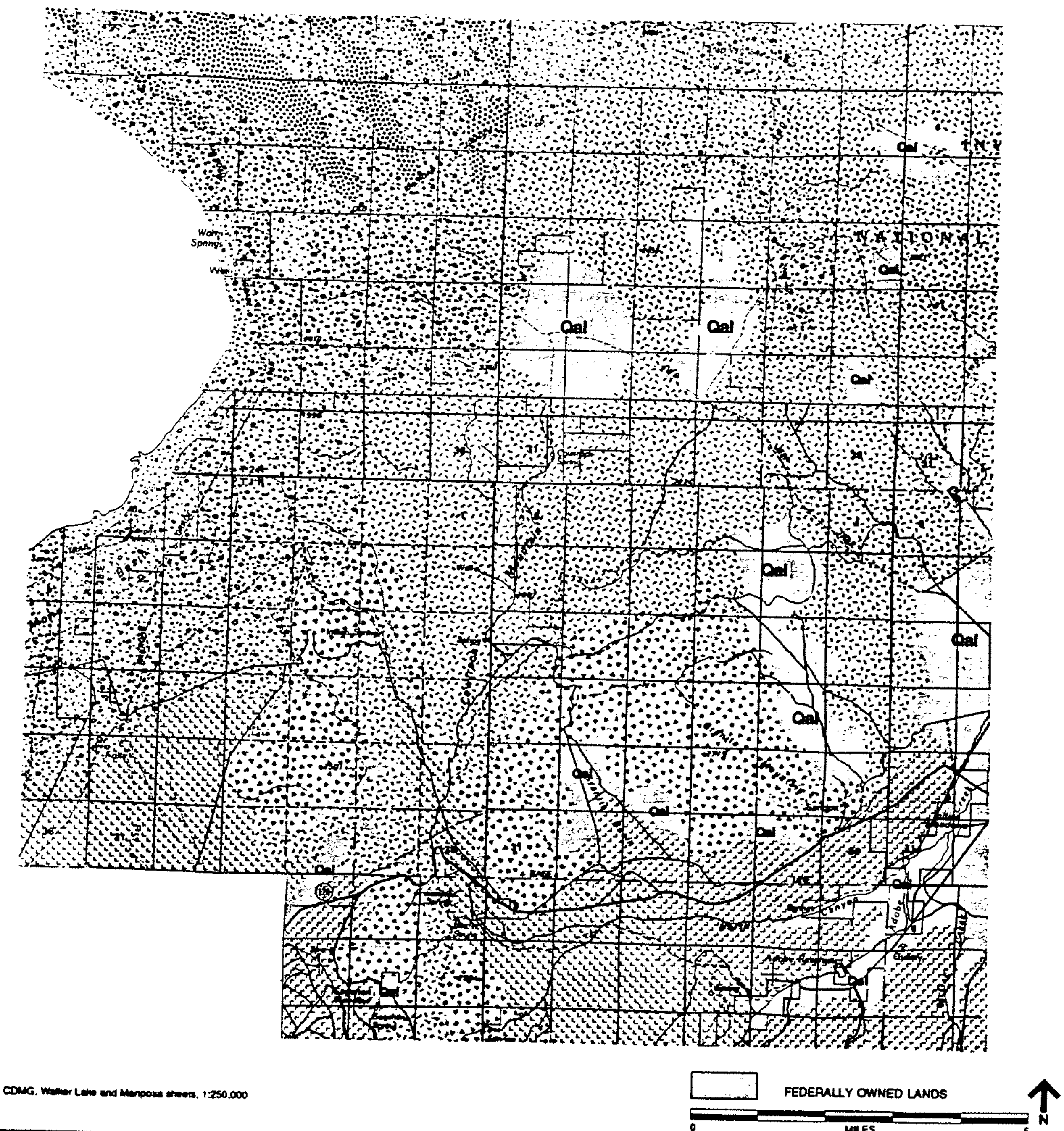
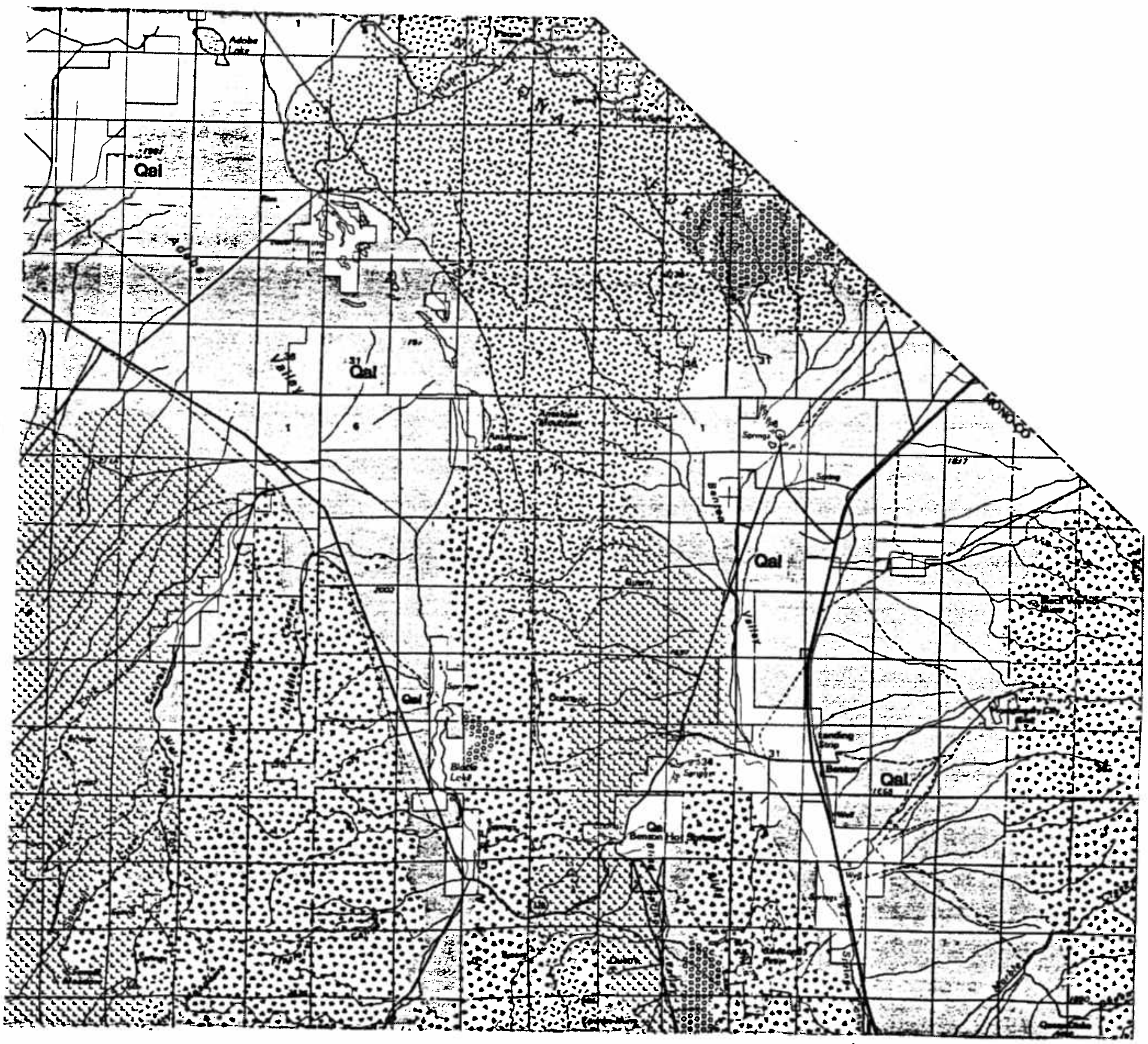


FIGURE 15 G
GEOLOGIC MAP

LEGEND

Qal	QUATERNARY ALLUVIUM
	QUATERNARY DUNE SAND
	QUATERNARY LAKE DEPOSITS
	QUATERNARY GLACIAL DEPOSITS
	UNDIFFERENTIATED QUATERNARY SEDIMENTS
	QUATERNARY VOLCANIC MATERIAL
	TERTIARY VOLCANIC MATERIAL
	PRE-TERTIARY ROCKS

H. Adobe Valley / Benton



SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

FEDERALLY OWNED LANDS

0 MILES 5

N

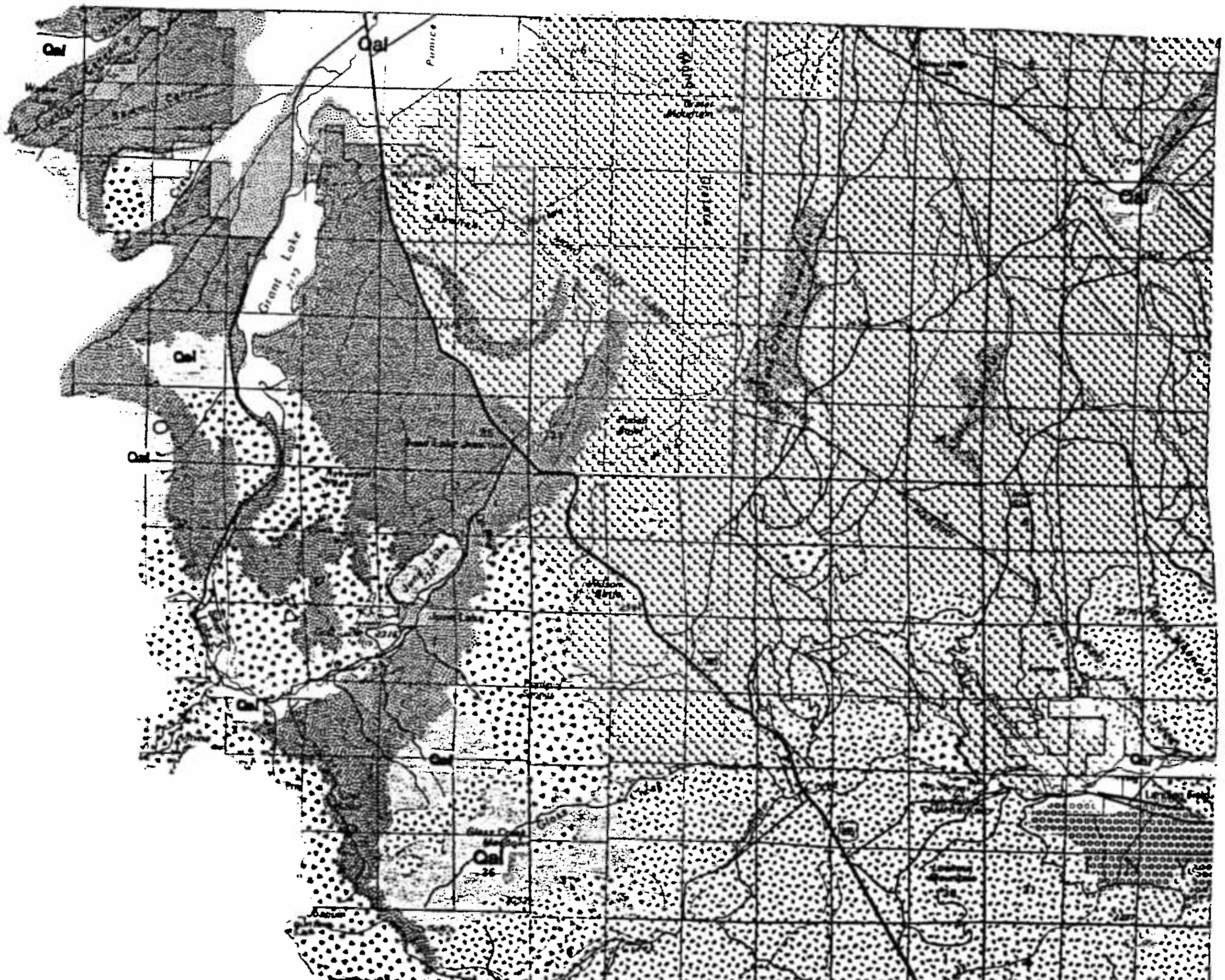
MONO COUNTY MEA

FIGURE 15 H
GEOLOGIC MAP

LEGEND

Qal	QUATERNARY ALLUVIUM
	QUATERNARY DUNE SAND
	QUATERNARY LAKE DEPOSITS
	QUATERNARY GLACIAL DEPOSITS
	UNDIFFERENTIATED QUATERNARY SEDIMENTS
	QUATERNARY VOLCANIC MATERIAL
	TERTIARY VOLCANIC MATERIAL
	PRE-TERTIARY ROCKS

I. June Lake



SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 15 I
GEOLOGIC MAP

LEGEND

Qal QUATERNARY ALLUVIUM

QUATERNARY DUNE SAND

QUATERNARY LAKE DEPOSITS

QUATERNARY GLACIAL DEPOSITS

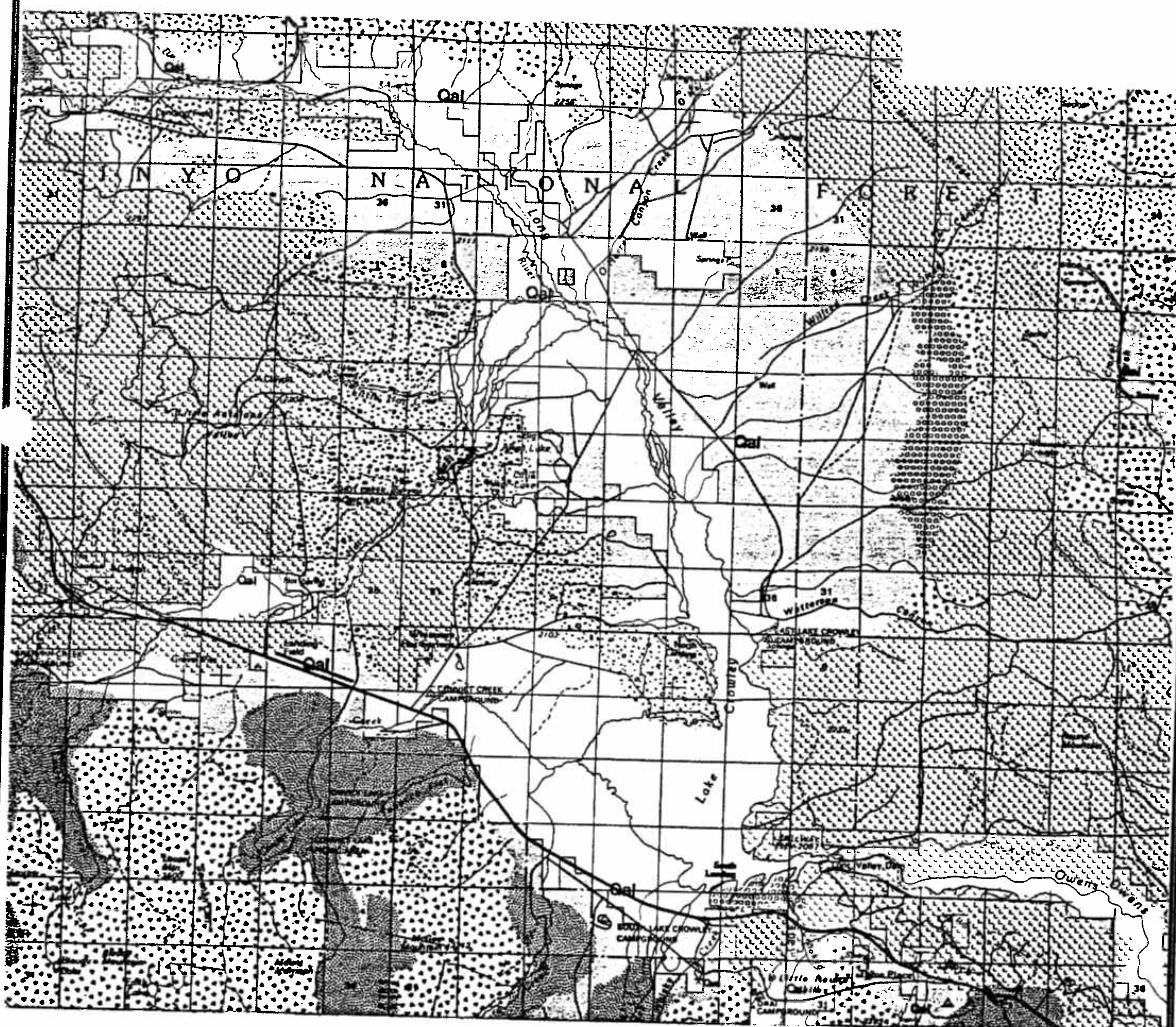
UNDIFFERENTIATED QUATERNARY SEDIMENTS

QUATERNARY VOLCANIC MATERIAL

TERTIARY VOLCANIC MATERIAL

PRE-TERTIARY ROCKS

J. Long Valley



SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

FEDERALLY OWNED LANDS

0 MILES 5

N

LEGEND

Qal QUATERNARY ALLUVIUM

QUATERNARY DUNE SAND

QUATERNARY LAKE DEPOSITS

QUATERNARY GLACIAL DEPOSITS

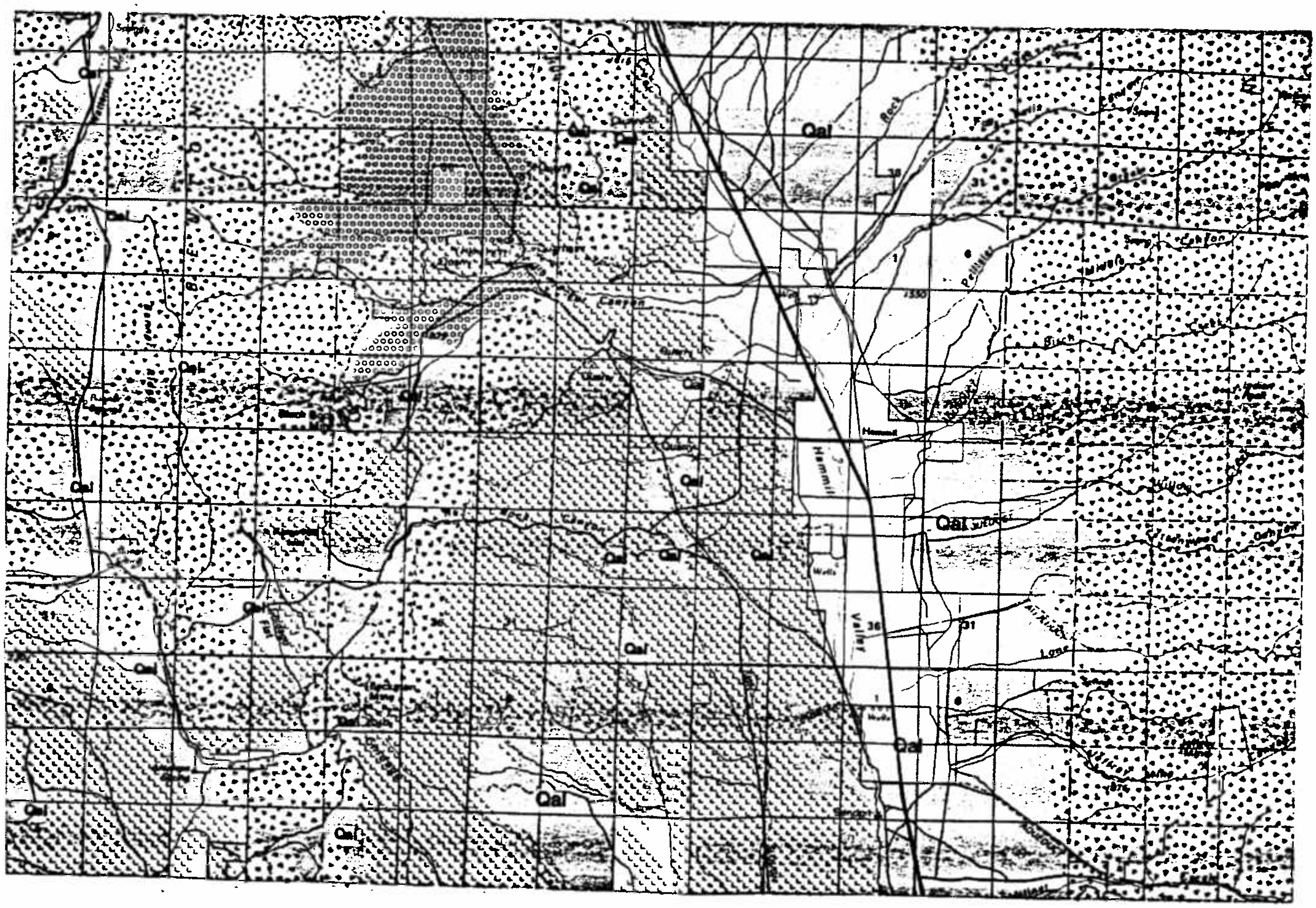
UNDIFFERENTIATED QUATERNARY SEDIMENTS

QUATERNARY VOLCANIC MATERIAL

TERTIARY VOLCANIC MATERIAL

PRE-TERTIARY ROCKS

K. Hammil Valley



SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

FEDERALLY OWNED LANDS

0 MILES 5

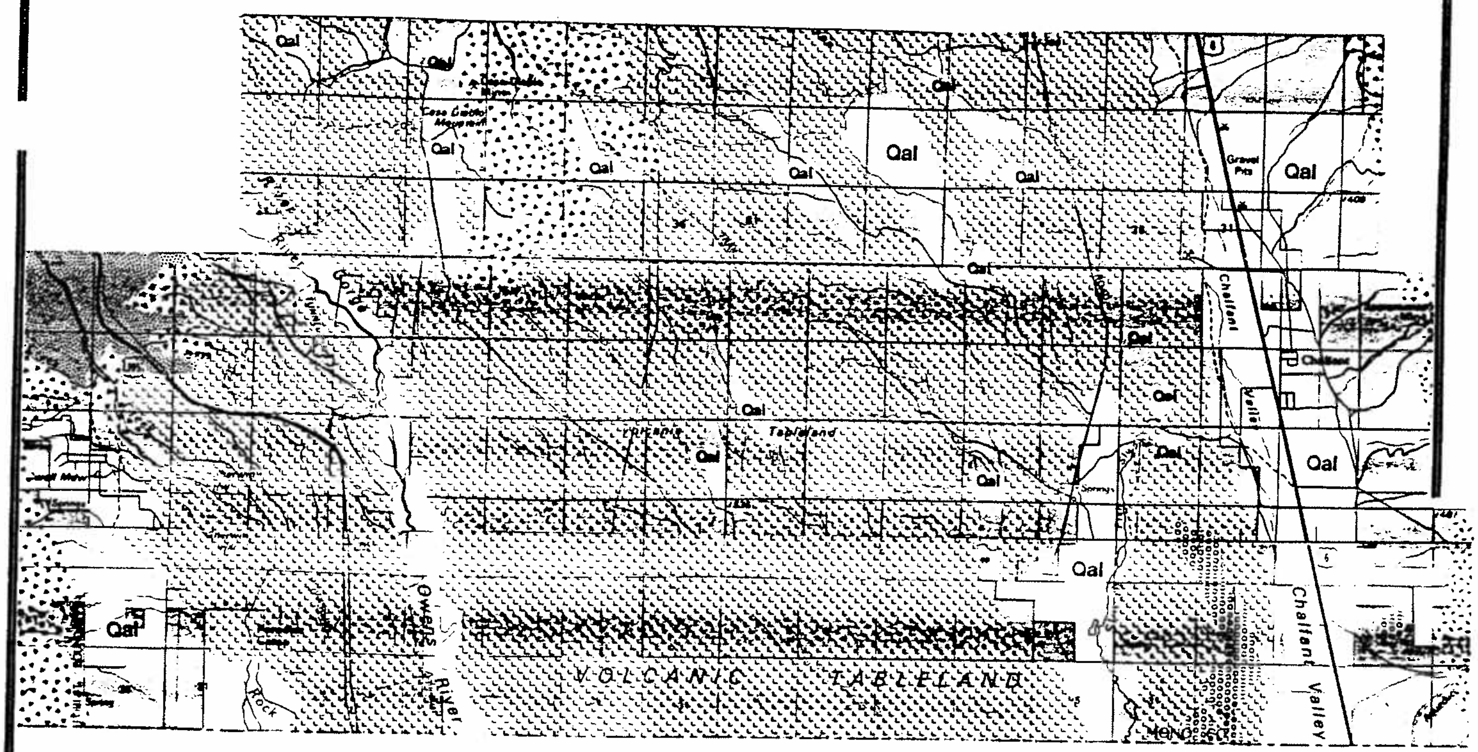
N

FIGURE 15 K
GEOLOGIC MAP

L. Wheeler / Paradise
M. Chalfant Valley

LEGEND

Qal	QUATERNARY ALLUVIUM
	QUATERNARY DUNE SAND
	QUATERNARY LAKE DEPOSITS
	QUATERNARY GLACIAL DEPOSITS
	UNDIFFERENTIATED QUATERNARY SEDIMENTS
	QUATERNARY VOLCANIC MATERIAL
	TERTIARY VOLCANIC MATERIAL
	PRE-TERTIARY ROCKS



SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

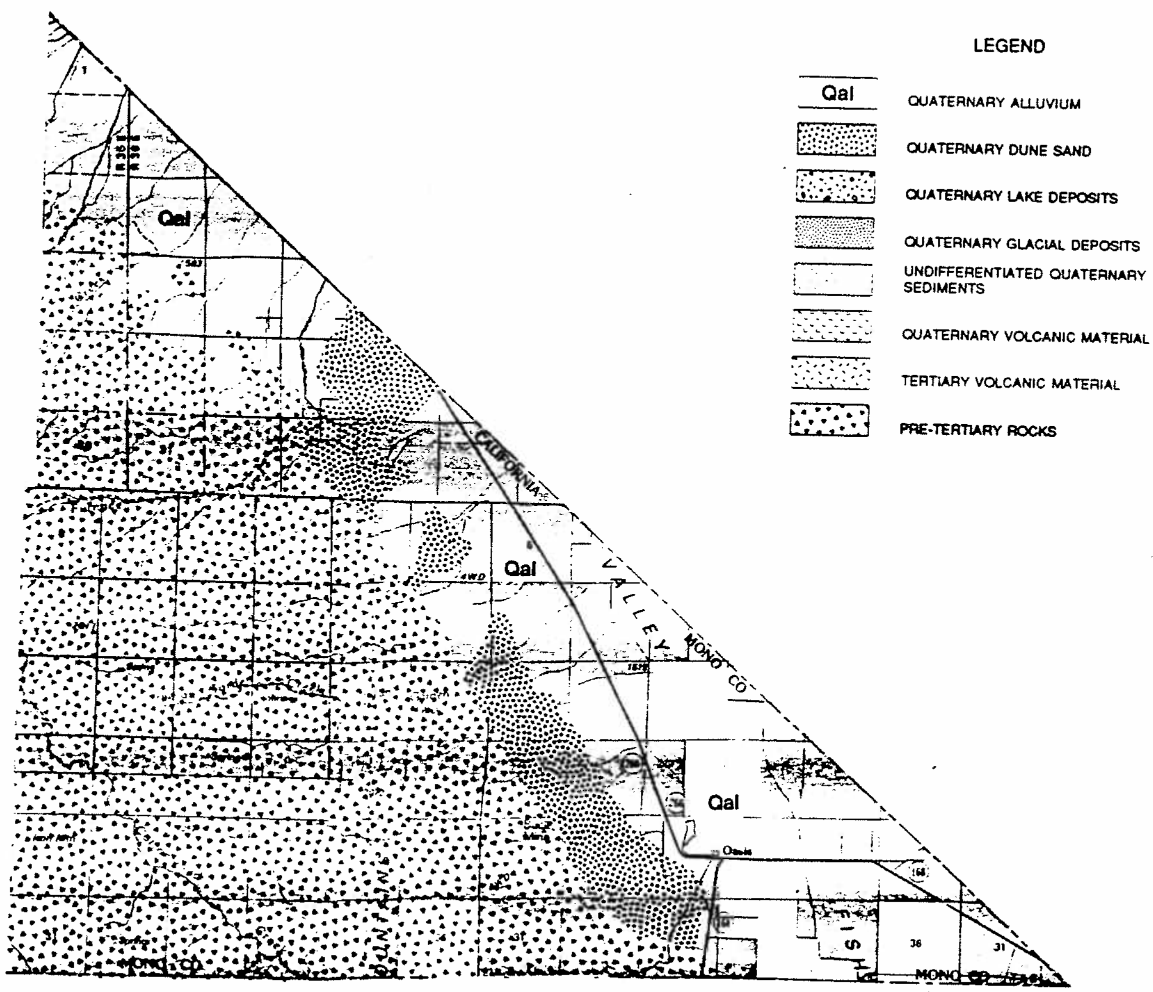
FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 15 L & M
GEOLOGIC MAP

N. Fish Lake Valley



SOURCE: CDMG, Walker Lake and Mariposa sheets, 1:250,000

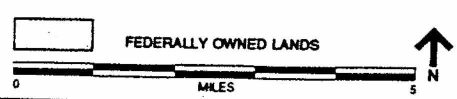
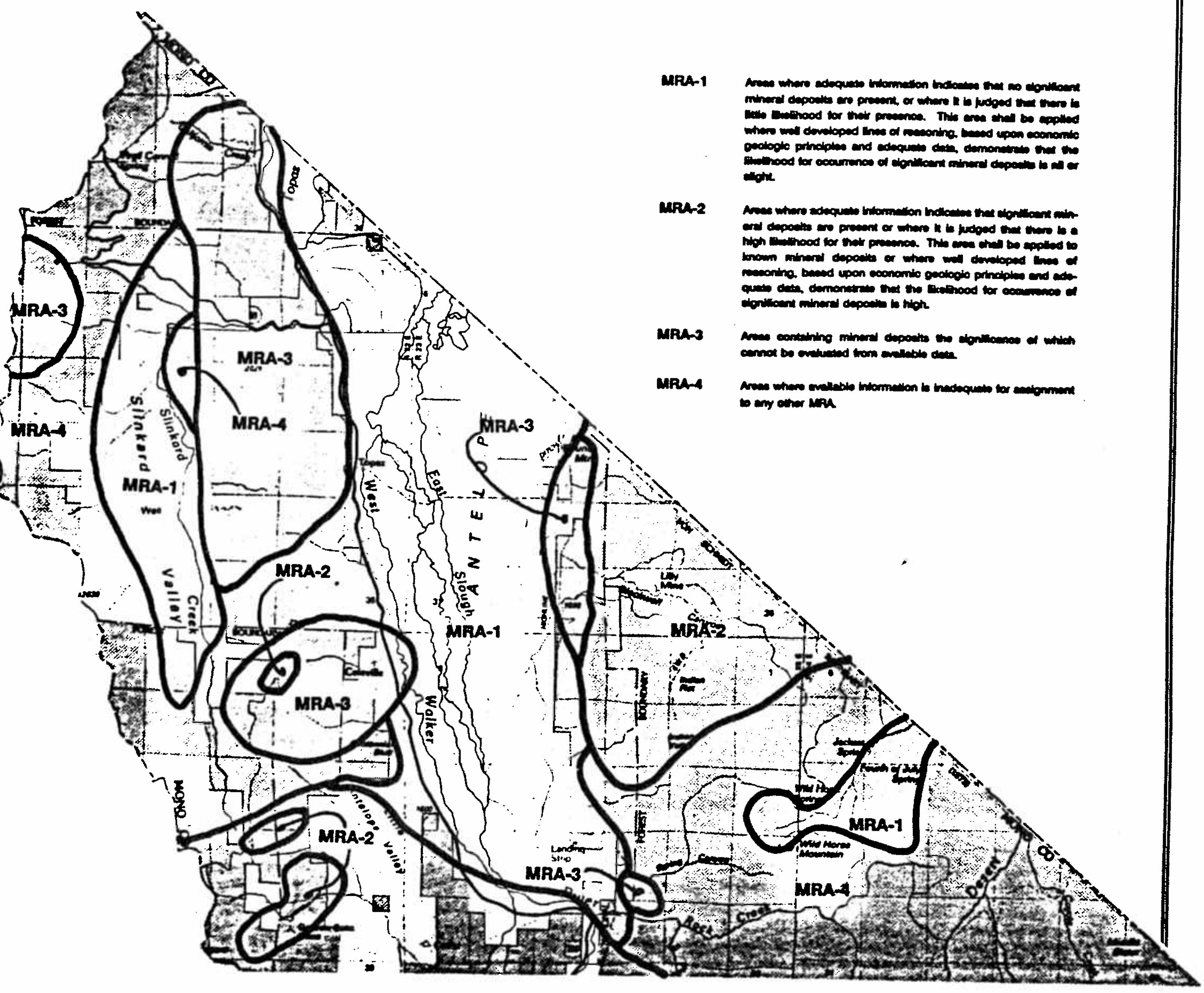


Figure 17

Mineral Resources

A. Antelope Valley
B. Devil's Gate
C. East Walker
D. Bridgeport
E. Bodie
F. Mono Lake
G. Cowtrack Mountain
H. Adobe Valley / Benton
I. June Lake
J. Long Valley
K. Hammil Valley
L. Wheeler / Paradise
M. Chalfant Valley
N. Fish Lake Valley
O. Sonora Pass
P. Walker Mountain
Q. Tioga Pass
R. Adobe Hills
S. Ansel Adams Wilderness
T. Glass Mountain
U. Mount Dubois
V. Mammoth Lakes
W. John Muir Wilderness
X. White Mountain

A. Antelope Valley



MRA-1 Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.

MRA-2 Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRA-3 Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRA-4 Areas where available information is inadequate for assignment to any other MRA.

SOURCE: Mono County Mining Database

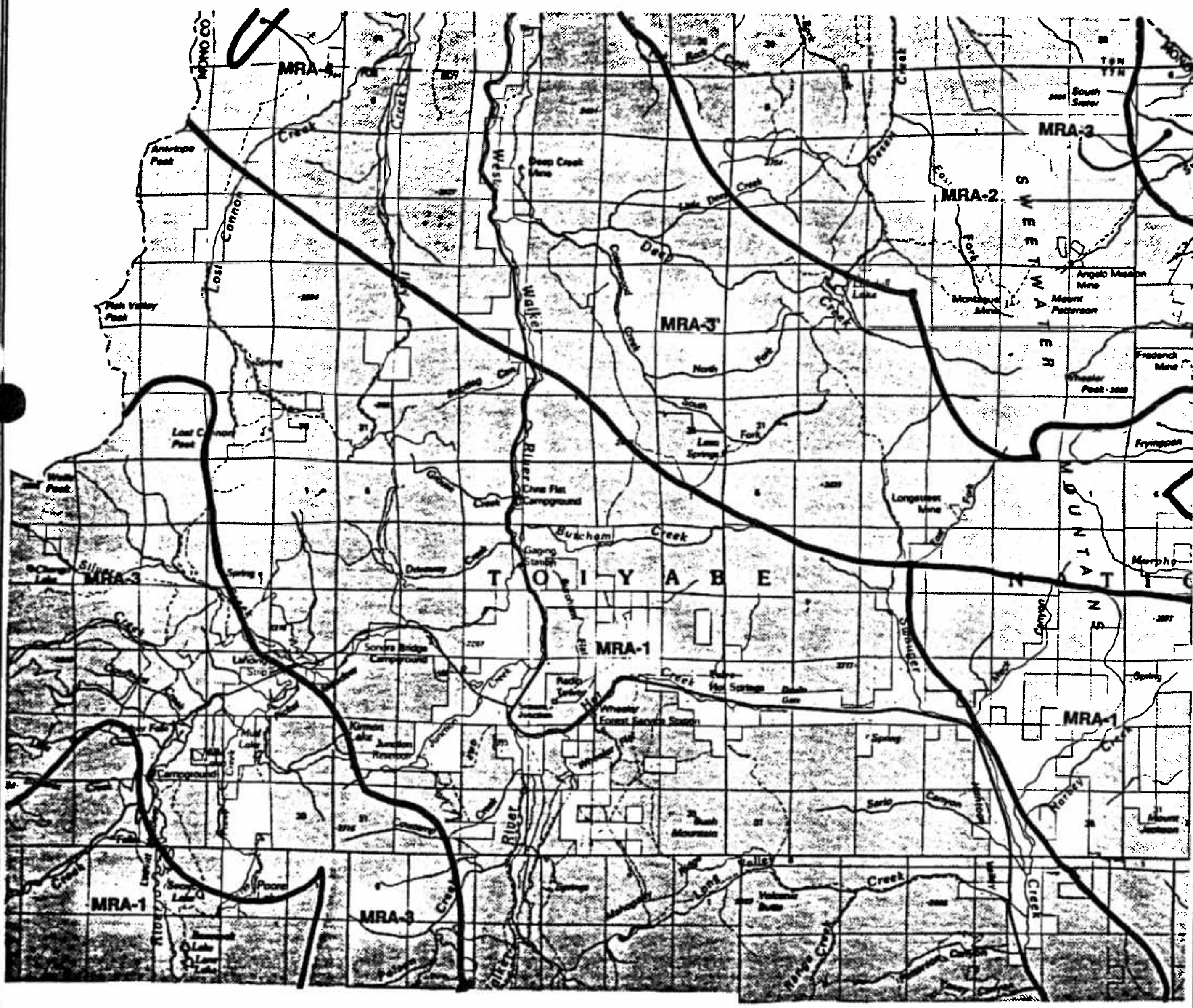
FEDERALLY OWNED LANDS

0 MILES 5

N

MRA-1	Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.
MRA-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.
MRA-3	Areas containing mineral deposits the significance of which cannot be evaluated from available data.
MRA-4	Areas where available information is inadequate for assignment to any other MRA.

B. Devil's Gate to Swauger Creek



FEDERALLY OWNED LANDS

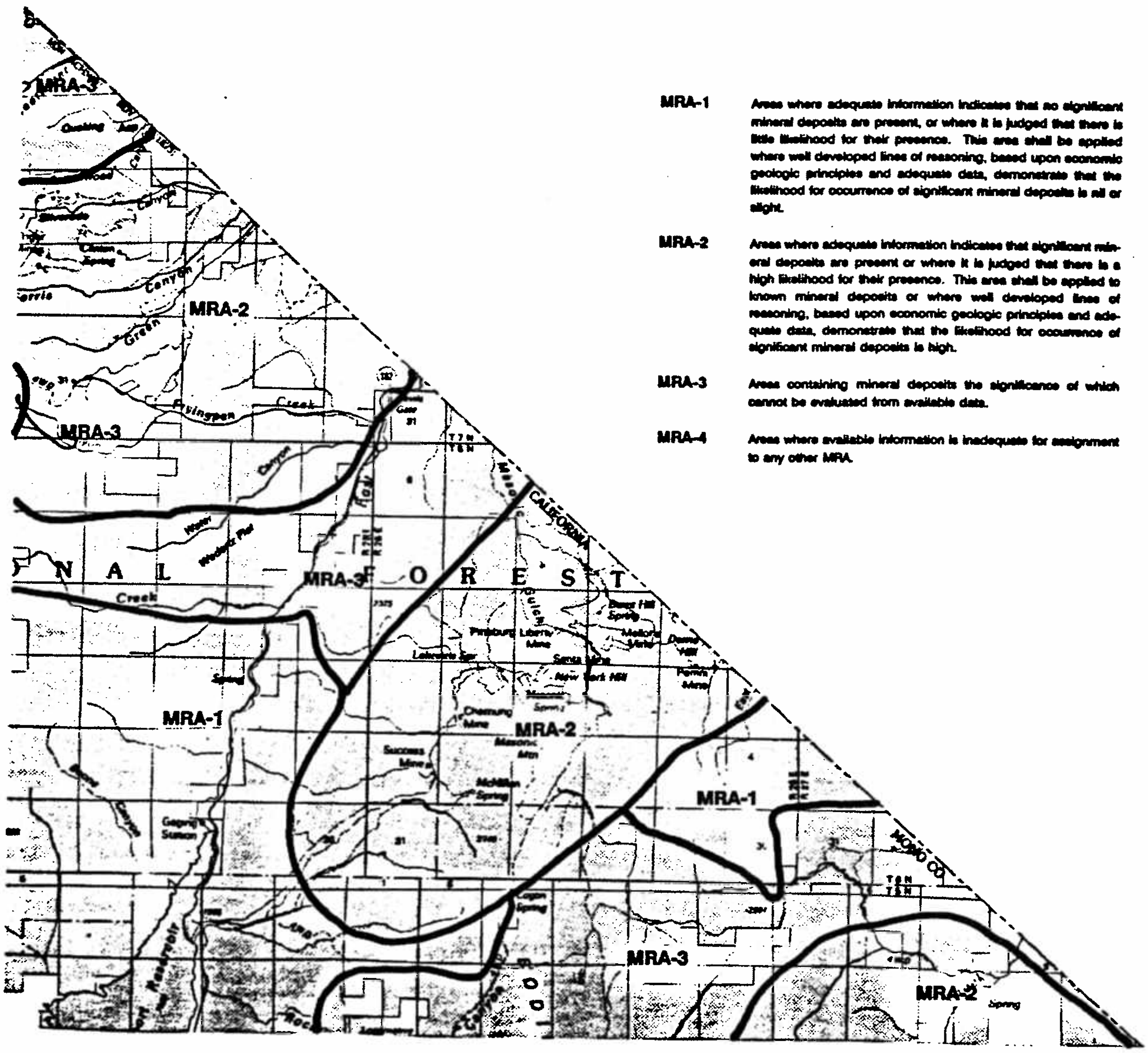
0 MILES 5

N

SOURCE: Mono County Mining Database

FIGURE 17 B
MINERAL RESOURCES

C. East Walker



MRA-1	Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.
MRA-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.
MRA-3	Areas containing mineral deposits the significance of which cannot be evaluated from available data.
MRA-4	Areas where available information is inadequate for assignment to any other MRA.

SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 17 C
MINERAL RESOURCES

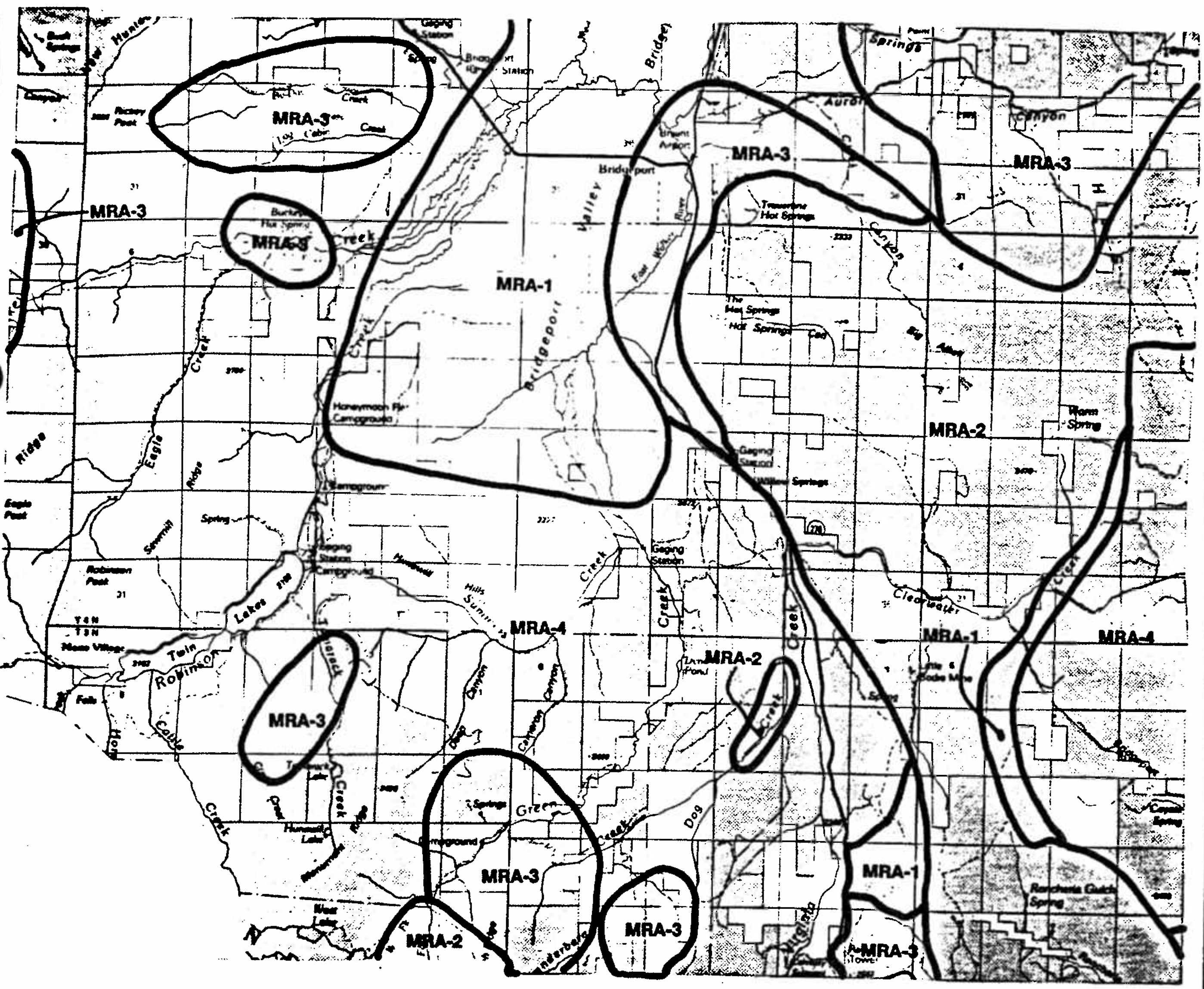
MRA-1 Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.

MRA-2 Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRA-3 Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRA-4 Areas where available information is inadequate for assignment to any other MRA.

D. Bridgeport



SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

0 MILES 5

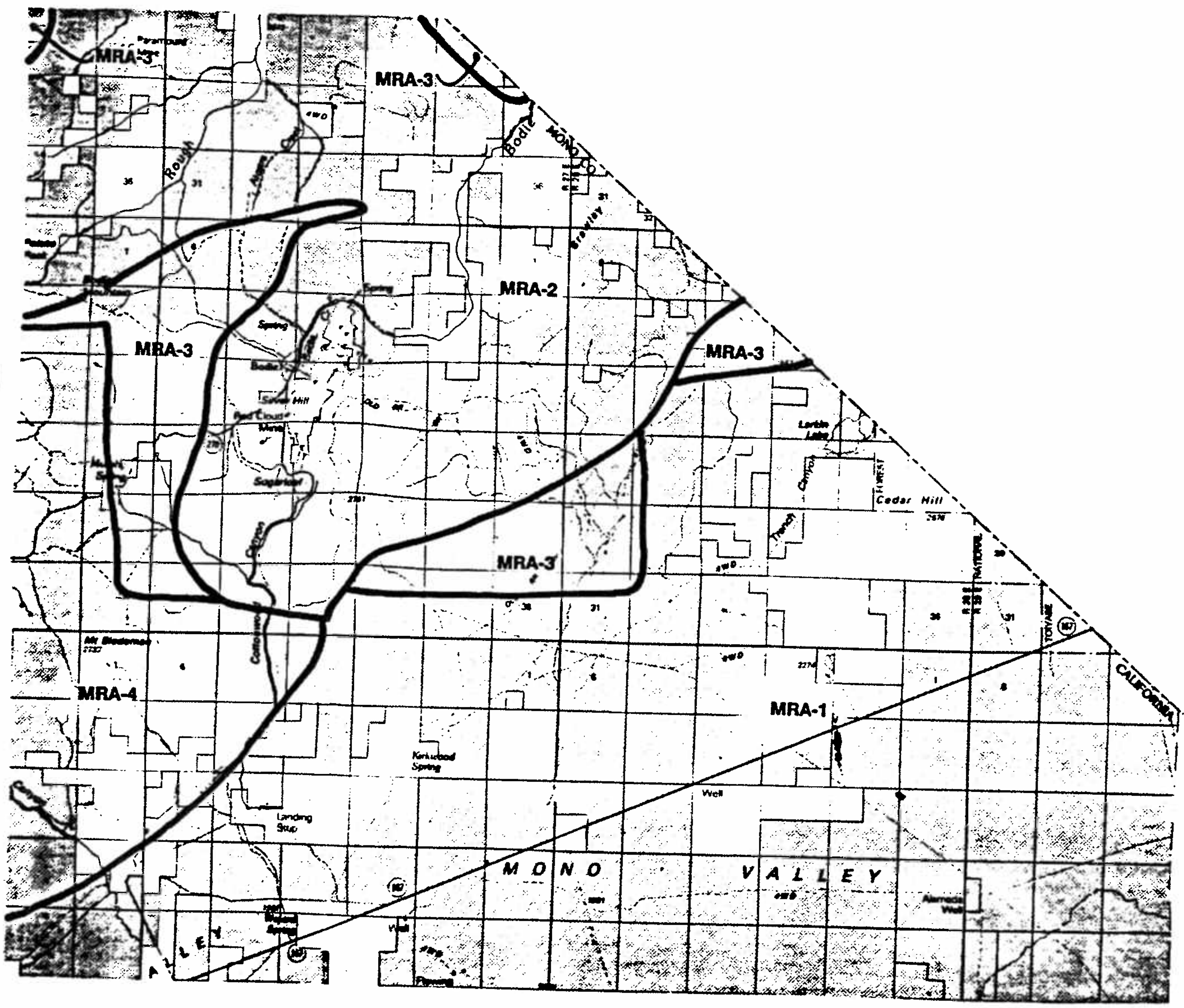
N

MONO COUNTY MEA

FIGURE 17 D
MINERAL RESOURCES

MRA-1	Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.
MRA-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.
MRA-3	Areas containing mineral deposits the significance of which cannot be evaluated from available data.
MRA-4	Areas where available information is inadequate for assignment to any other MRA.

E. Bodie



SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

MILES

N

FIGURE 17 E
MINERAL RESOURCES

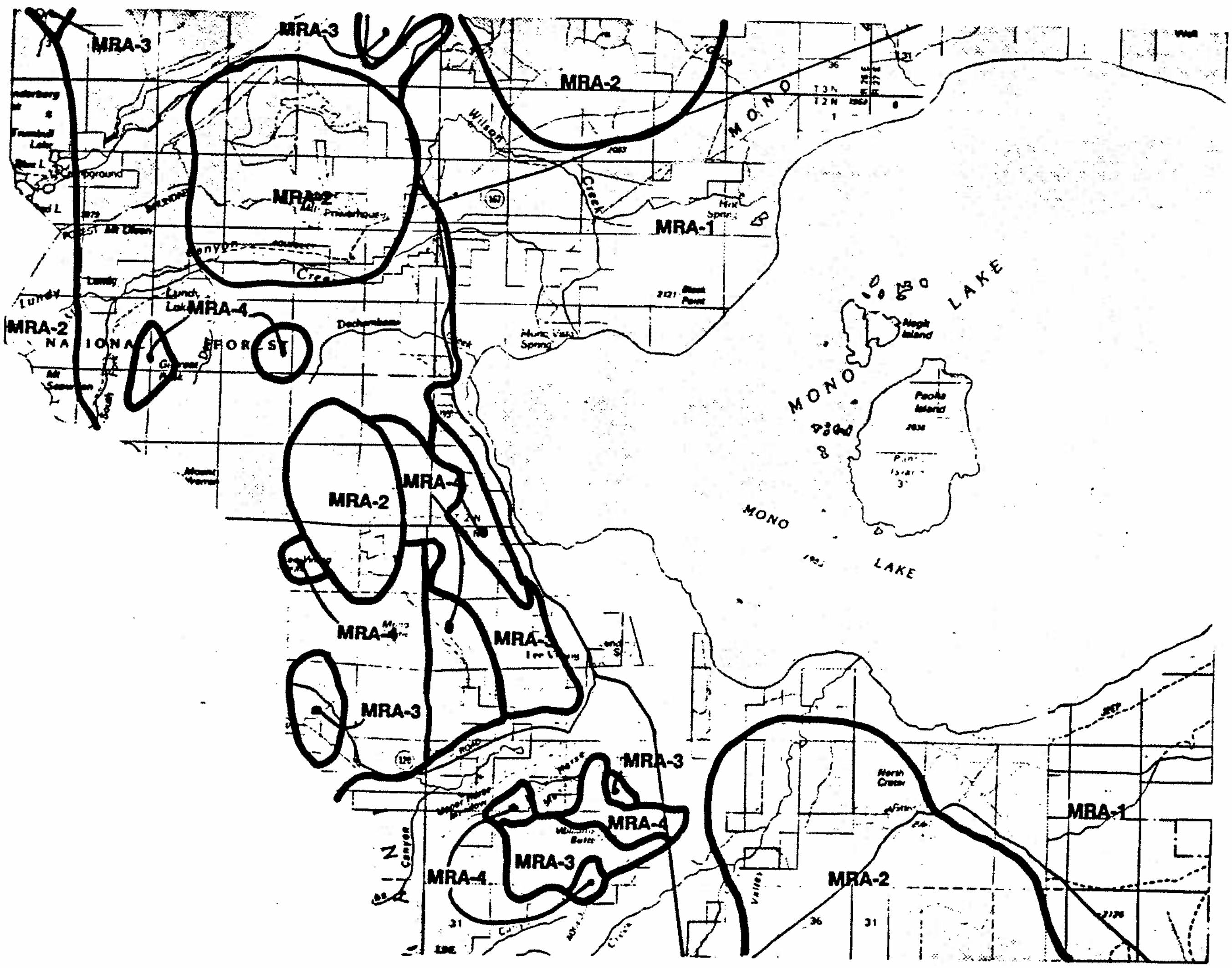
MRA-1 Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.

MRA-2 Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRA-3 Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRA-4 Areas where available information is inadequate for assignment to any other MRA.

F. Mono Lake



SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

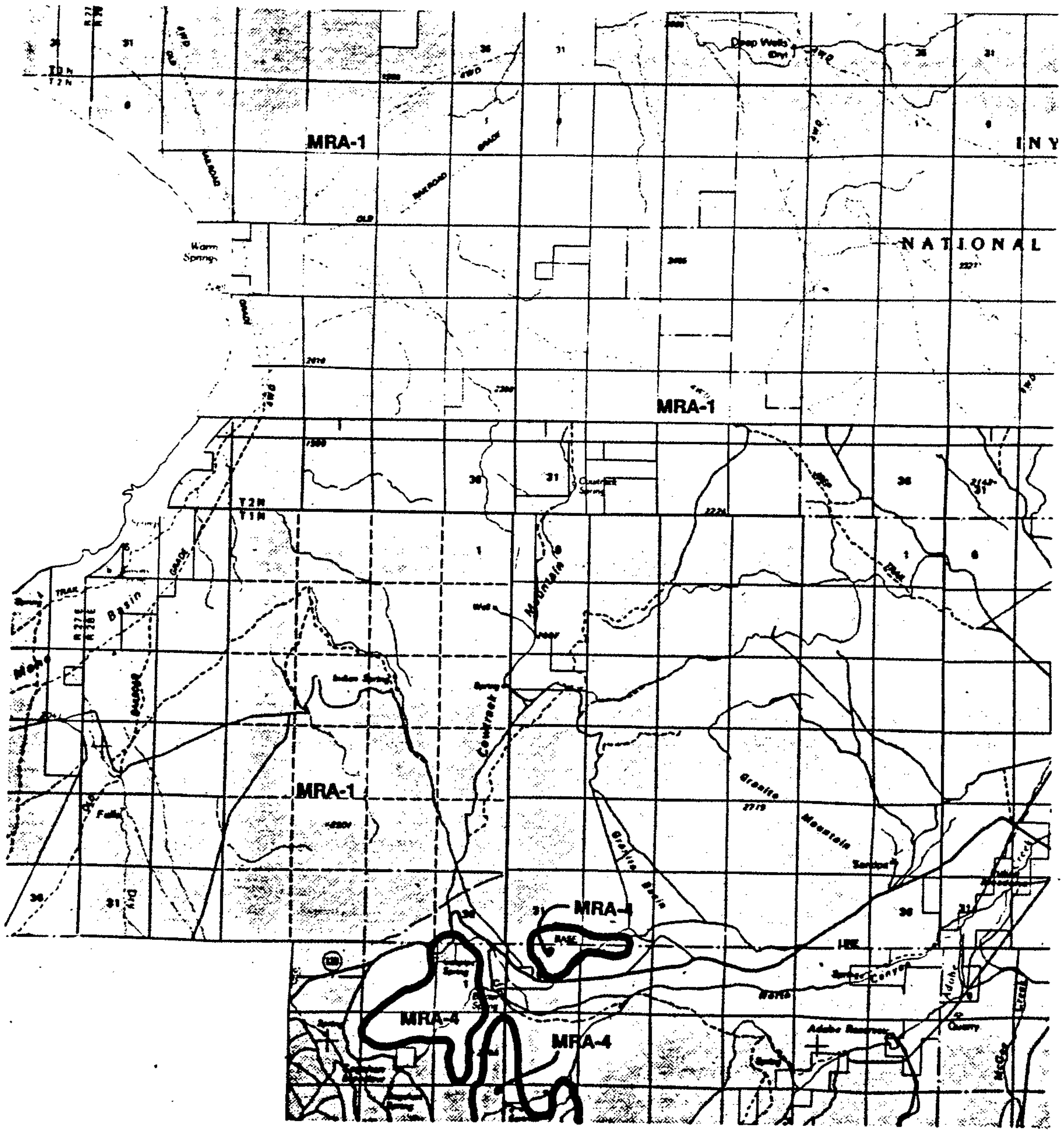
0 MILES 5

N

FIGURE 17 F
MINERAL RESOURCES

MRA-1	Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.
MRA-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.
MRA-3	Areas containing mineral deposits the significance of which cannot be evaluated from available data.
MRA-4	Areas where available information is inadequate for assignment to any other MRA.

G. Cowtrack Mountain



SOURCE: Mono County Mining Database

MONO COUNTY MEA

FIGURE 17 G
MINERAL RESOURCES

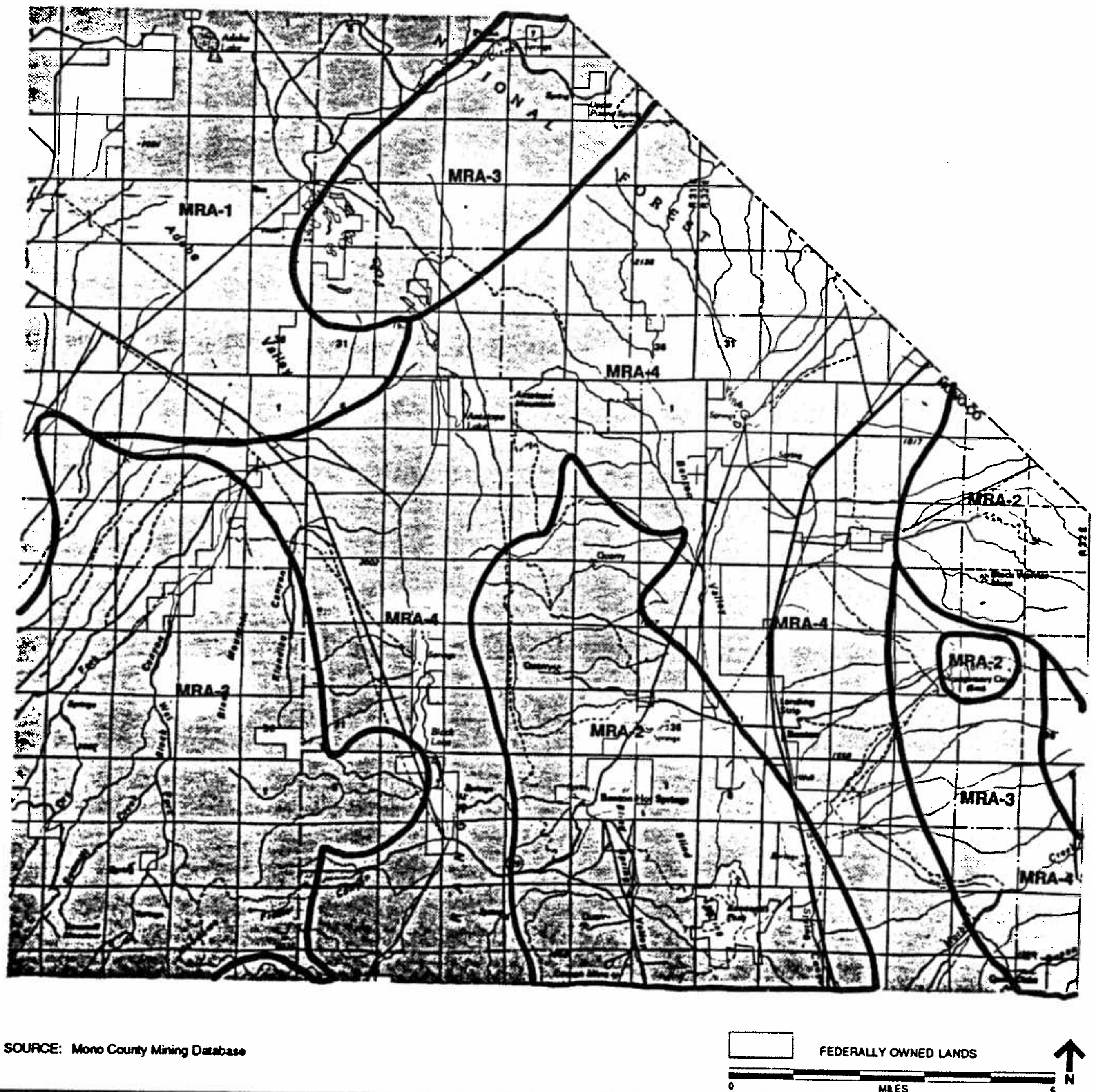
MRA-1 Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.

MRA-2 Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRA-3 Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRA-4 Areas where available information is inadequate for assignment to any other MRA.

H. Adobe Valley / Benton

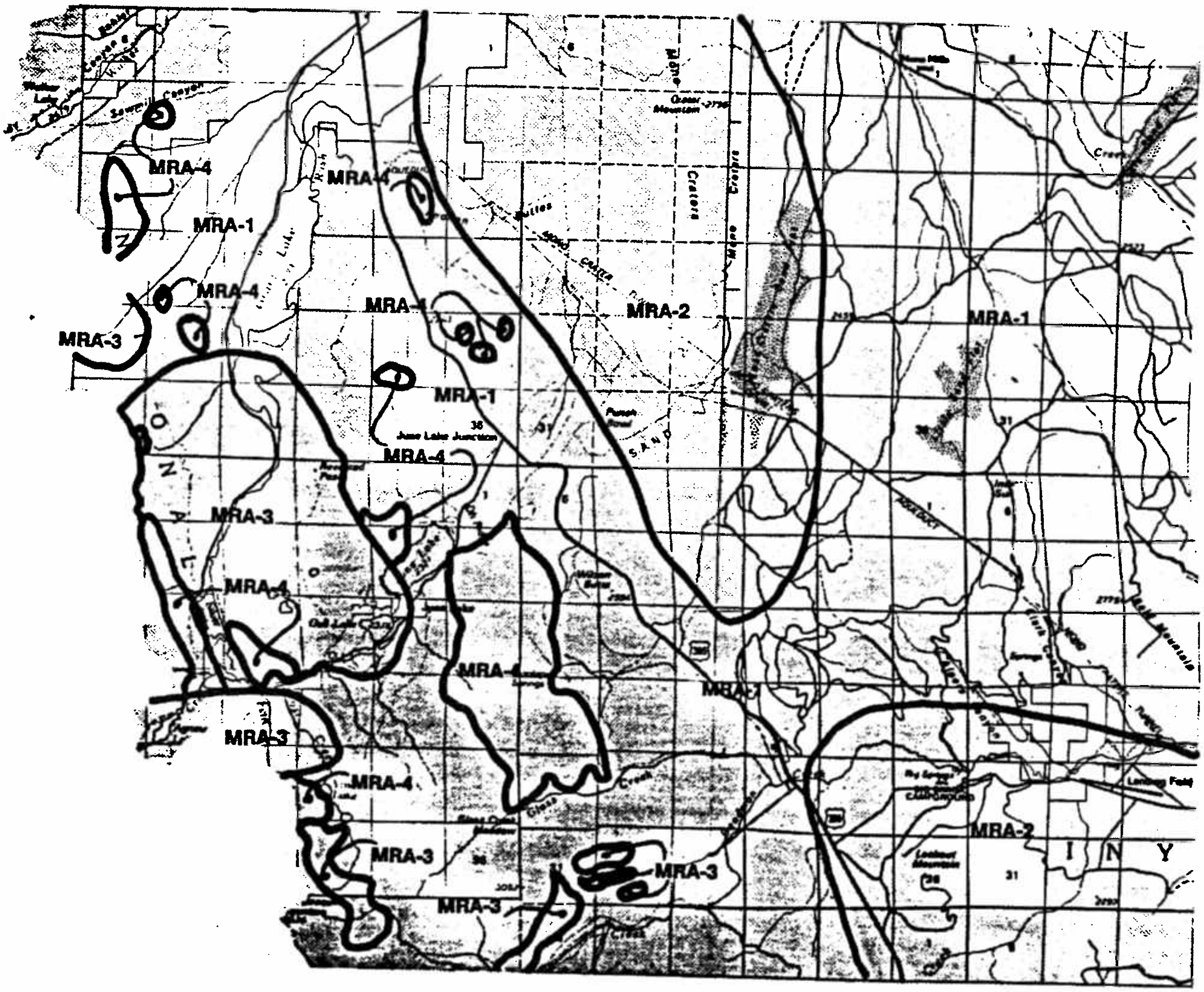


MONO COUNTY MEA

FIGURE 17 H
MINERAL RESOURCES

MRA-1	Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.
MRA-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.
MRA-3	Areas containing mineral deposits the significance of which cannot be evaluated from available data.
MRA-4	Areas where available information is inadequate for assignment to any other MRA.

I. June Lake



SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 17 I
MINERAL RESOURCES

MRA-1 Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.

MRA-2 Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRA-3 Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRA-4 Areas where available information is inadequate for assignment to any other MRA.

J. Long Valley

SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

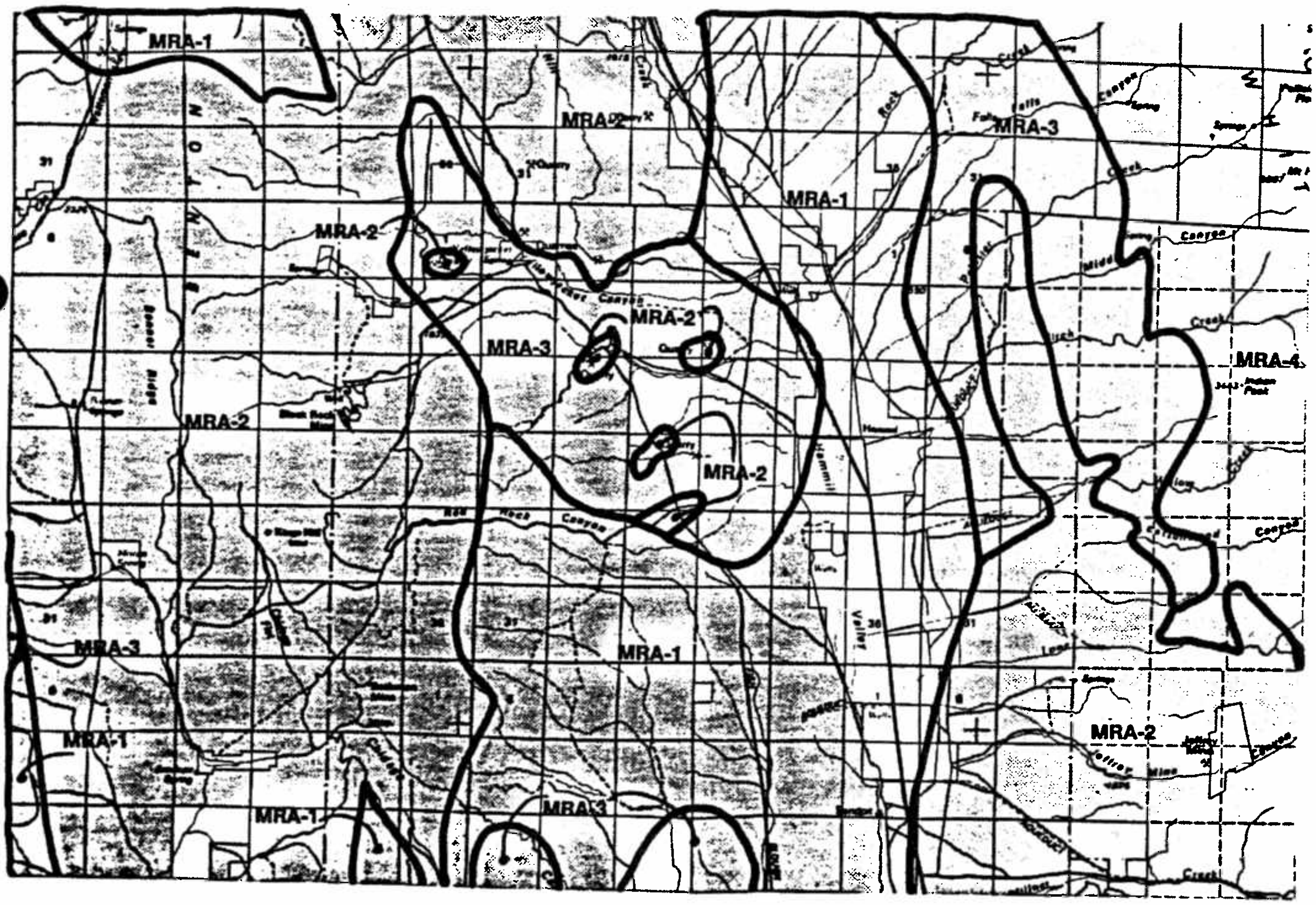
0 MILES 5

N

FIGURE 17 J
MINERAL RESOURCES

MRA-1	Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.
MRA-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.
MRA-3	Areas containing mineral deposits the significance of which cannot be evaluated from available data.
MRA-4	Areas where available information is inadequate for assignment to any other MRA.

K. Hammil Valley



SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 17 K
MINERAL RESOURCES

L. Wheeler / Paradise
M. Chalfant Valley

MRA-1	Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.
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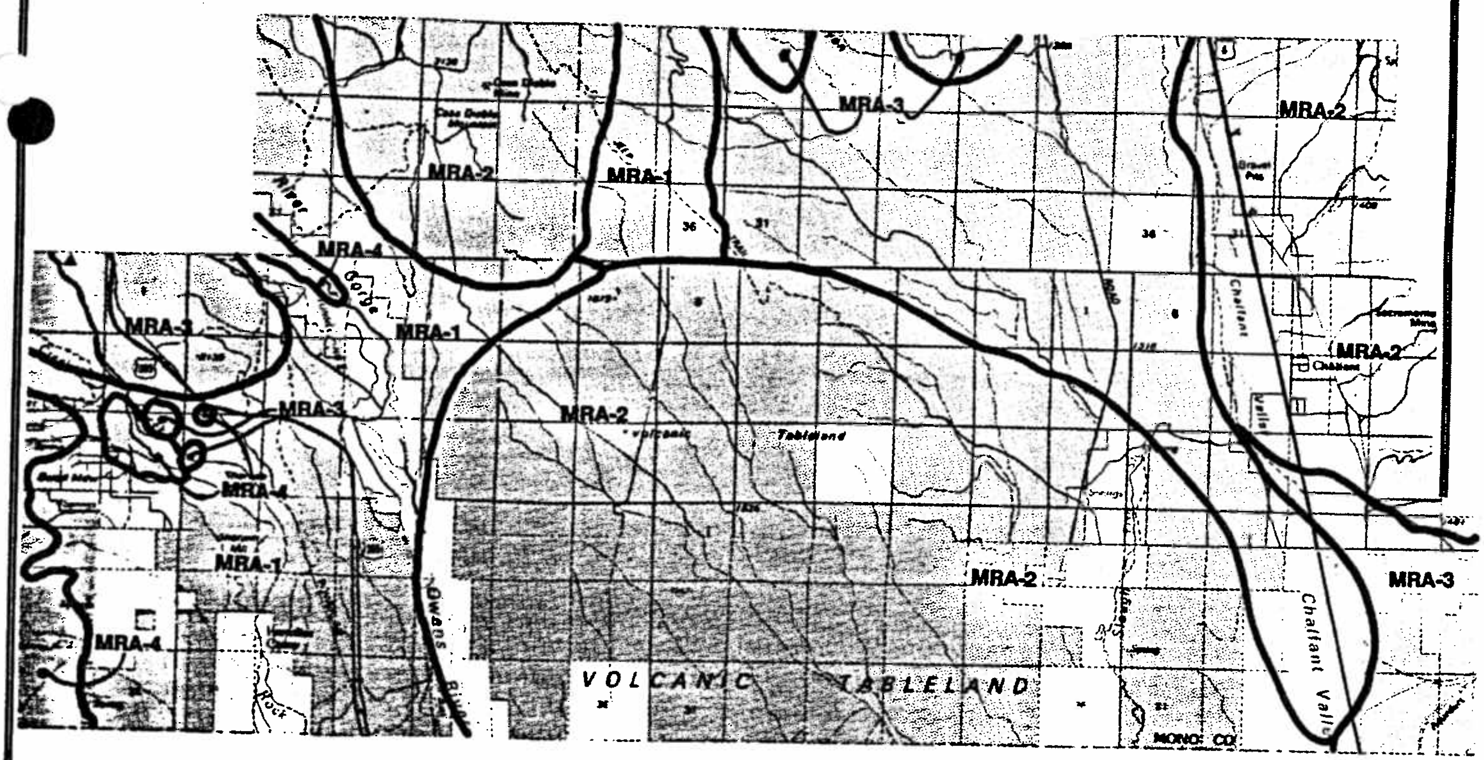
MRA-3	Areas containing mineral deposits the significance of which cannot be evaluated from available data.
MRA-4	Areas where available information is inadequate for assignment to any other MRA.



SOURCE: Mono County Mining Database

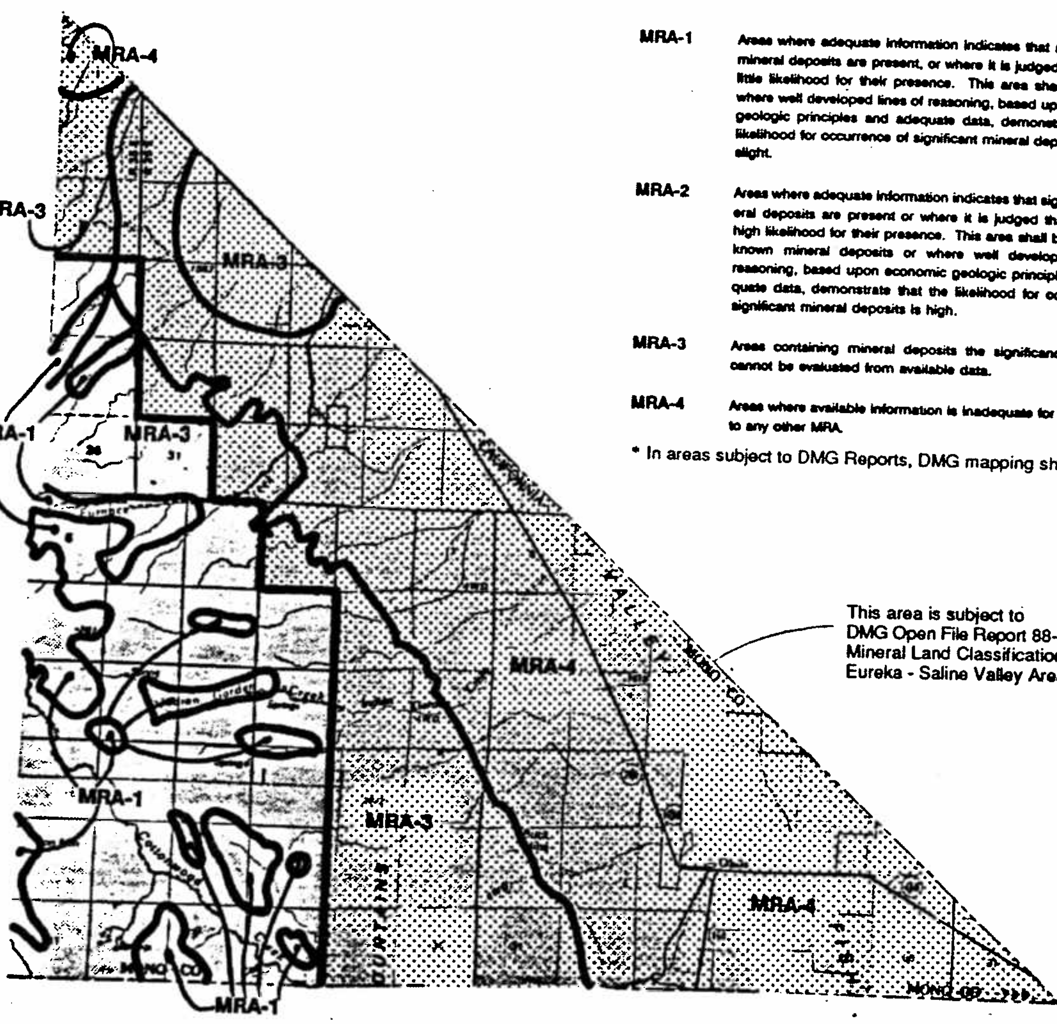
FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 17 L & M
MINERAL RESOURCES

N. Fish Lake Valley



MRA-1 Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.

MRA-2 Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRA-3 Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRA-4 Areas where available information is inadequate for assignment to any other MRA.

* In areas subject to DMG Reports, DMG mapping shall take precedence

This area is subject to
DMG Open File Report 88-2
Mineral Land Classification of the
Eureka - Saline Valley Area

SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

0 MILES 5

N

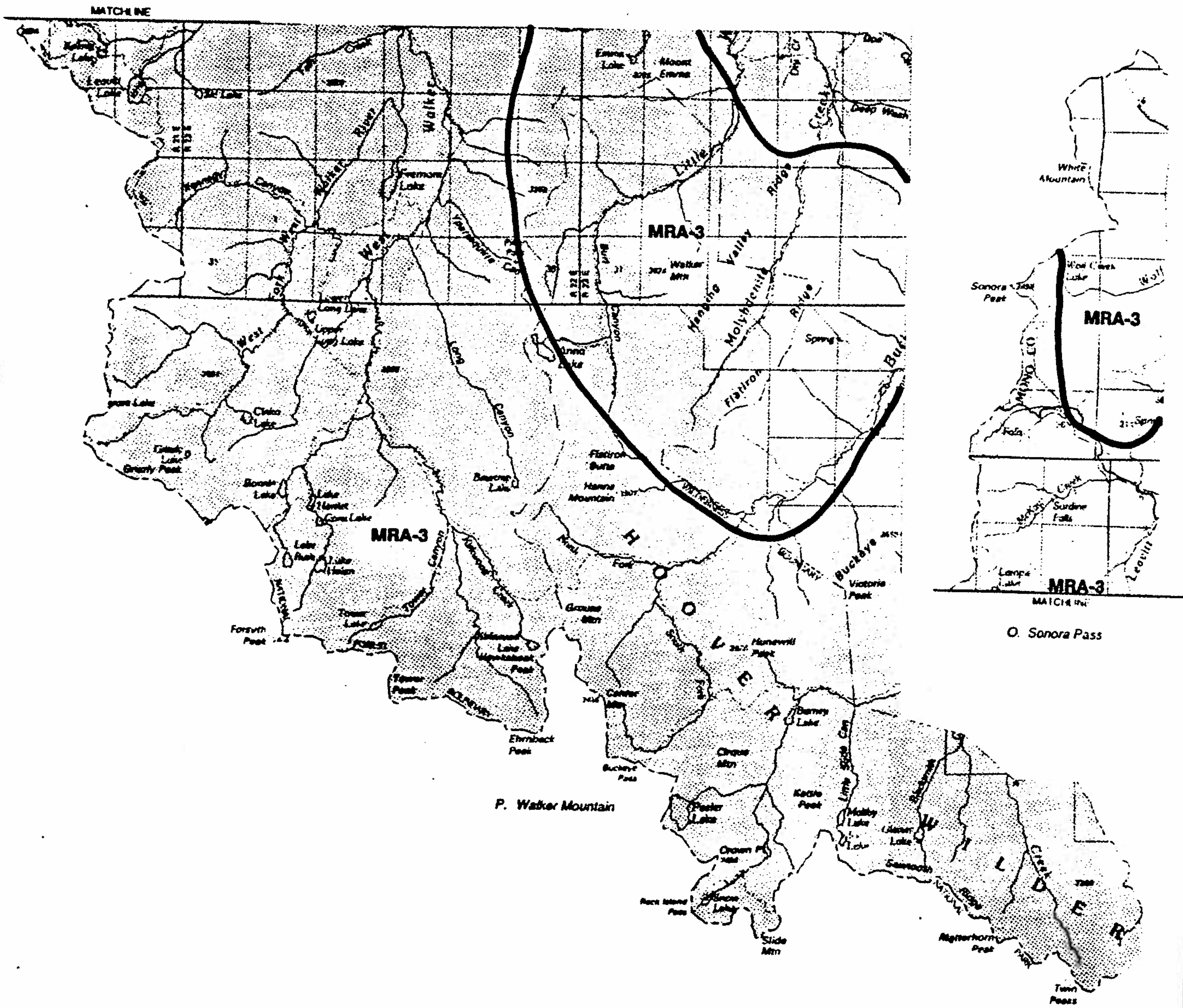
MRA-1 Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.

MRA-2 Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRA-3 Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRA-4 Areas where available information is inadequate for assignment to any other MRA.

O. Sonora Pass
P. Walker Mountain



SOURCE: Mono County Mining Database

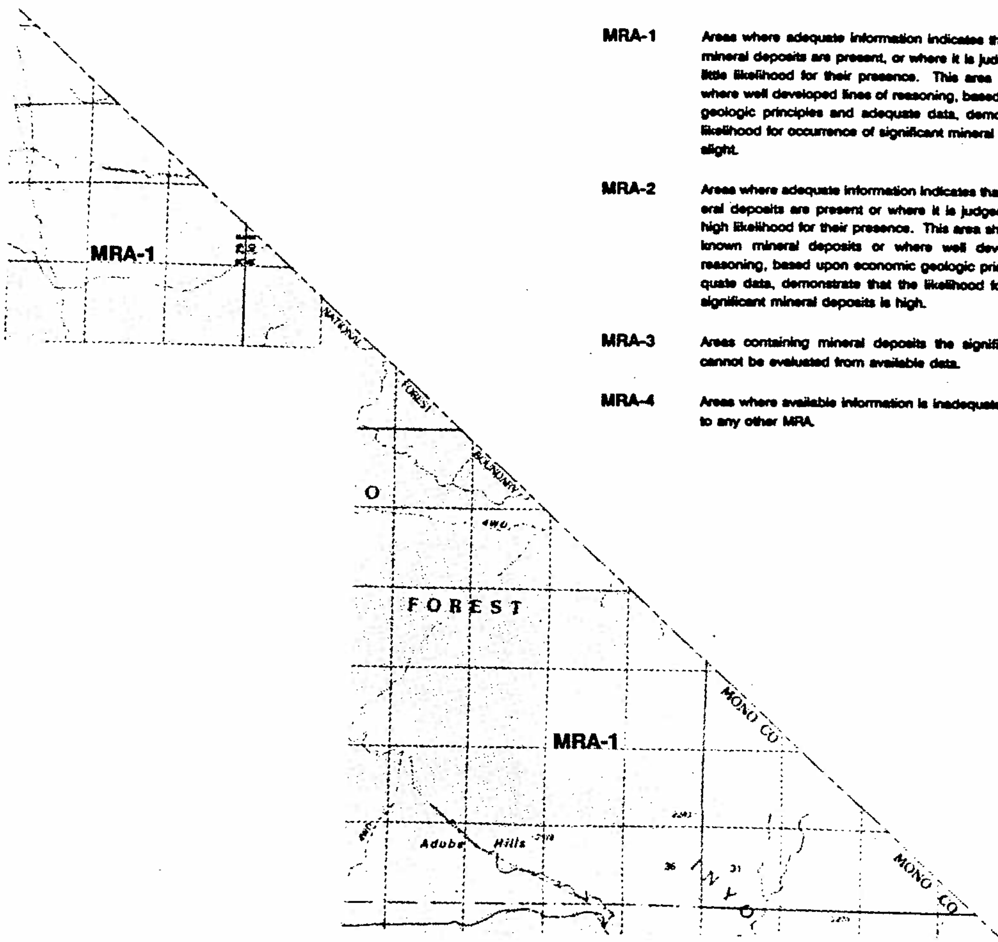
FEDERALLY OWNED LANDS

0 MILES 6

N

FIGURE 17 O & P
MINERAL RESOURCES

R. Adobe Hills



R. Adobe Hills

MRA-1	Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.
MRA-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.
MRA-3	Areas containing mineral deposits the significance of which cannot be evaluated from available data.
MRA-4	Areas where available information is inadequate for assignment to any other MRA.

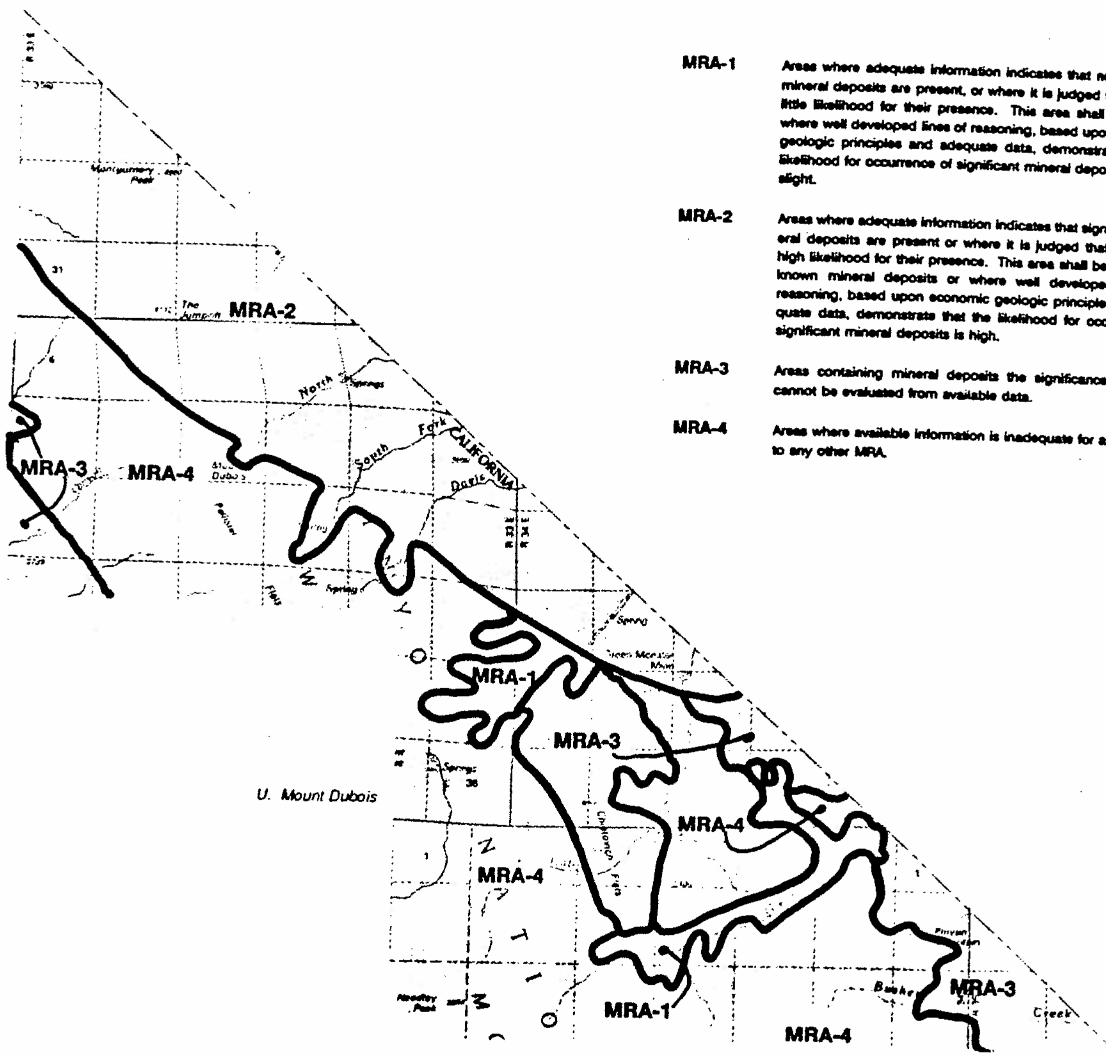
SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

0 MILES 5

N

U. Mount Dubois



MRA-1 Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.

MRA-2 Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRA-3 Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRA-4 Areas where available information is inadequate for assignment to any other MRA.

SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 17 U
MINERAL RESOURCES

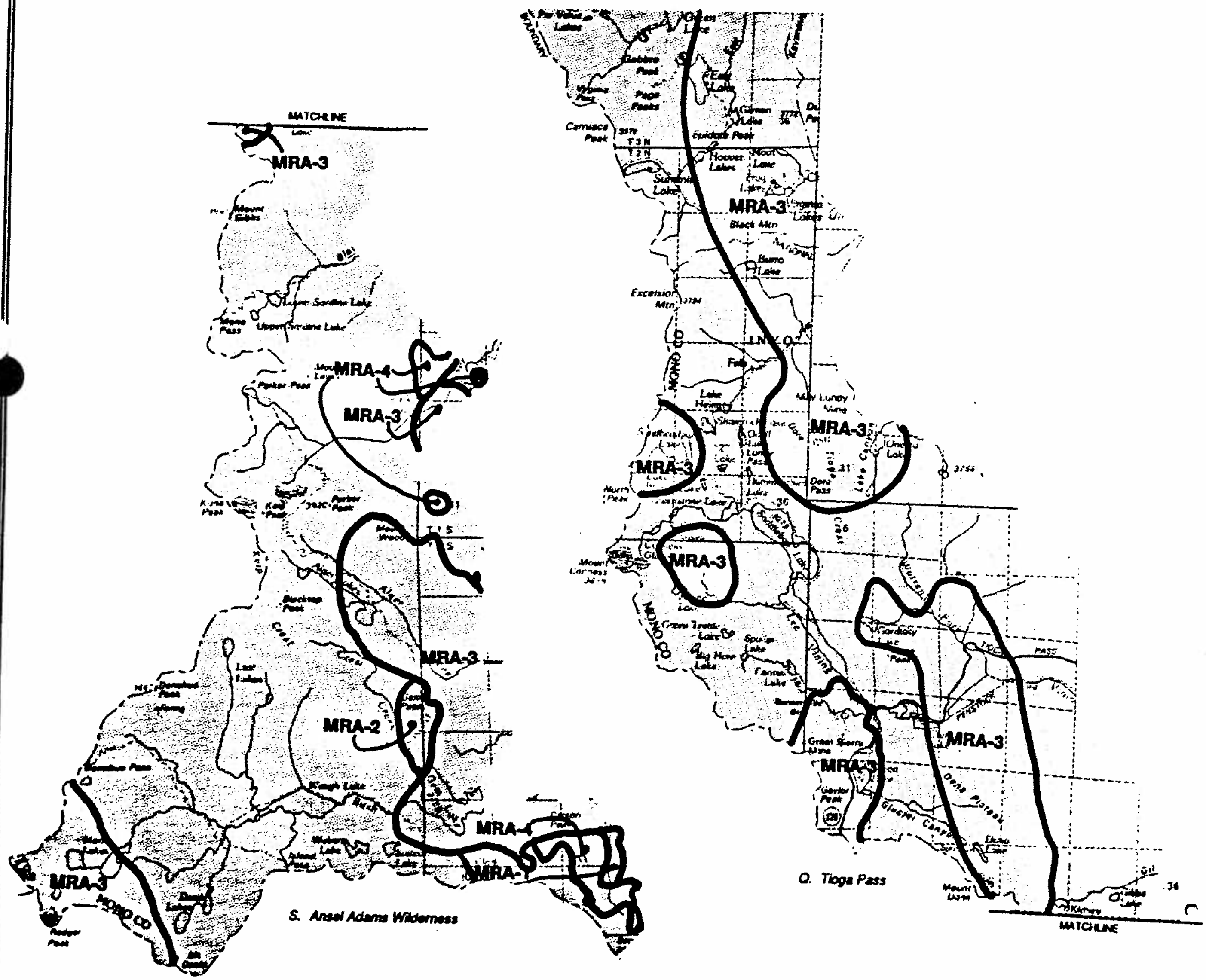
MRA-1 Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.

MRA-2 Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRA-3 Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRA-4 Areas where available information is inadequate for assignment to any other MRA.

Q. Tioga Pass
S. Ansel Adams Wilderness



SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

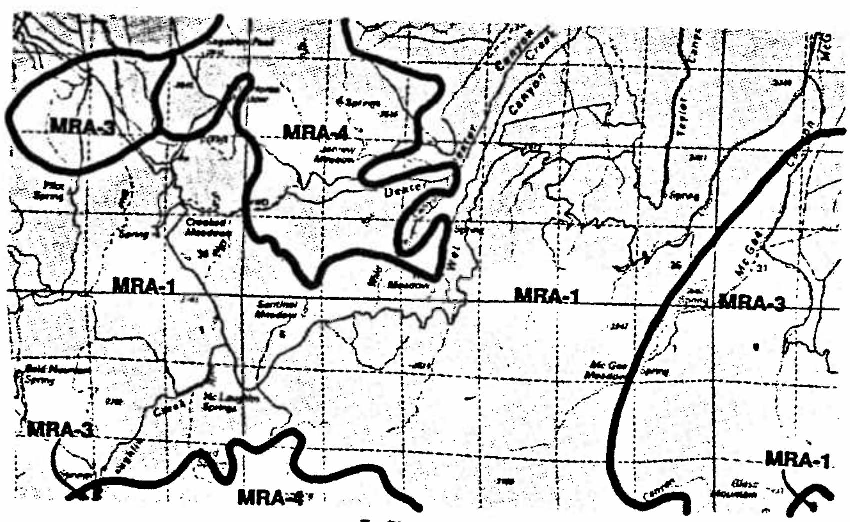
0 MILES 5

N

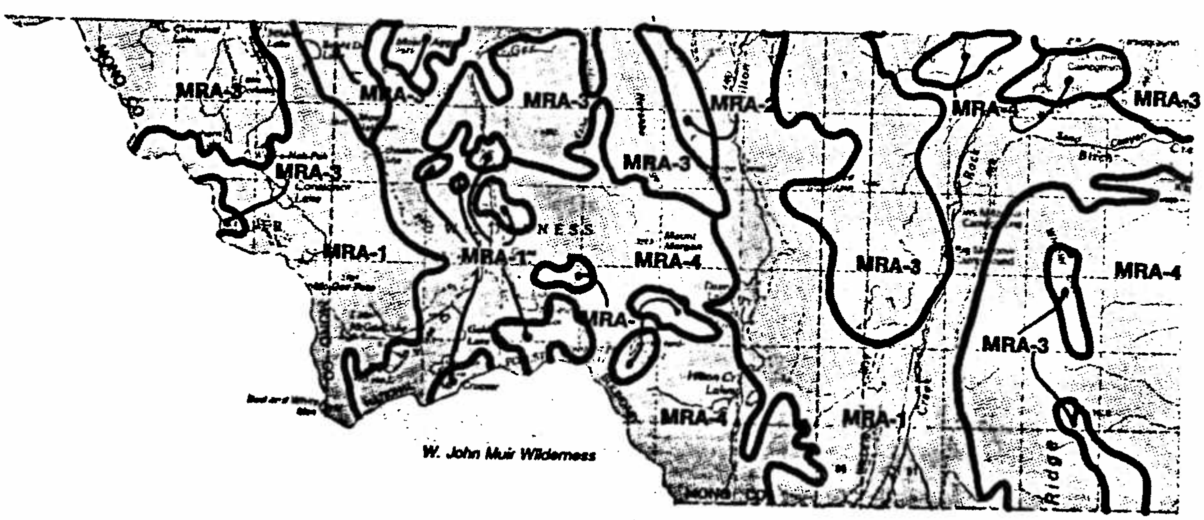
FIGURE 17 Q & S
MINERAL RESOURCES

MRA-1	Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.
MRA-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.
MRA-3	Areas containing mineral deposits the significance of which cannot be evaluated from available data.
MRA-4	Areas where available information is inadequate for assignment to any other MRA.

T. Glass Mountain
W. John Muir Wilderness



T. Glass Mountain



W. John Muir Wilderness

SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

0 MILES 5

N

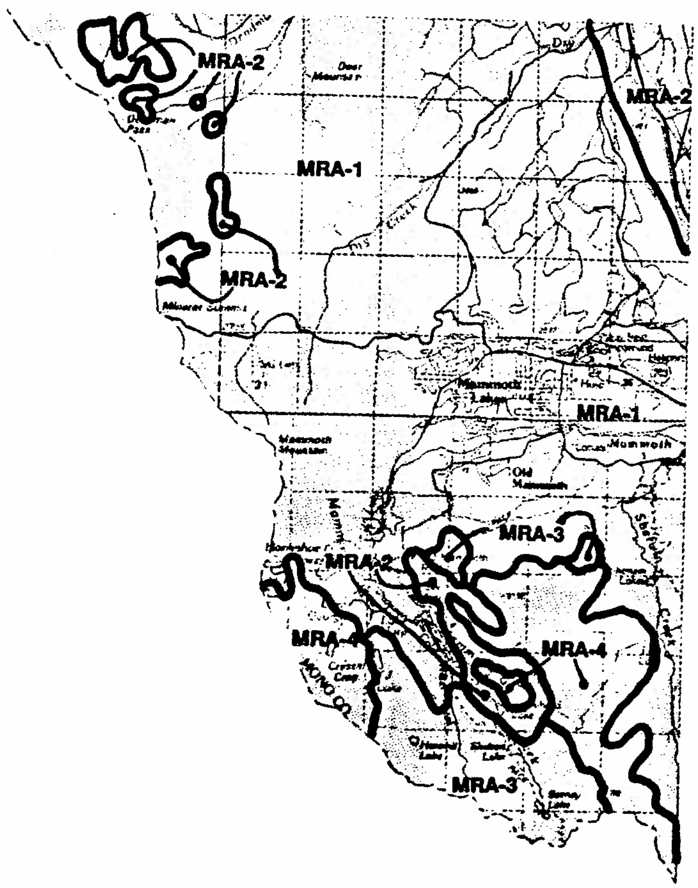
MRA-1 Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.

MRA-2 Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This area shall be applied to known mineral deposits or where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRA-3 Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRA-4 Areas where available information is inadequate for assignment to any other MRA.

V. Mammoth Lakes



SOURCE: Mono County Mining Database

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 17 V
MINERAL RESOURCES

MRA-1	Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This area shall be applied where well developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.
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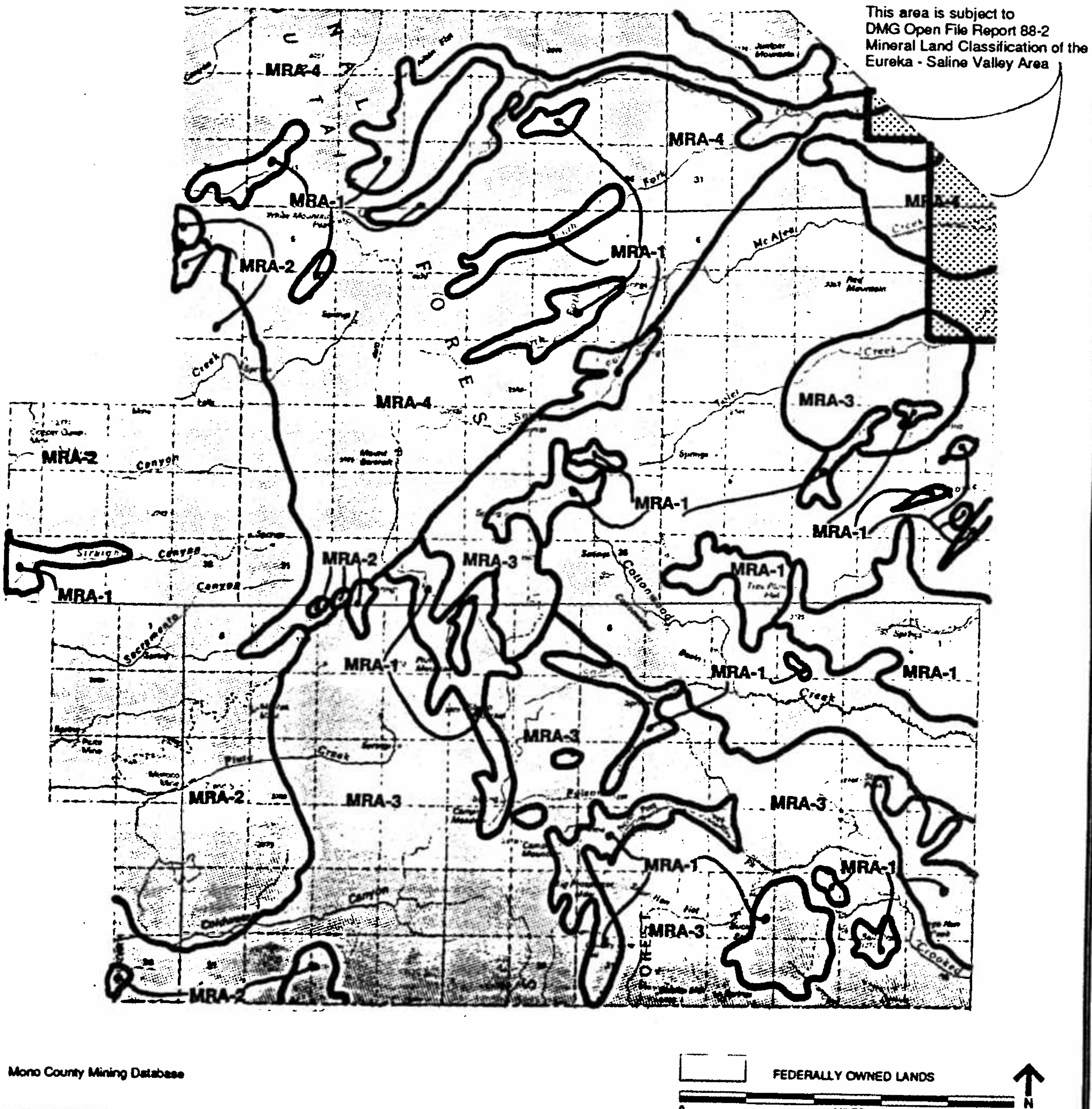
MRA-3	Areas containing mineral deposits the significance of which cannot be evaluated from available data.
MRA-4	Areas where available information is inadequate for assignment to any other MRA.

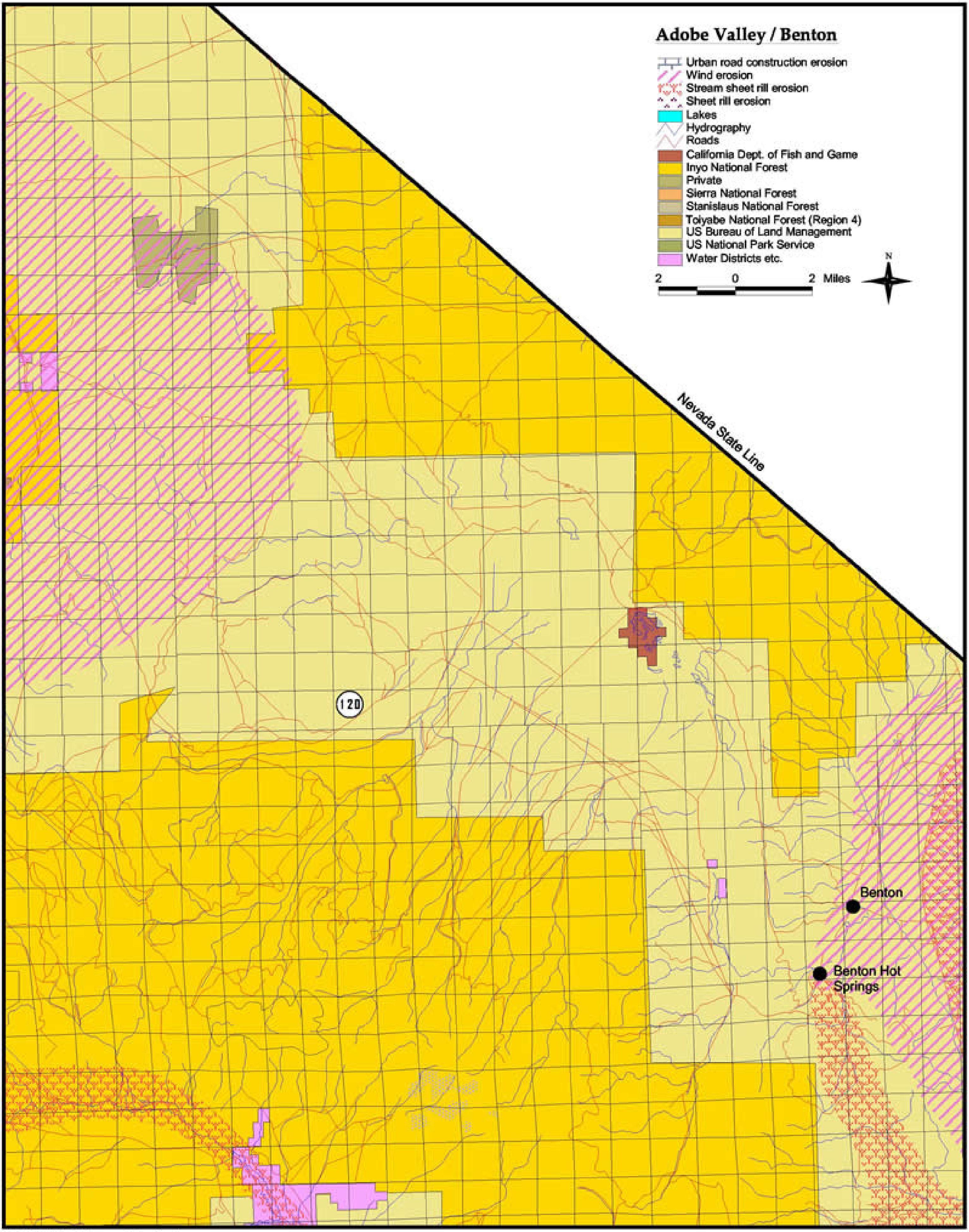
* In areas subject to DMG Reports, DMG mapping shall take precedence

X. White Mountain



SOURCE: Mono County Mining Database

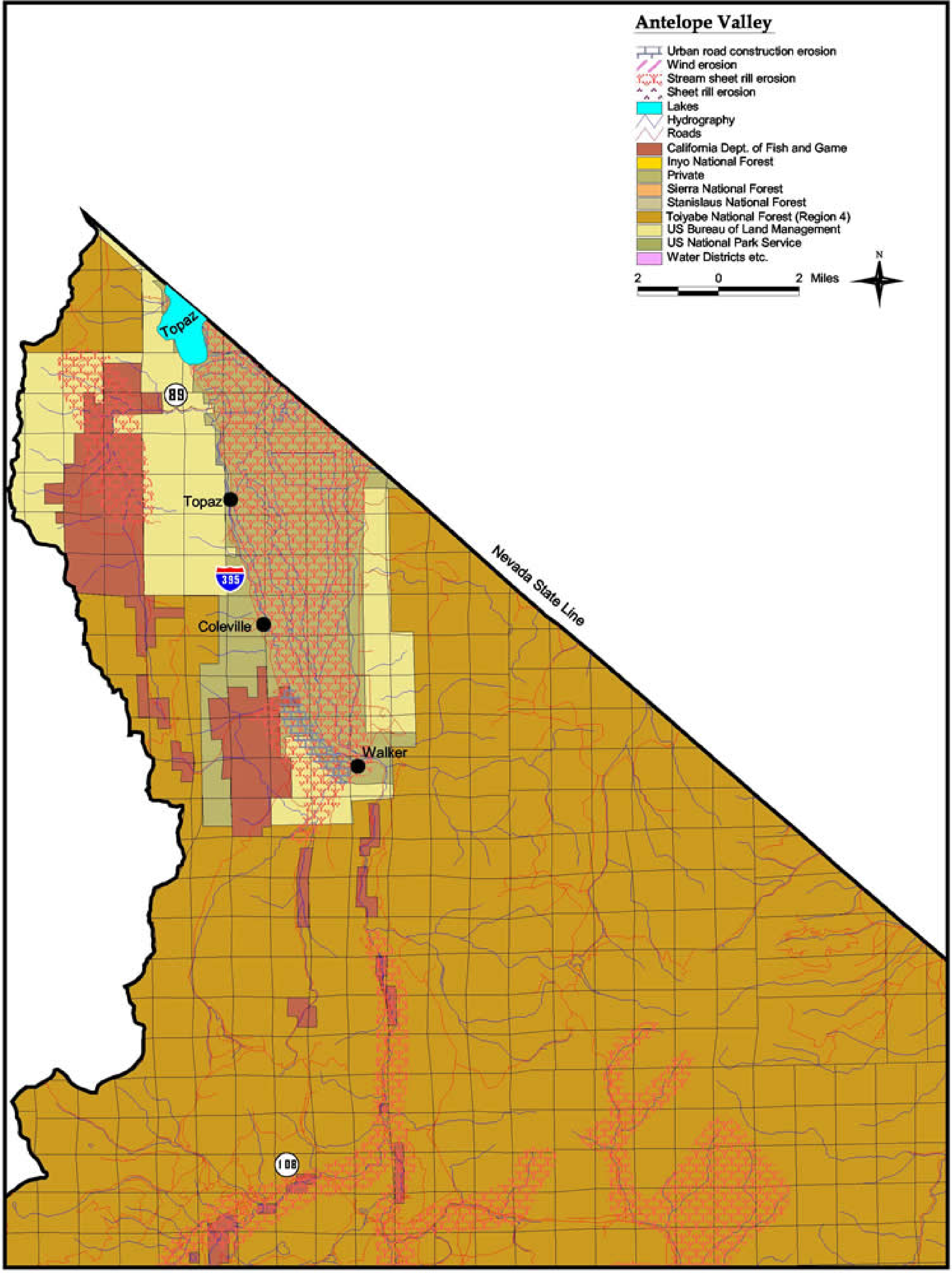
FIGURE 17 X
MINERAL RESOURCES



SOURCE: Soil Conservation Service

Mono County MEA – 2001

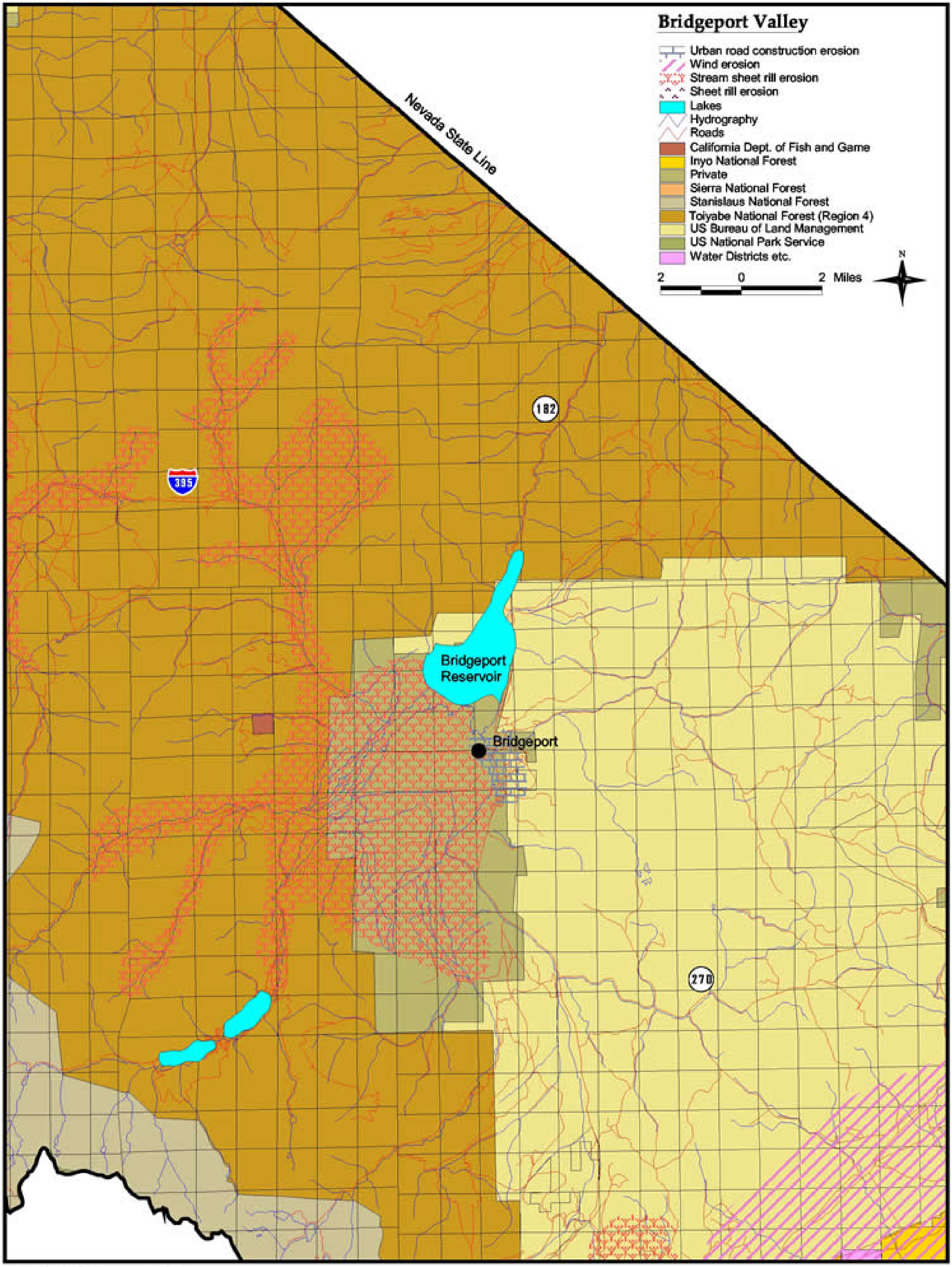
FIGURE 18 D
SOIL EROSION



SOURCE: Soil Conservation Service

Mono County MEA – 2001

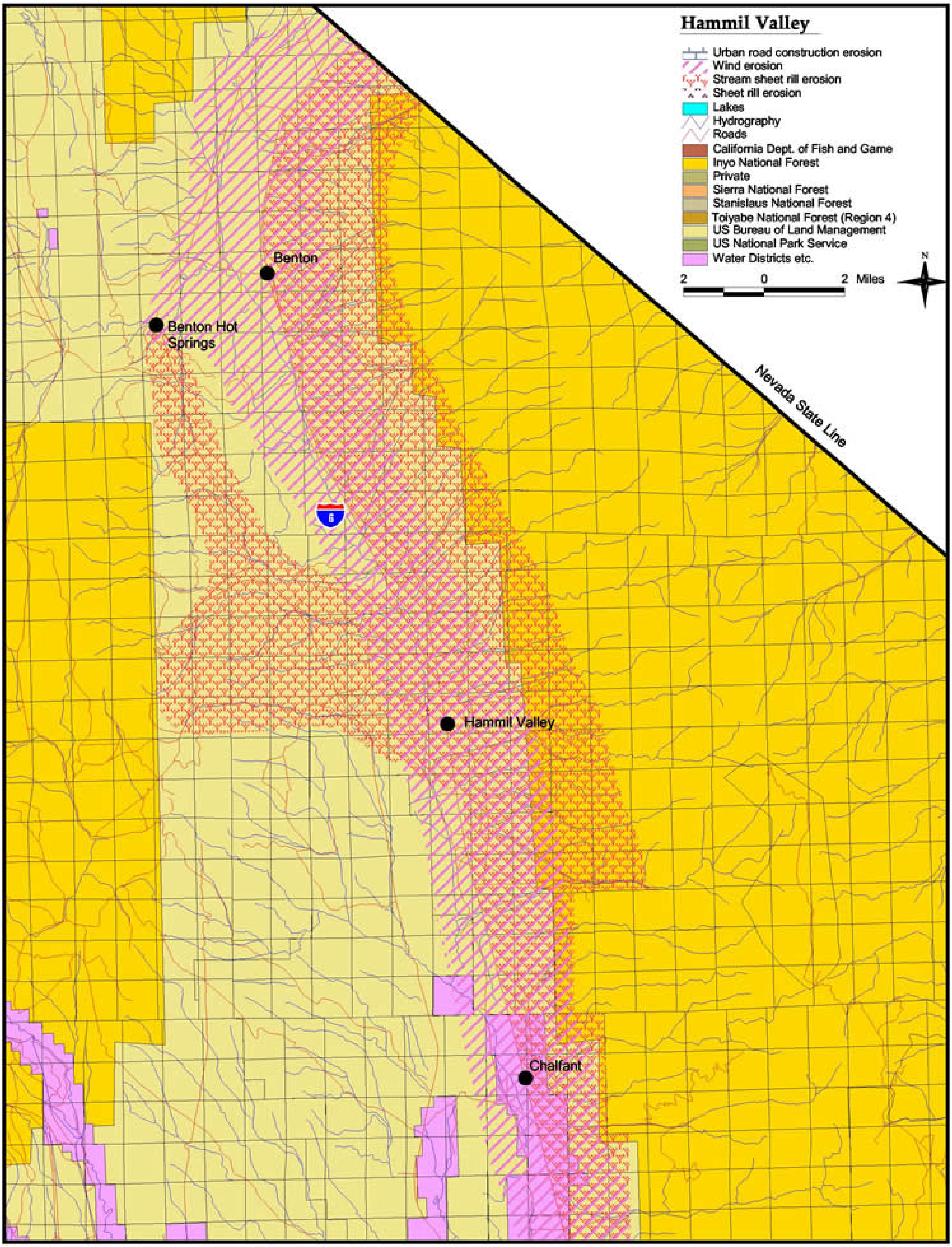
FIGURE 18 A
SOIL EROSION



SOURCE: Soil Conservation Service

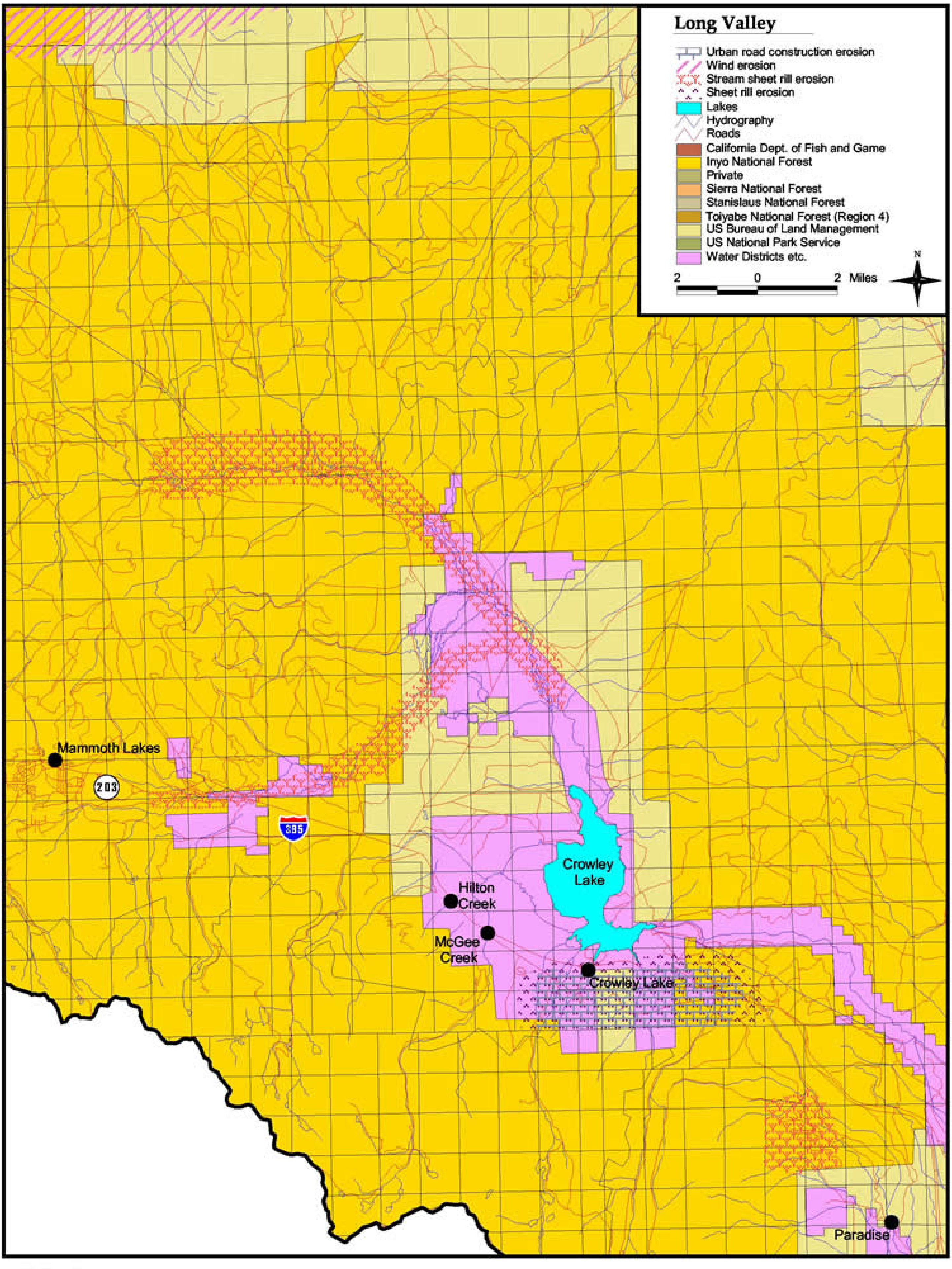
Mono County MEA -- 2001

FIGURE 18 B
SOIL EROSION



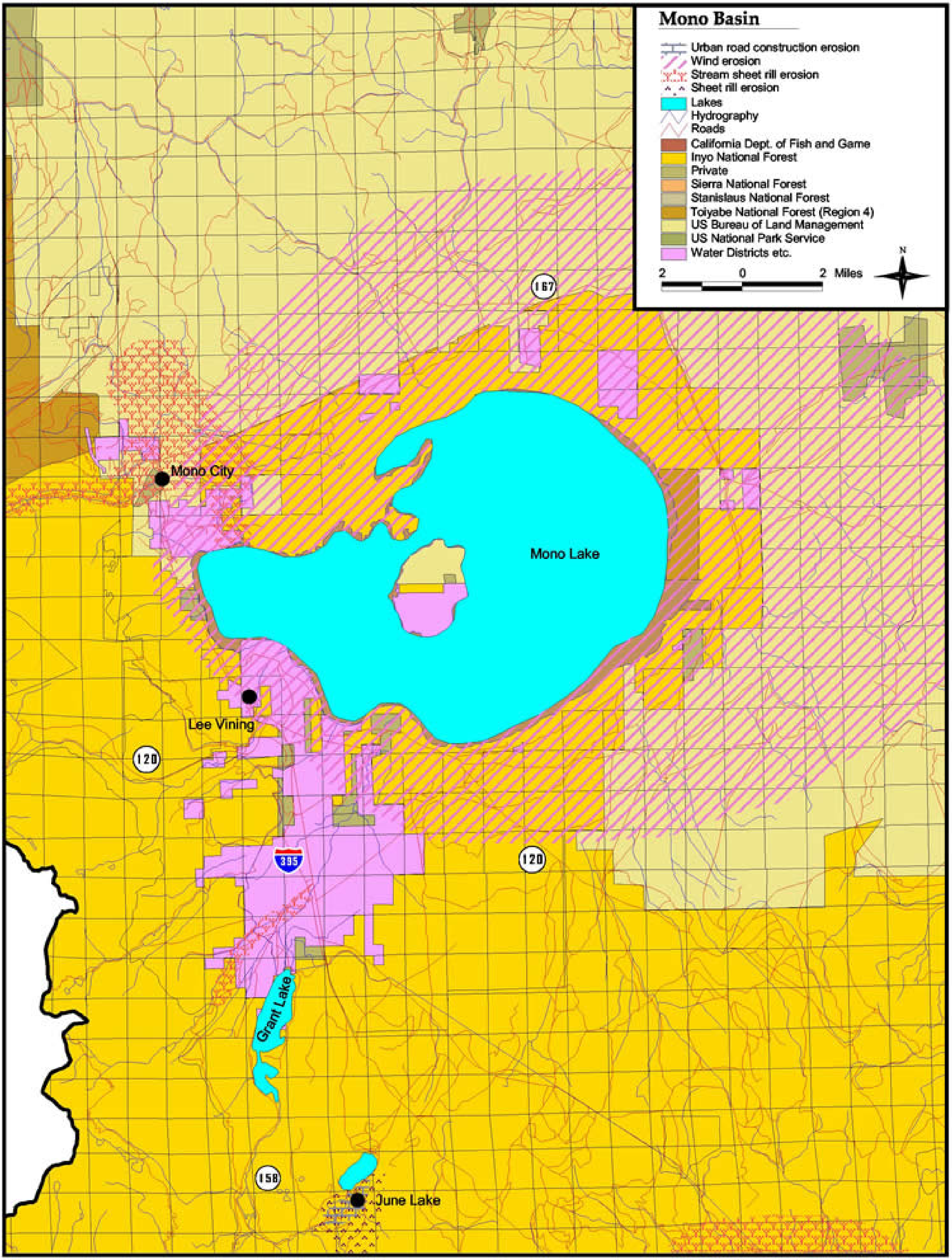
SOURCE: Soil Conservation Service

FIGURE 18 F
SOIL EROSION



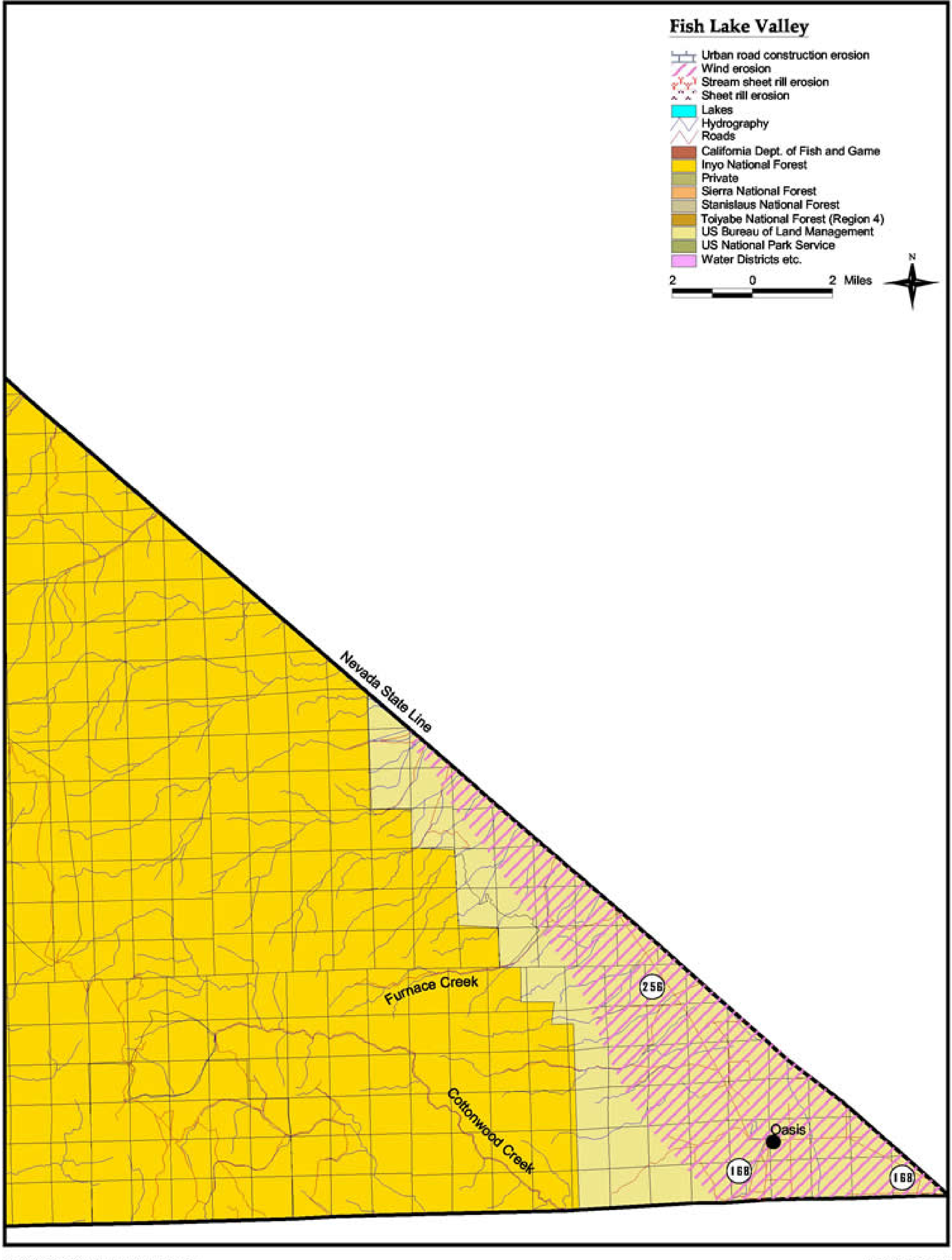
SOURCE: Soil Conservation Service

FIGURE 18 E
SOIL EROSION



SOURCE: Soil Conservation Service

FIGURE 18 C
SOIL EROSION



SOURCE: Soil Conservation Service

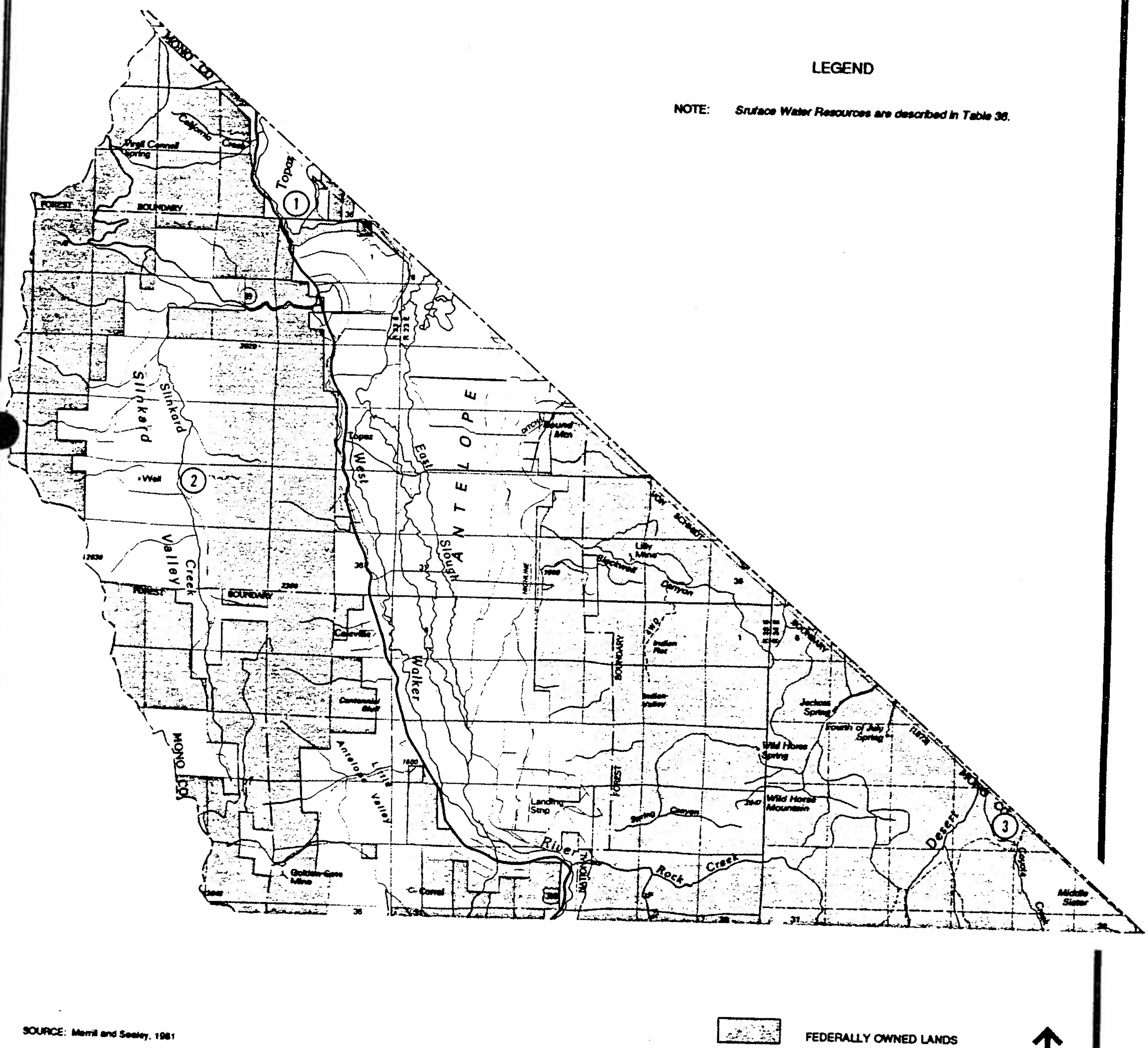
FIGURE 18 G
SOIL EROSION

Figure 19

Surface Water Resources

A. Antelope Valley
B. Devil's Gate
C. East Walker
D. Bridgeport
F. Mono Lake
G. Cowtrack Mountain
H. Adobe Valley / Benton
I. June Lake
J. Long Valley
K. Hammil Valley
L. Wheeler / Paradise
M. Chalfant Valley
N. Fish Lake Valley

A. Antelope Valley



MONO COUNTY MEA

FIGURE 19 A
SURFACE WATER RESOURCES

B. Devil's Gate to Swauger Creek

LEGEND

NOTE: *Surface Water Resources are described in Table 36.*

SOURCE: Merril and Seeley, 1981

FEDERALLY OWNED LANDS

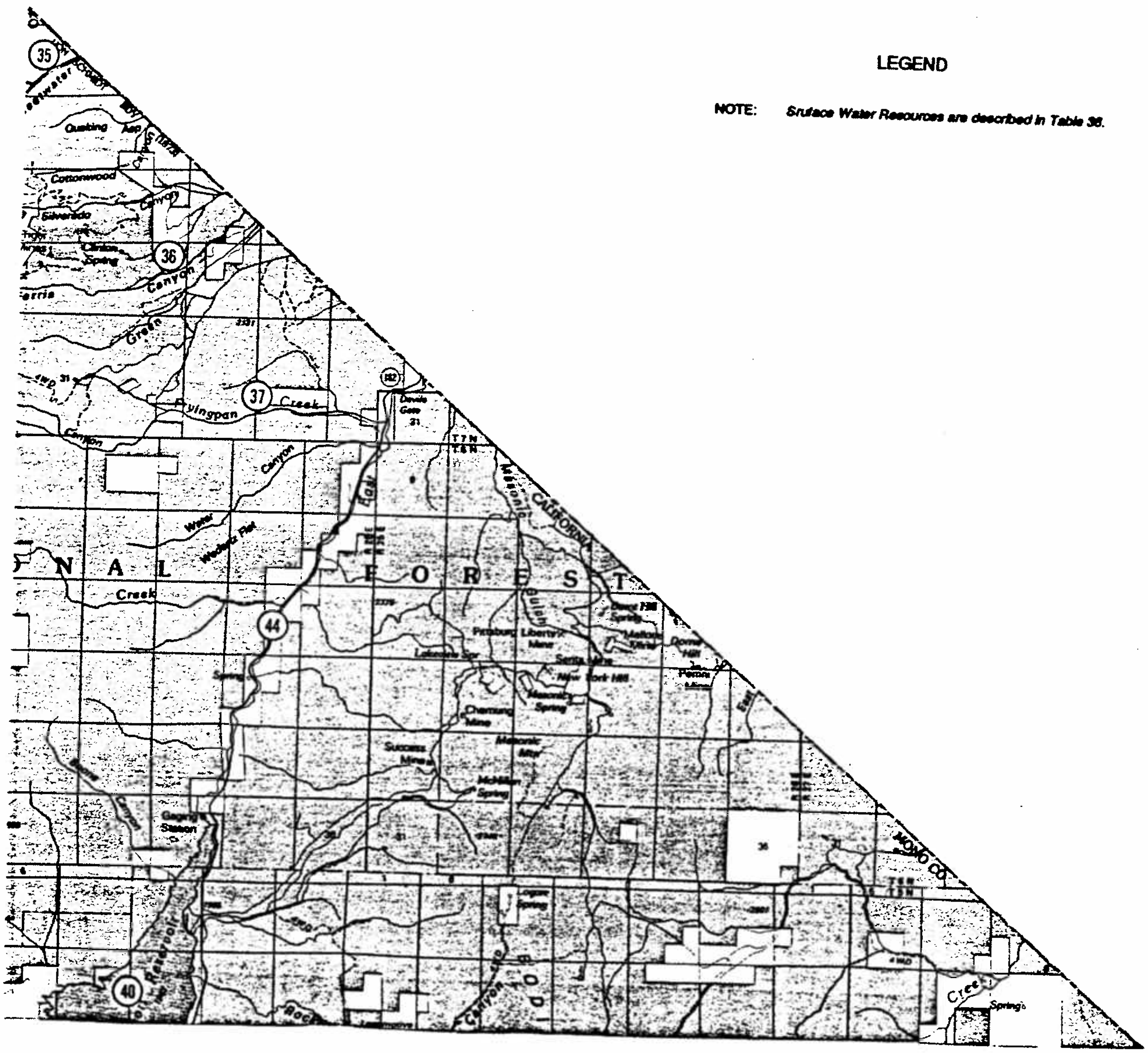
0 MILES 5

N

MONO COUNTY MEA

FIGURE 19 B
SURFACE WATER RESOURCES

C. East Walker



LEGEND

NOTE: *Srufacе Water Resources are described in Table 36.*

SOURCE: Merril and Seeley, 1981

FEDERALLY OWNED LANDS

MILES 0 5

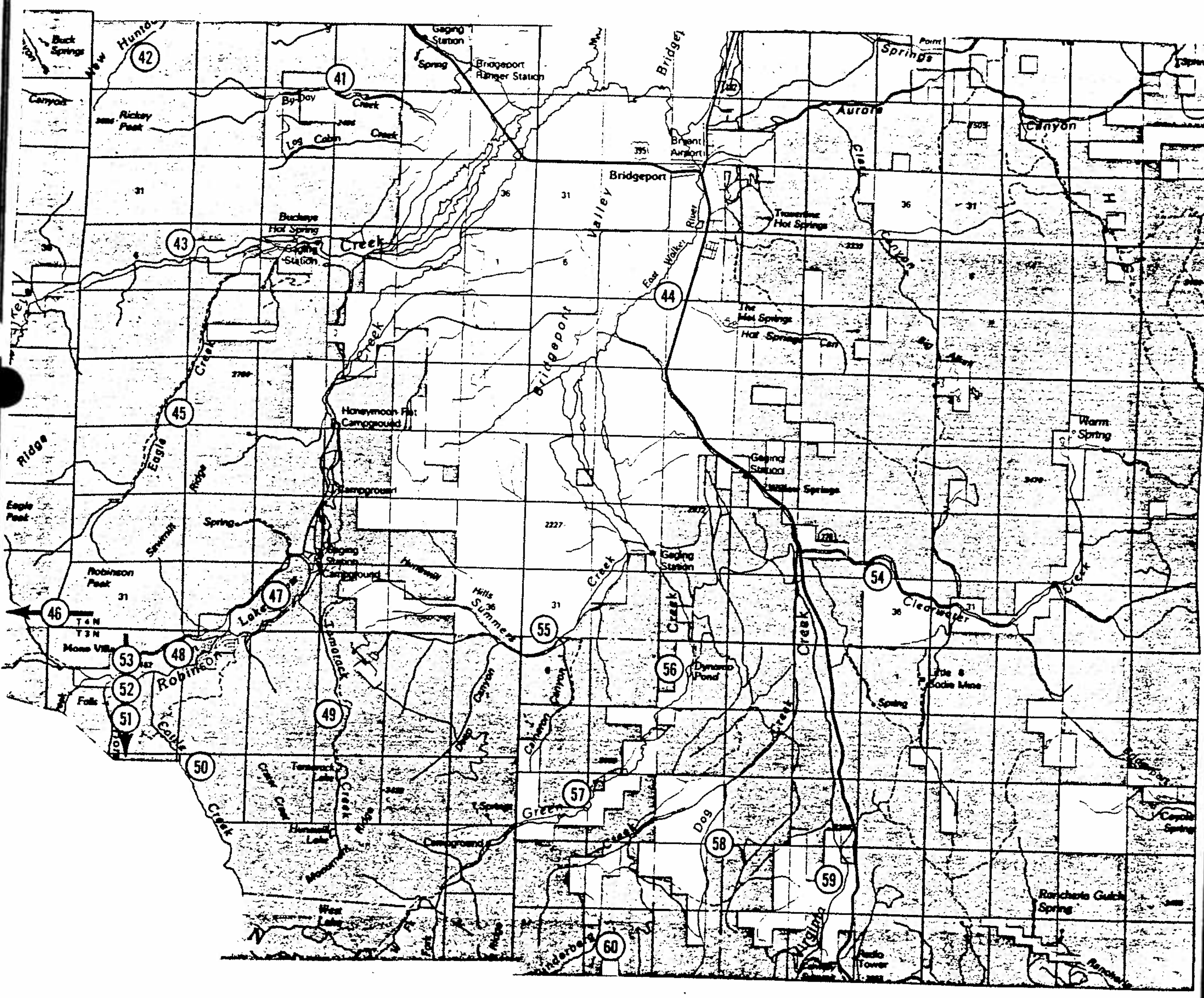
N

FIGURE 19 C
SURFACE WATER RESOURCES

D. Bridgeport

LEGEND

NOTE: *Sruface Water Resources are described in Table 36.*



SOURCE: Merrill and Seeley, 1981

FEDERALLY OWNED LANDS

0 MILES 5

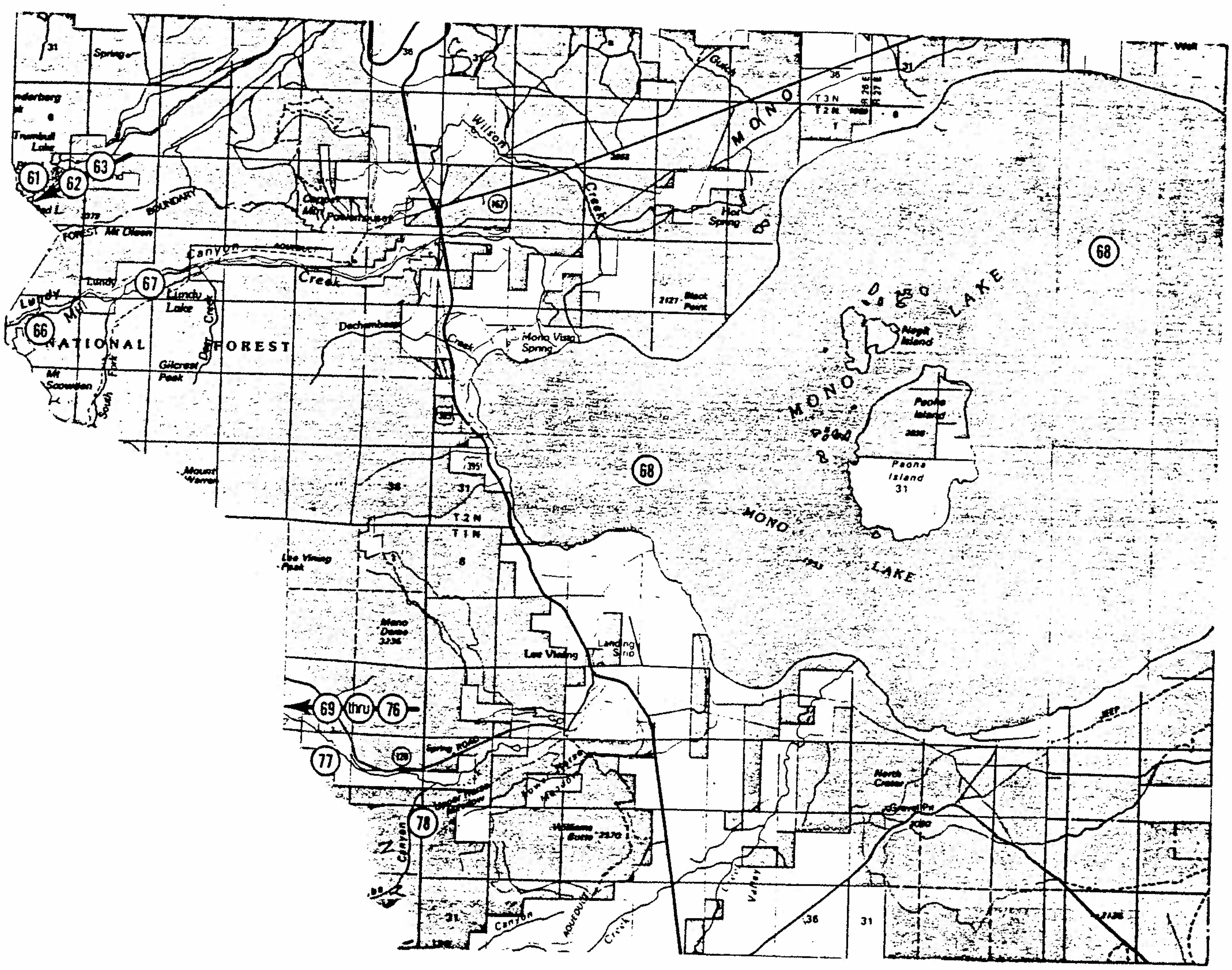
N

FIGURE 19 D
SURFACE WATER RESOURCES

F. Mono Lake

LEGEND

NOTE: *Sruface Water Resources are described in Table 36.*



SOURCE: Merrill and Seeley, 1981

FEDERALLY OWNED LANDS

0 MILES 5

N

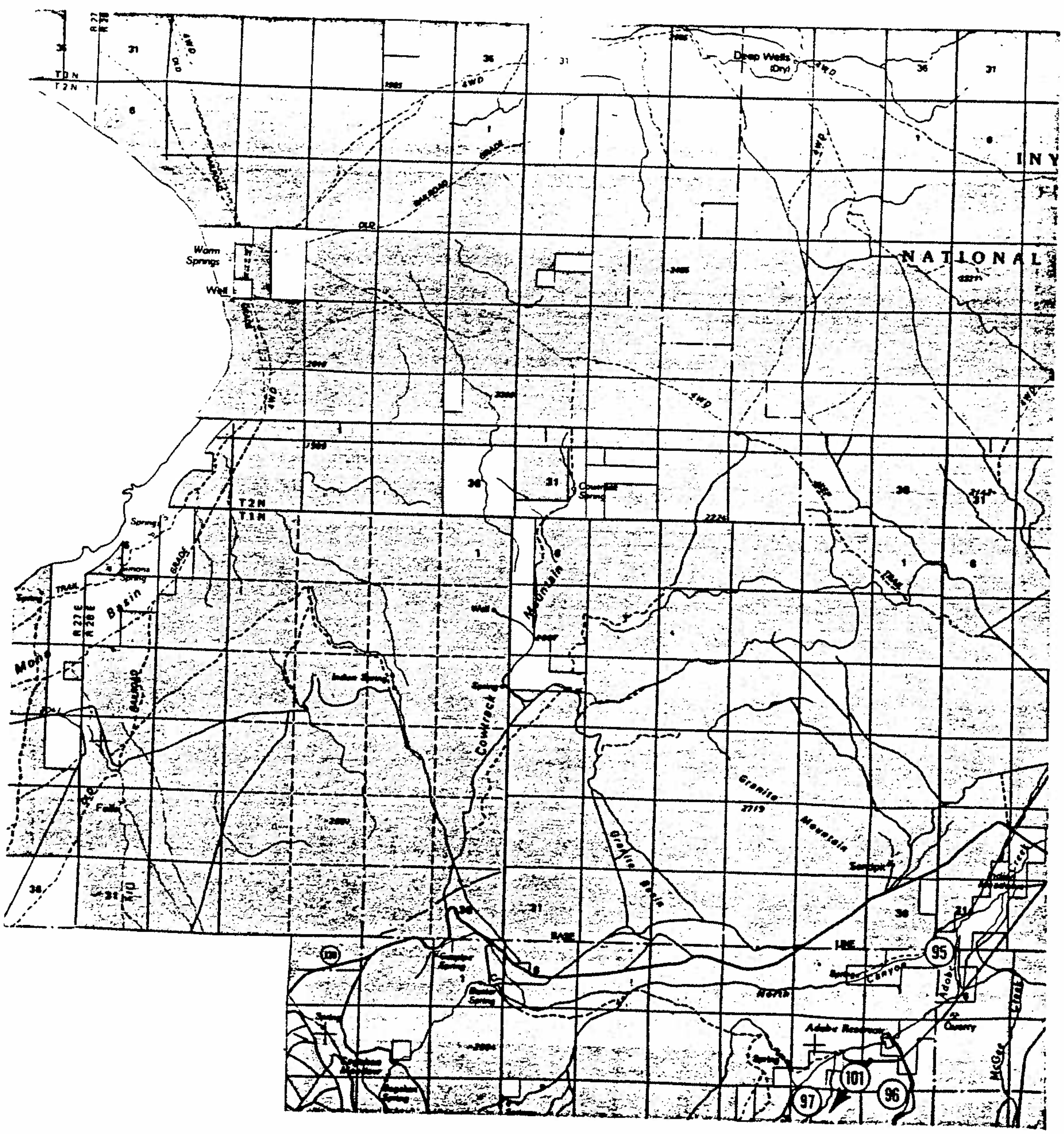
MONO COUNTY MEA

FIGURE 19 F
SURFACE WATER RESOURCES

G. Cowtrack Mountain

LEGEND

NOTE: *Surface Water Resources are described in Table 36.*



SOURCE: Merrill and Sealey, 1981

FEDERALLY OWNED LANDS

0 MILES 5

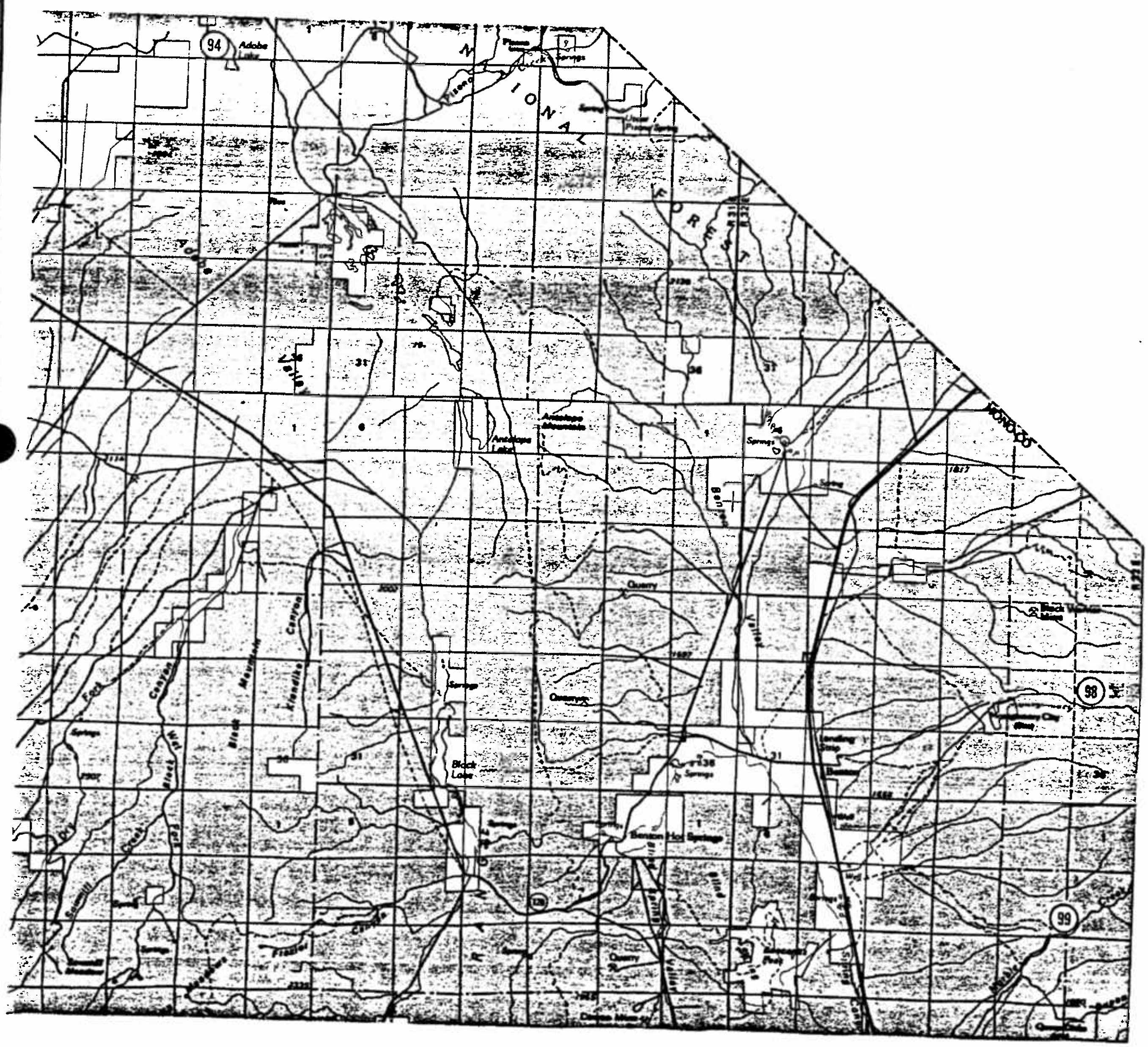
N

FIGURE 19 G
SURFACE WATER RESOURCES

H. Adobe Valley / Benton

LEGEND

NOTE: *Sruface Water Resources are described in Table 36.*



SOURCE: Merril and Seeley, 1981

FEDERALLY OWNED LANDS

0 MILES 5

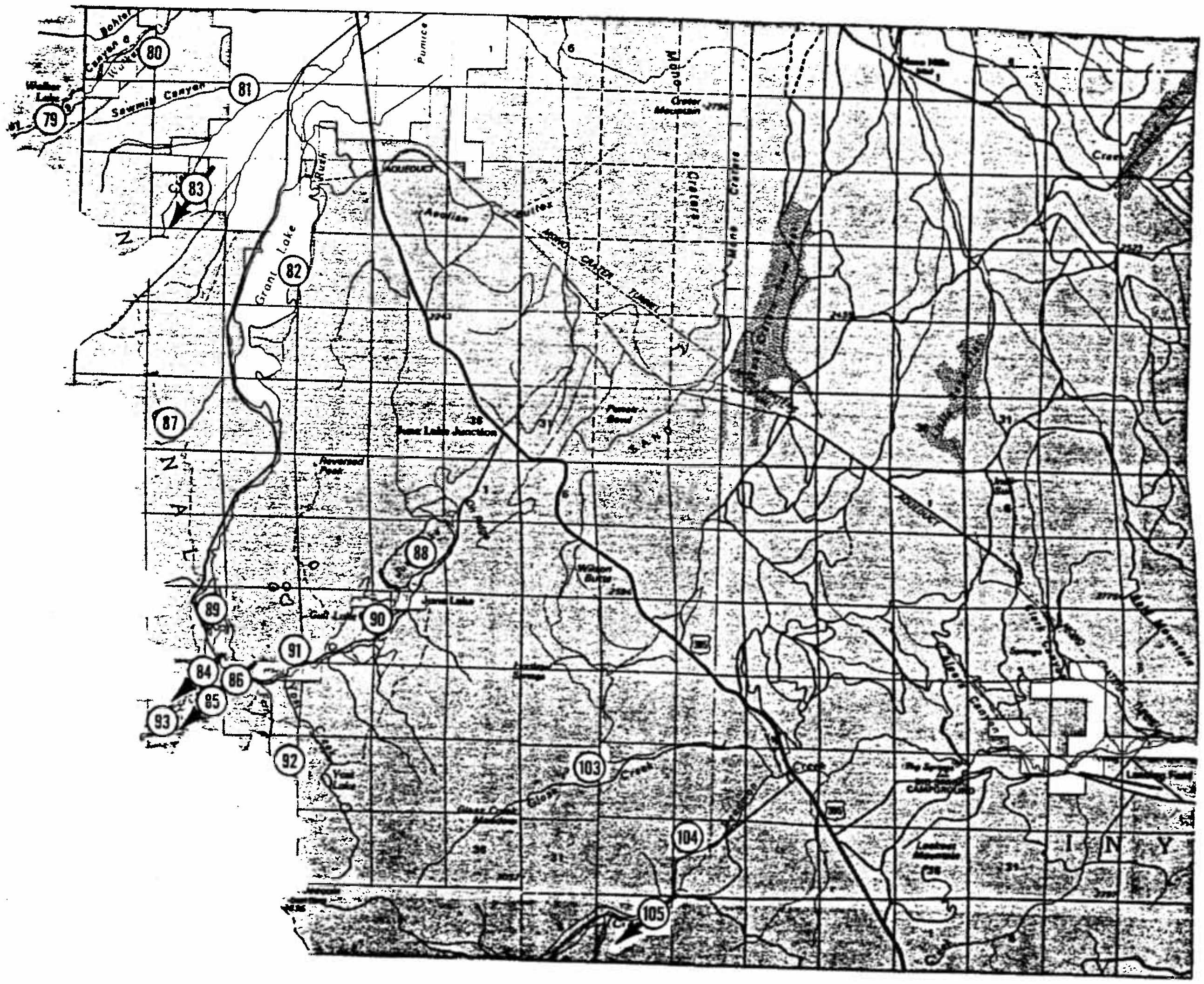
N

FIGURE 19 H
SURFACE WATER RESOURCES

I. June Lake

LEGEND

NOTE: *Srufece Water Resources are described in Table 38.*



SOURCE: Merrill and Sesley, 1981

FEDERALLY OWNED LANDS

0 MILES 5

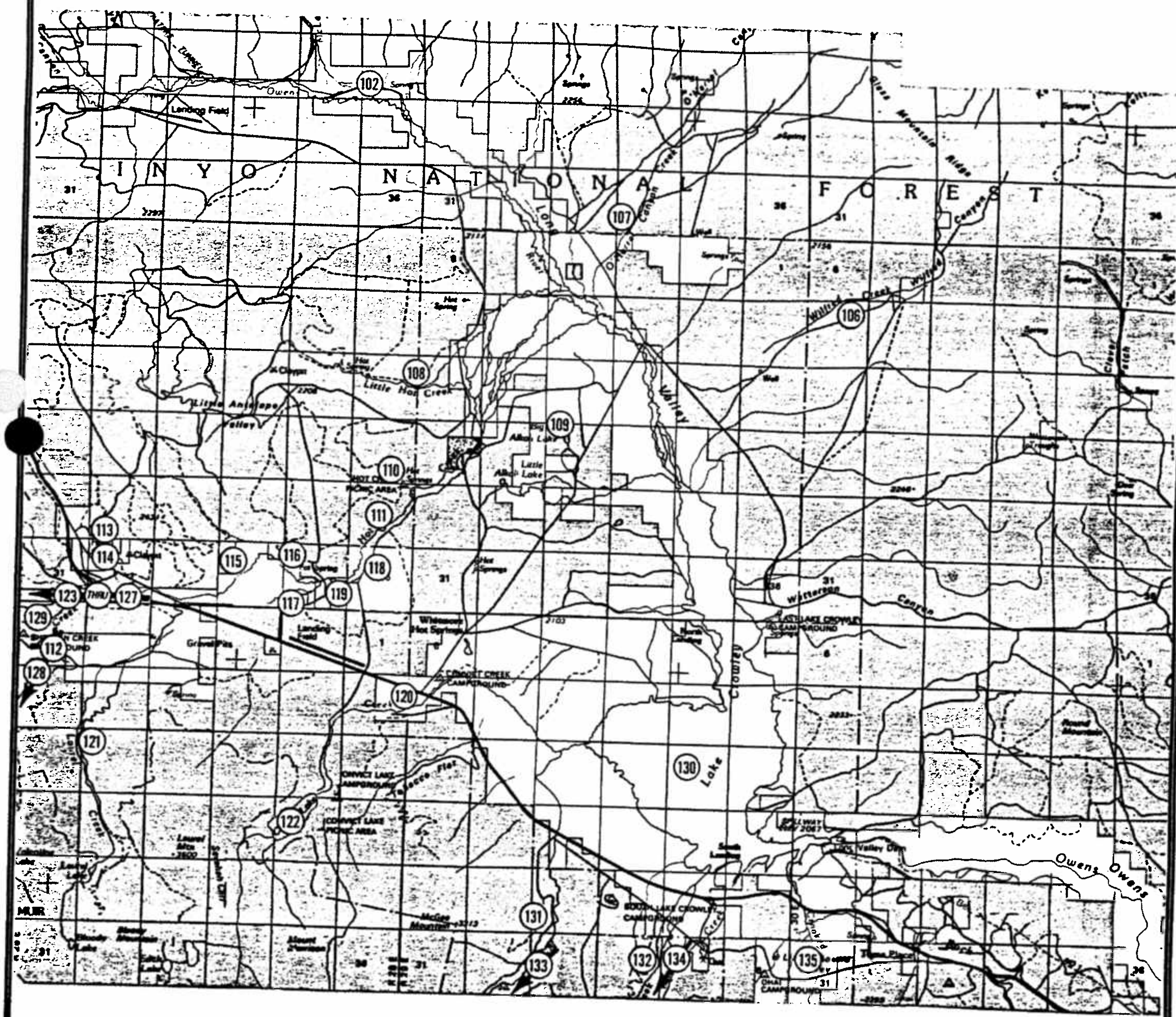
N

FIGURE 19 I
SURFACE WATER RESOURCES

J. Long Valley

LEGEND

NOTE: *Srurface Water Resources are described in Table 38.*



SOURCE: Merril and Seeley, 1981

FEDERALLY OWNED LANDS

0 MILES 5

N

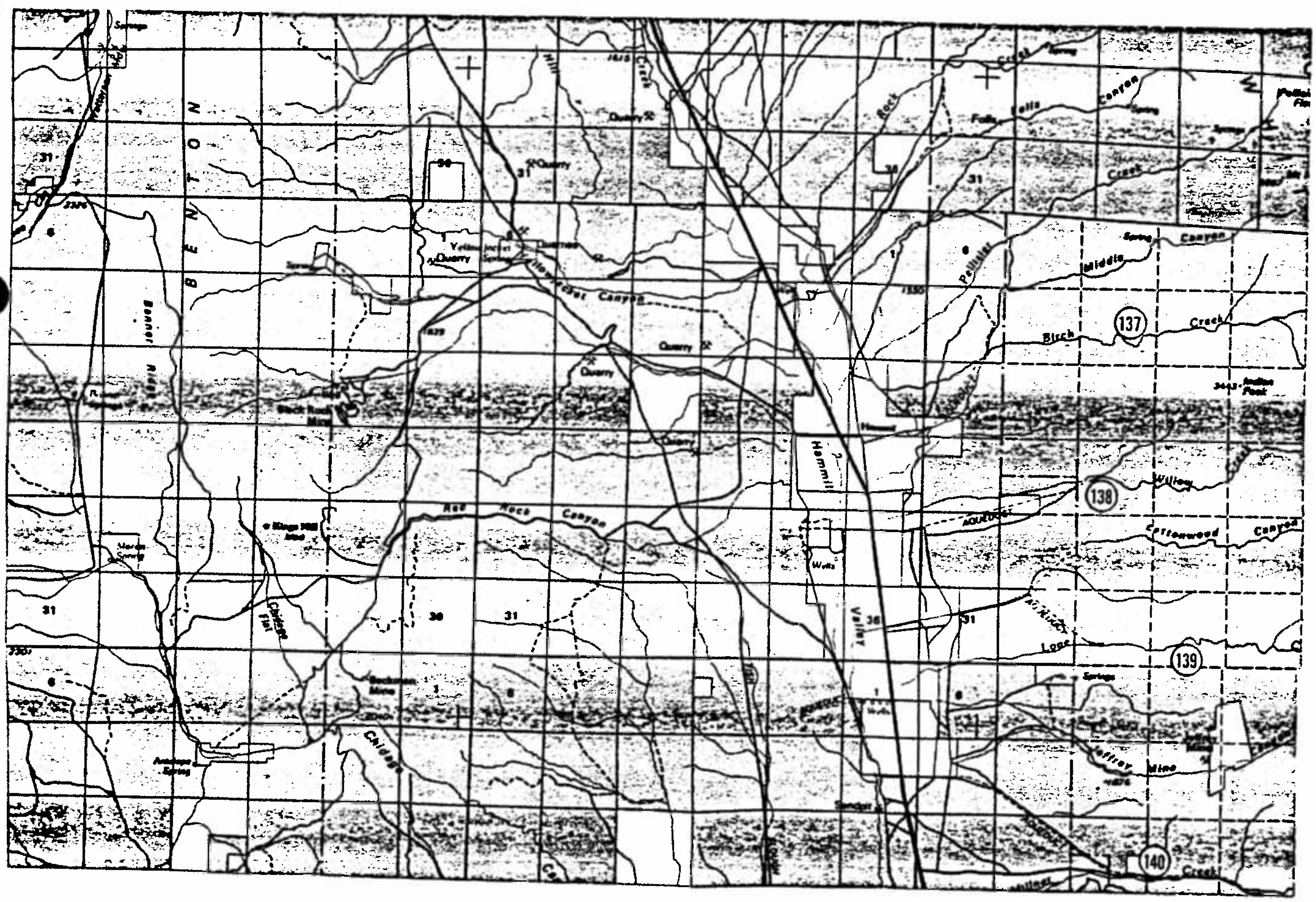
MONO COUNTY MEA

FIGURE 19 J
SURFACE WATER RESOURCES

K. Hammil Valley

LEGEND

NOTE: *Sruface Water Resources are described in Table 36.*



SOURCE: Merril and Seeley, 1981

FEDERALLY OWNED LANDS

0 MILES 5

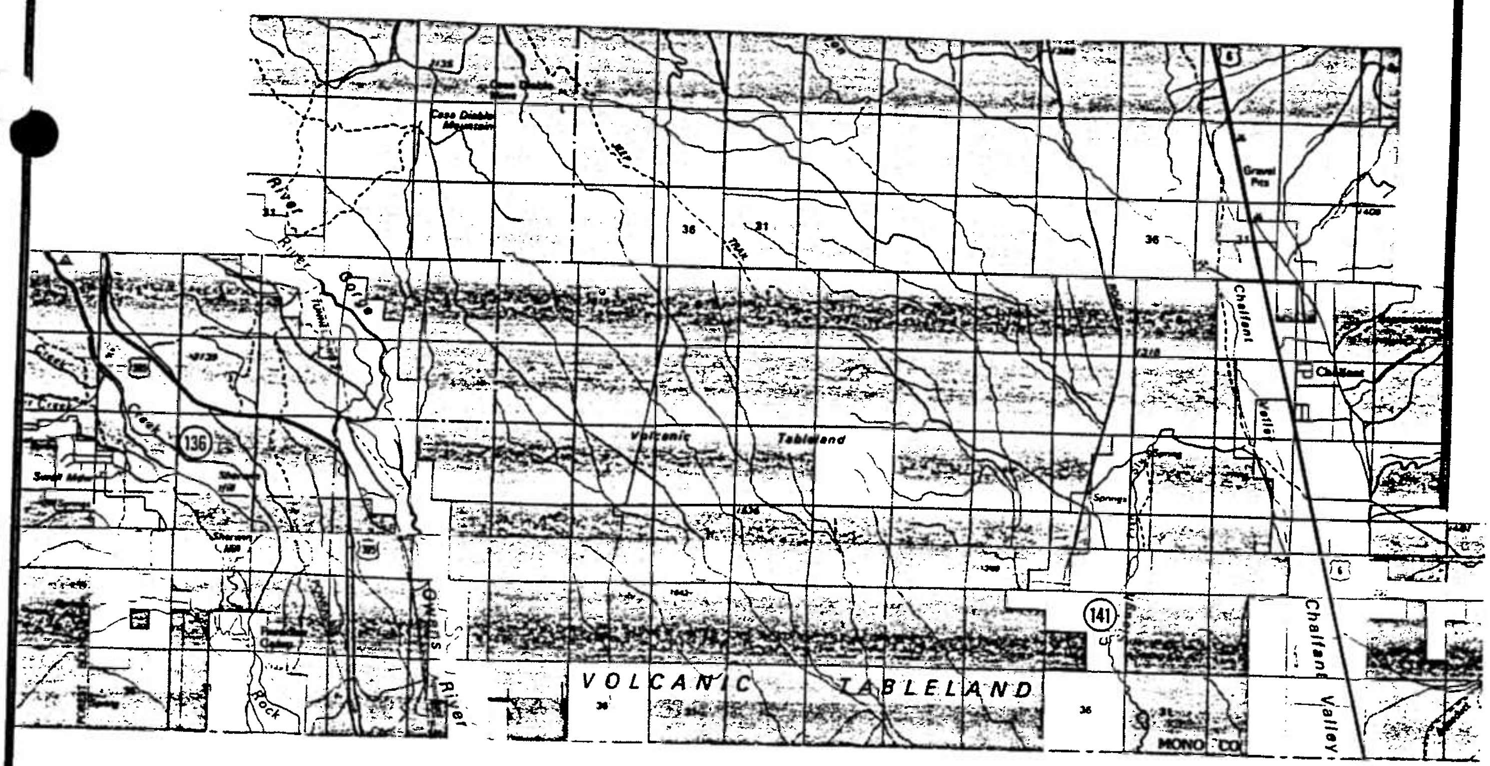
N

FIGURE 19 K
SURFACE WATER RESOURCES

L. Wheeler / Paradise
M. Chalfant Valley

LEGEND

NOTE: *Srutace Water Resources are described in Table 36.*



SOURCE: Merrill and Seeley, 1981

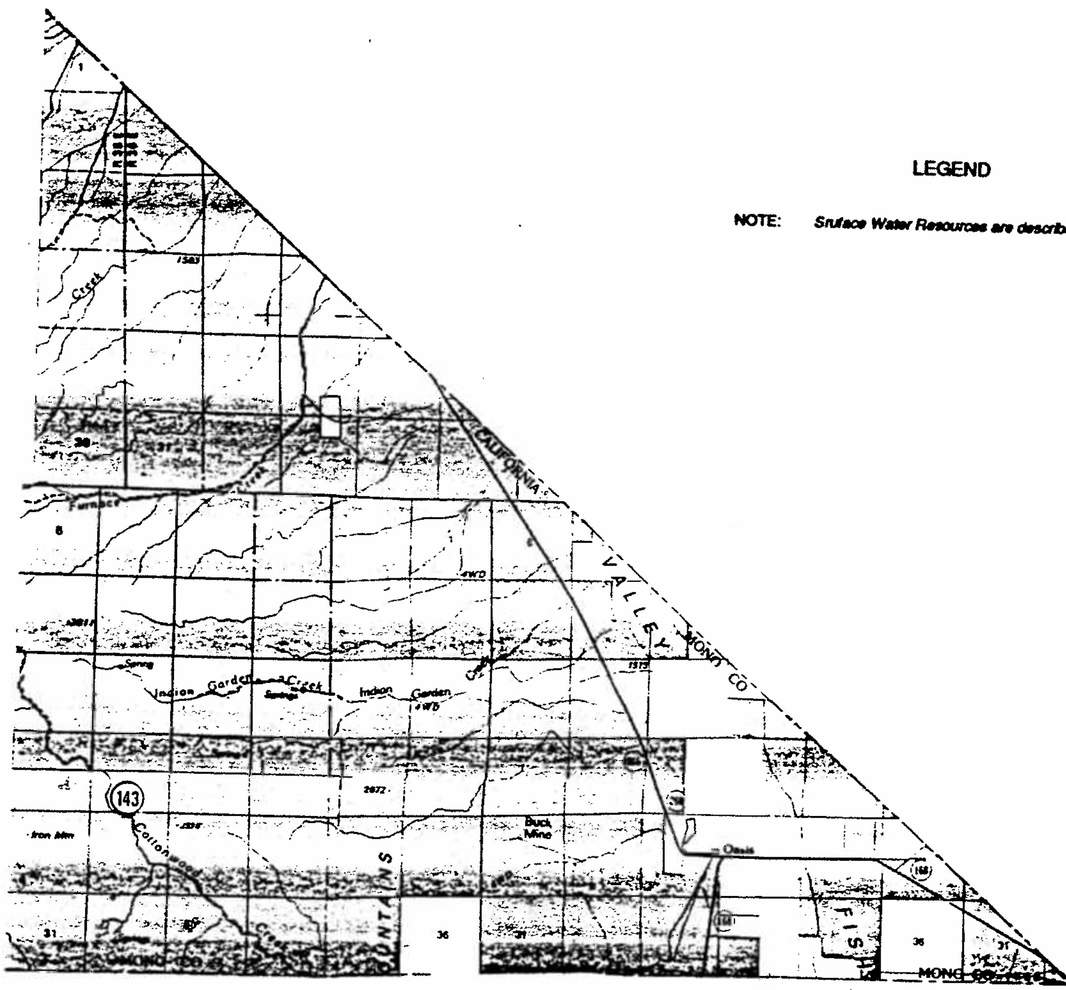
FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 19 L & M
SURFACE WATER RESOURCES

N. Fish Lake Valley



LEGEND

NOTE: *Sruface Water Resources are described in Table 38.*

SOURCE: Merril and Sealey, 1961

FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

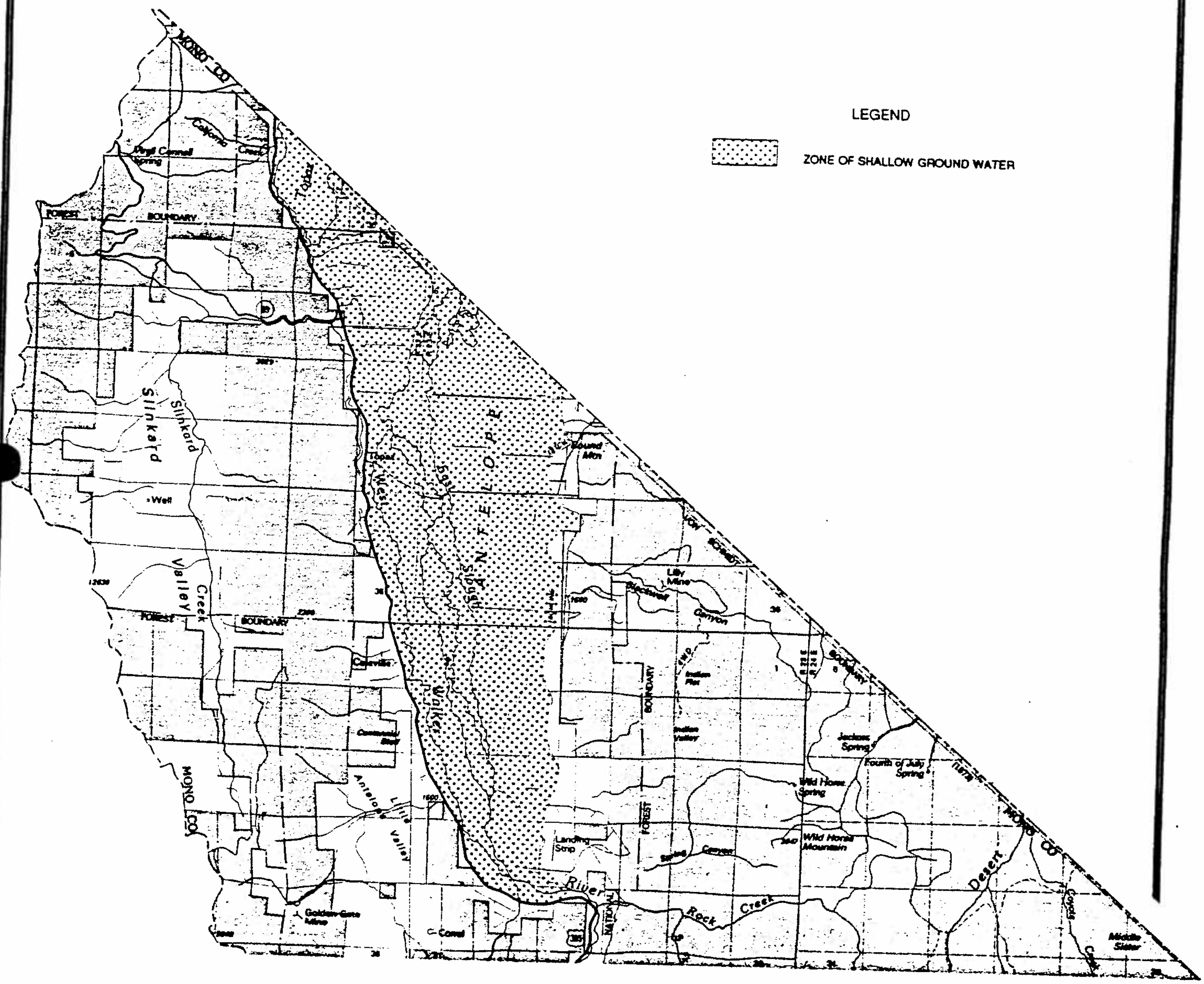
FIGURE 19 N
SURFACE WATER RESOURCES

Figure 21

Shallow Ground Water

A. Antelope Valley
C. East Walker
D. Bridgeport
F. Mono Lake
G. Cowtrack Mountain
H. Adobe Valley / Benton
I. June Lake
J. Long Valley

A. Antelope Valley



SOURCE: Soil Conservation Service, 1982.

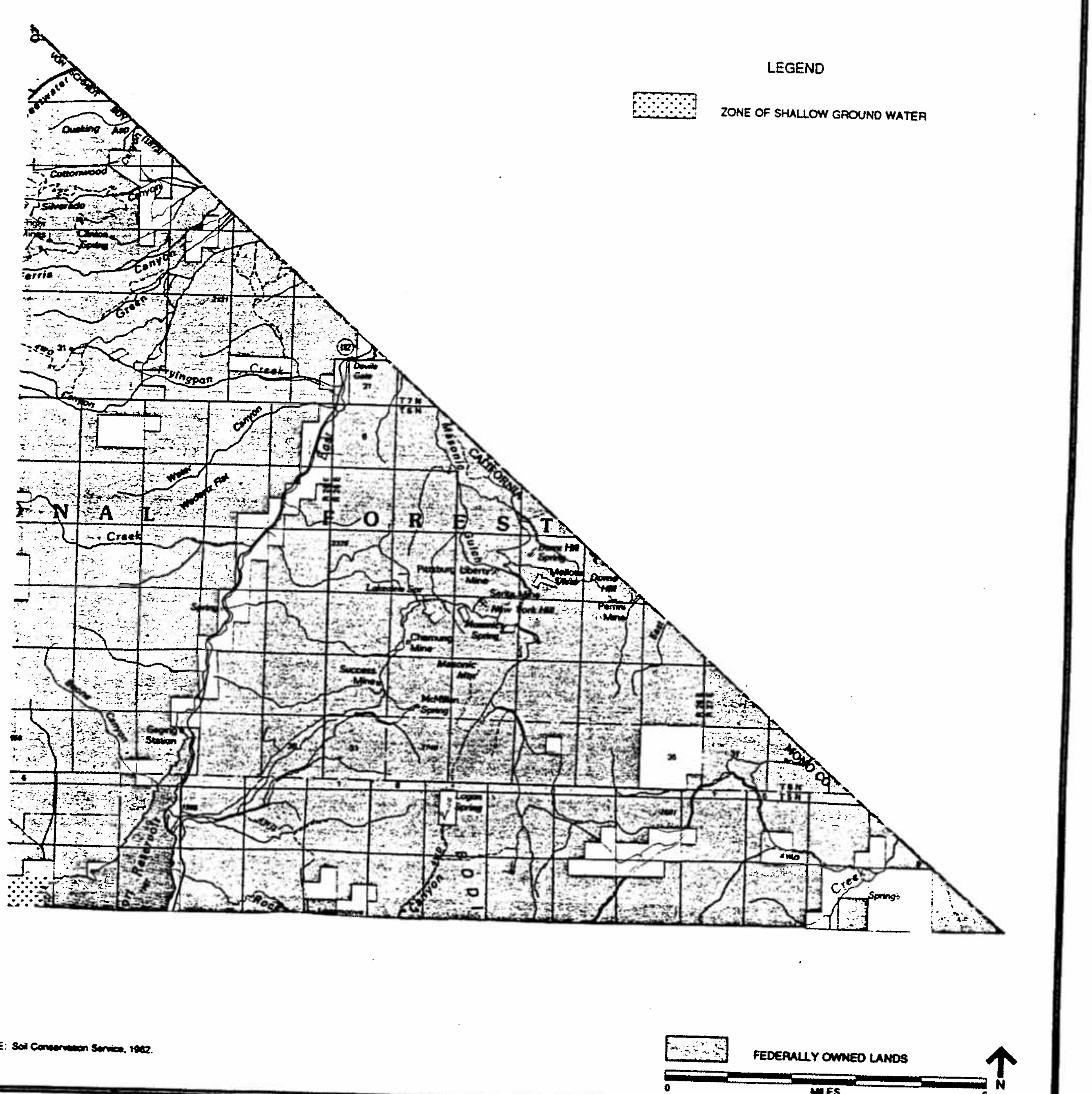
FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 21 A
SHALLOW GROUND WATER

C. East Walker



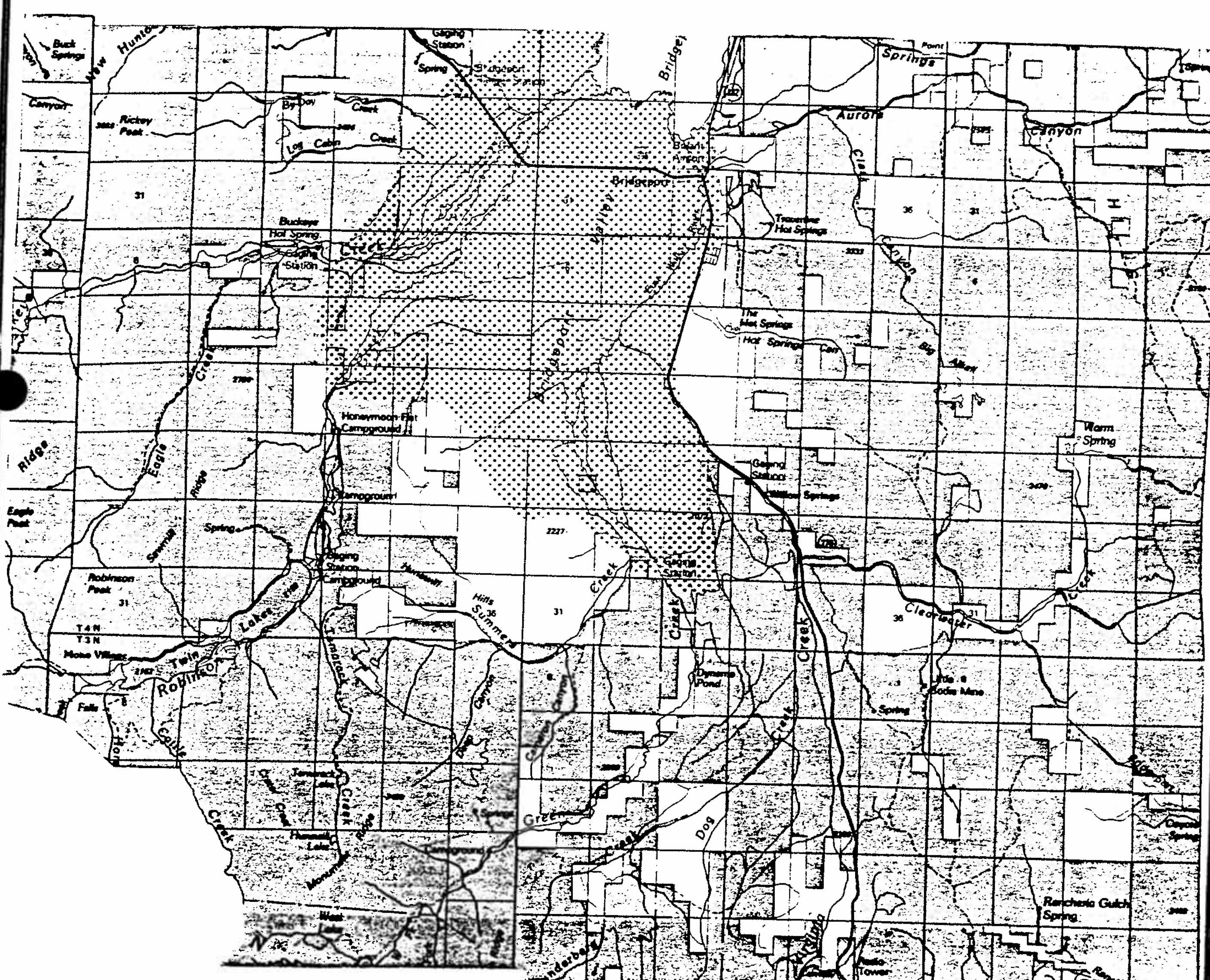
SOURCE: Soil Conservation Service, 1982.

FIGURE 21 C
SHALLOW GROUND WATER

D. Bridgeport

LEGEND

ZONE OF SHALLOW GROUND WATER



SOURCE: Soil Conservation Service, 1982.

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 21 D
SHALLOW GROUND WATER

F. Mono Lake

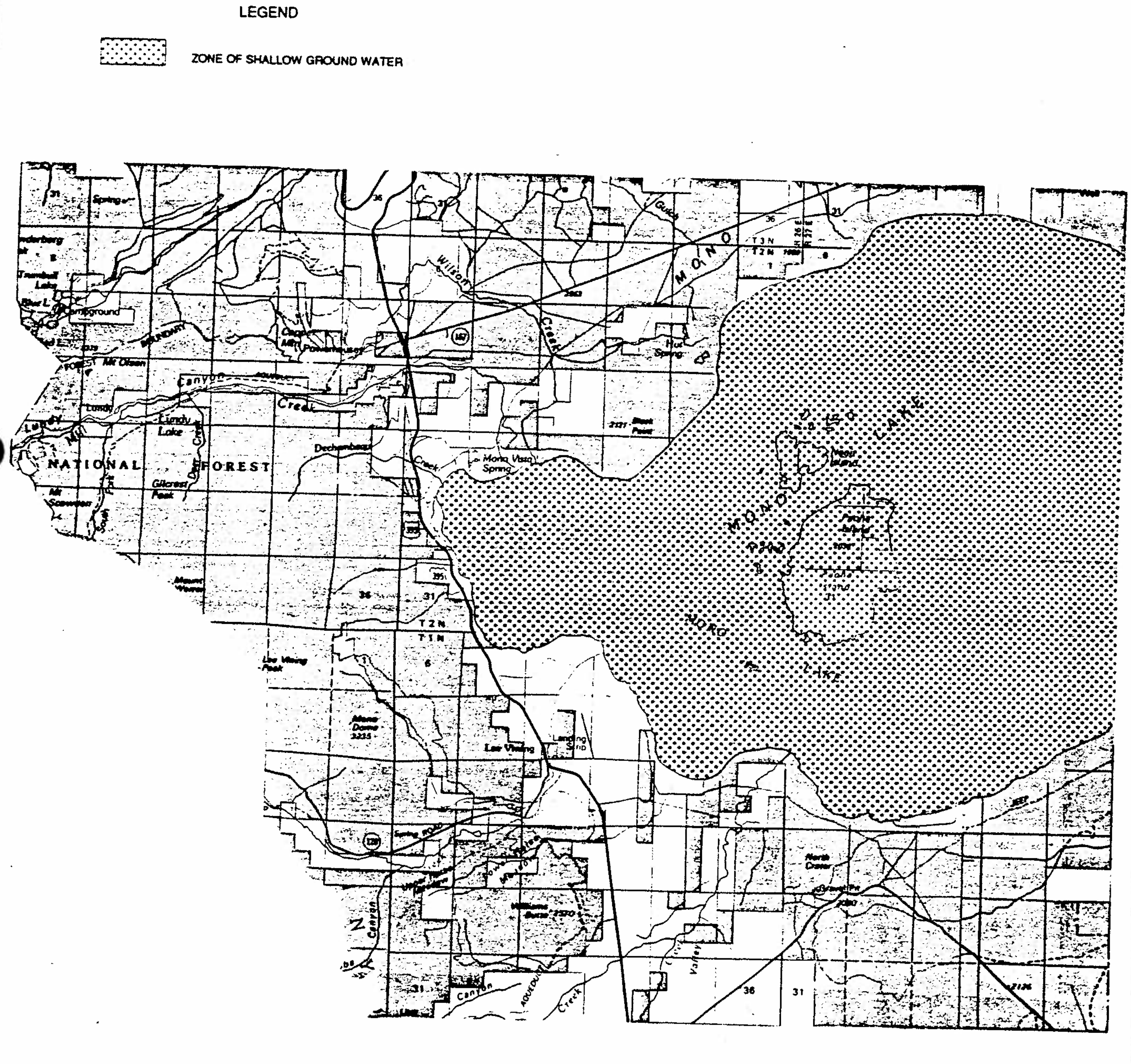
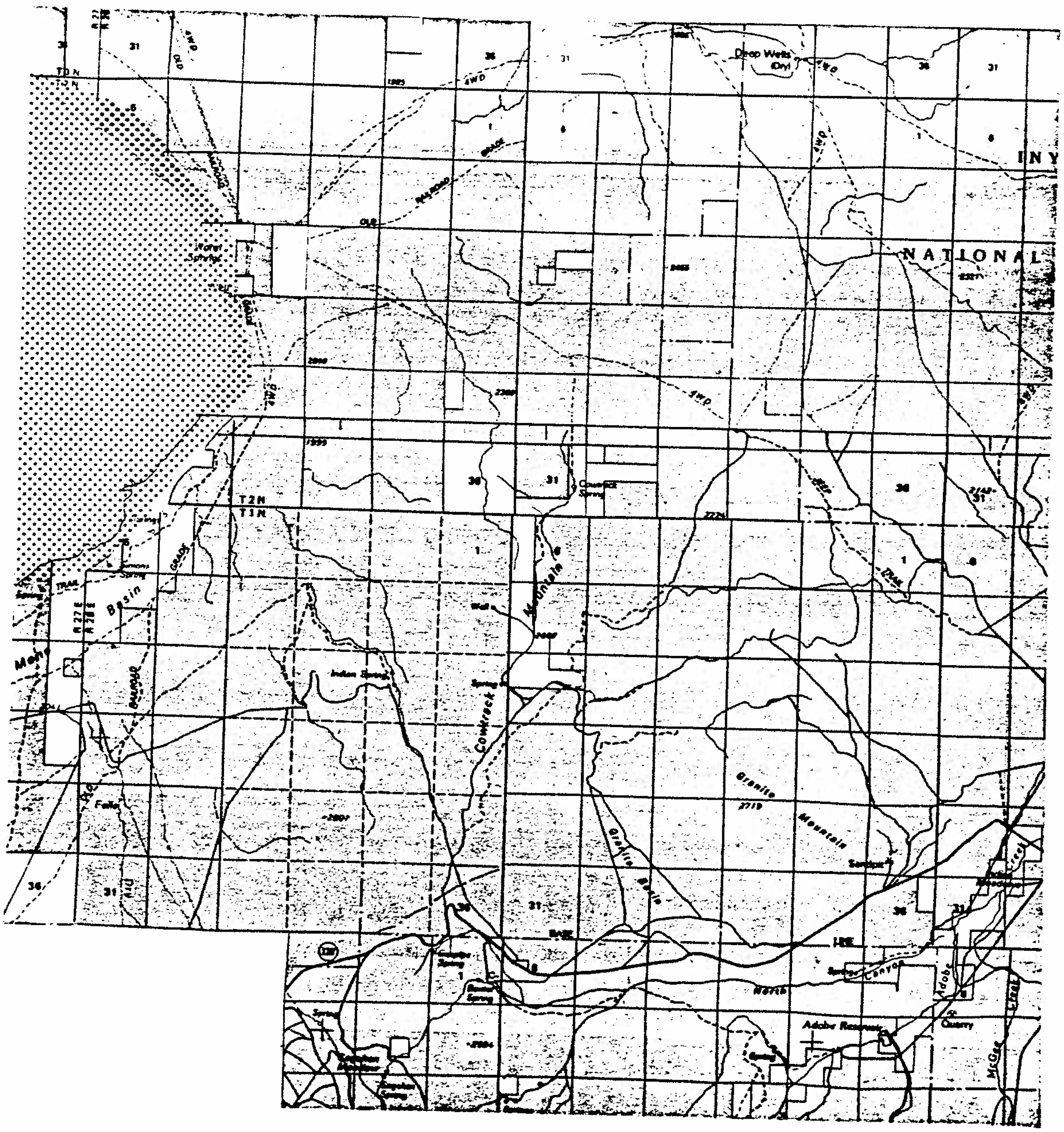


FIGURE 21 F
SHALLOW GROUND WATER

G. Cowtrack Mountain

LEGEND

ZONE OF SHALLOW GROUND WATER



SOURCE: Soil Conservation Service, 1982.

FEDERALLY OWNED LANDS

MILES 0 5

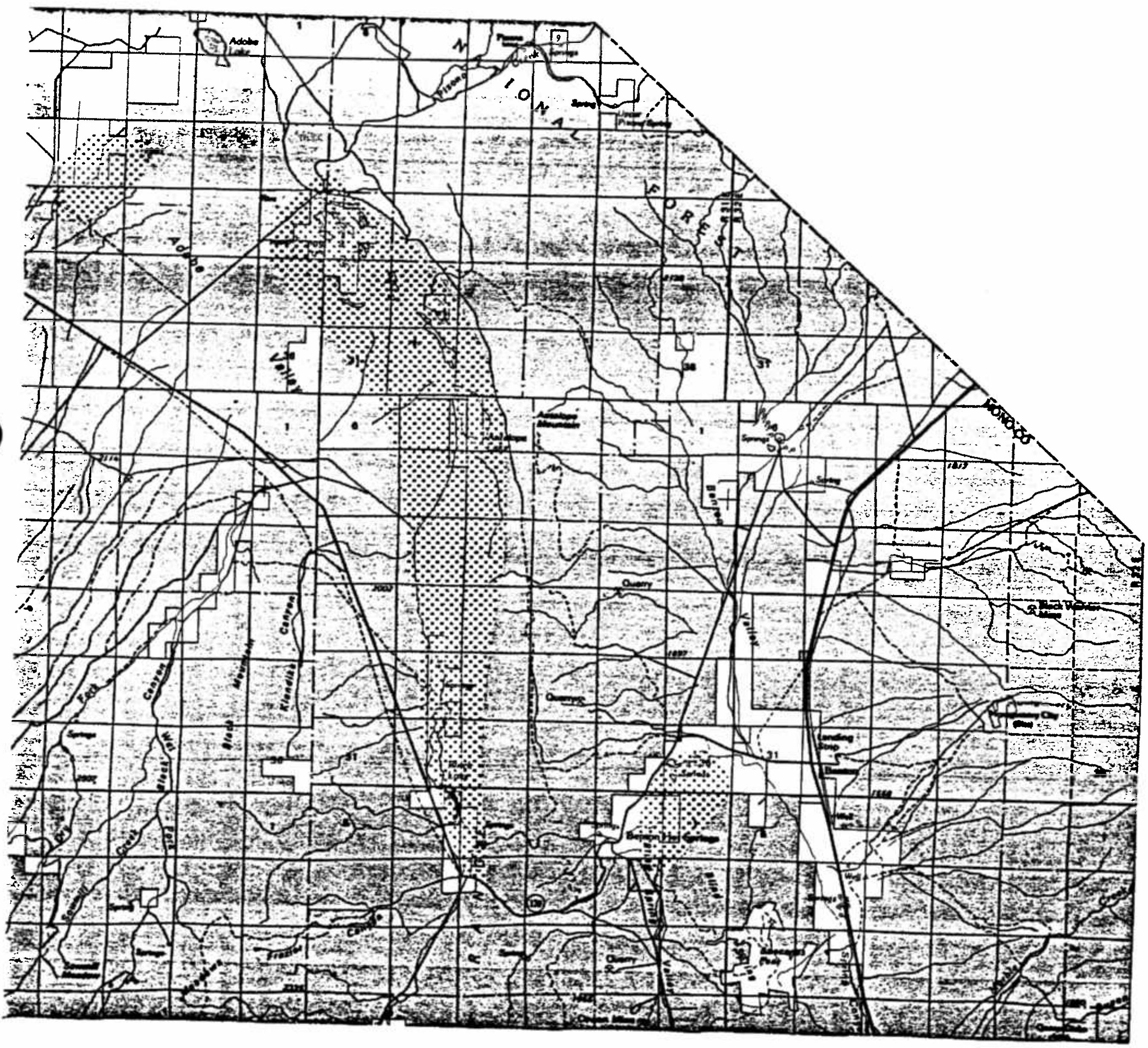
N

FIGURE 21 G
SHALLOW GROUND WATER

H. Adobe Valley / Benton

LEGEND

ZONE OF SHALLOW GROUND WATER



SOURCE: Soil Conservation Service, 1982.

FEDERALLY OWNED LANDS

0 MILES 5

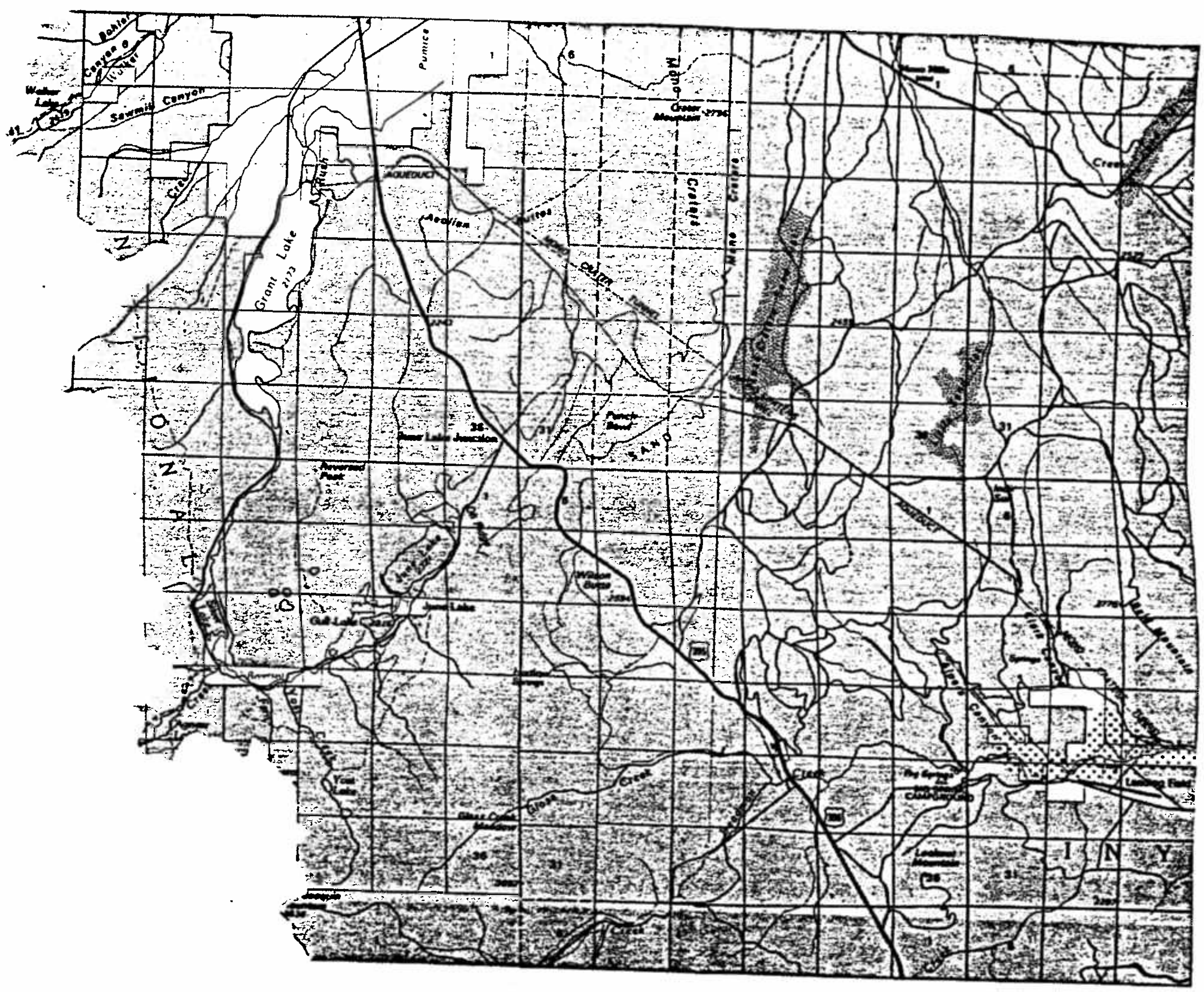
N

FIGURE 21 H
SHALLOW GROUND WATER

I. June Lake

LEGEND

ZONE OF SHALLOW GROUND WATER



SOURCE: Soil Conservation Service, 1982.

FEDERALLY OWNED LANDS

0 MILES 5

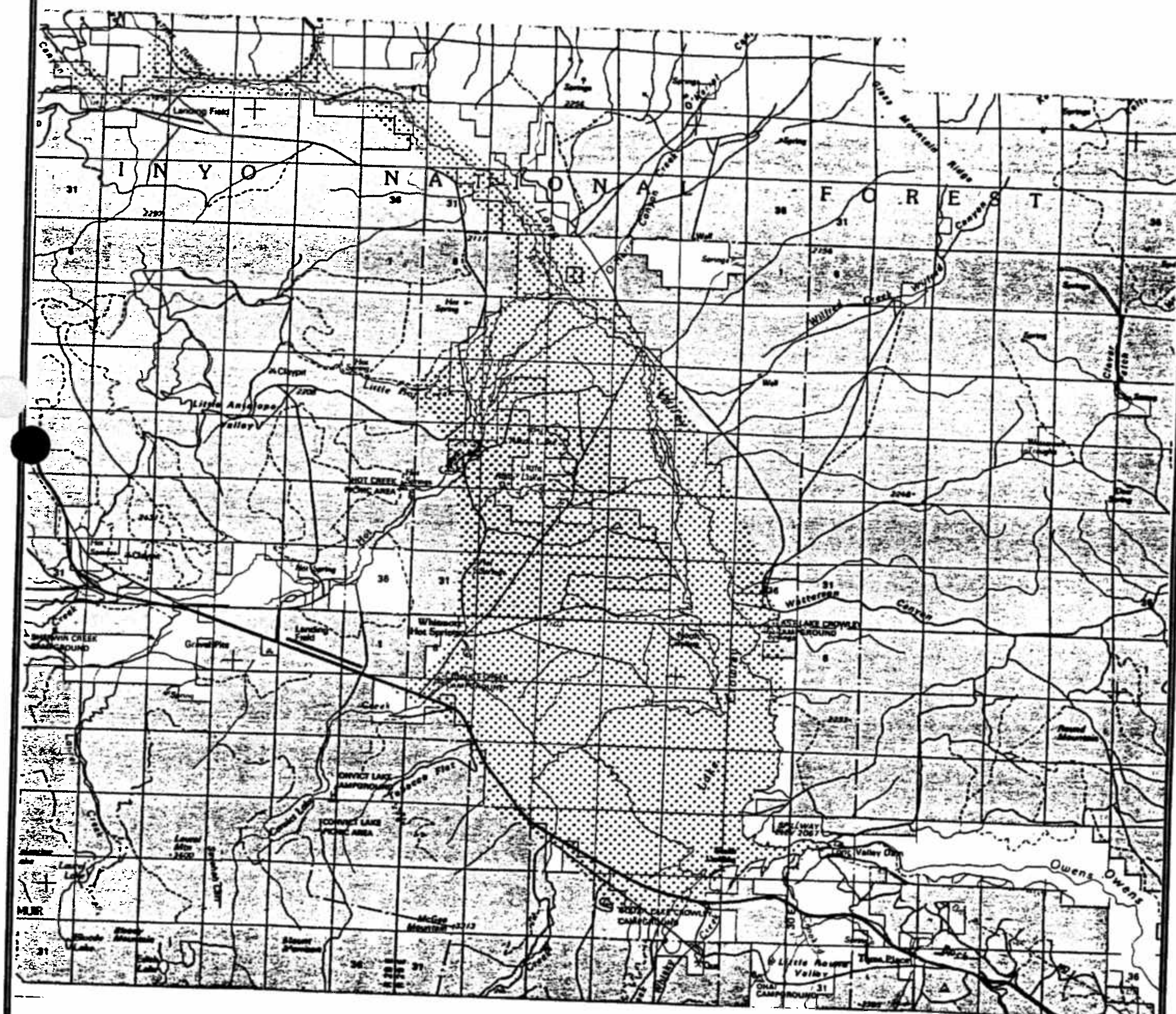
N

FIGURE 21 I
SHALLOW GROUND WATER

J. Long Valley

LEGEND

ZONE OF SHALLOW GROUND WATER



SOURCE: Soil Conservation Service, 1982.

FEDERALLY OWNED LANDS

0 MILES 5

N

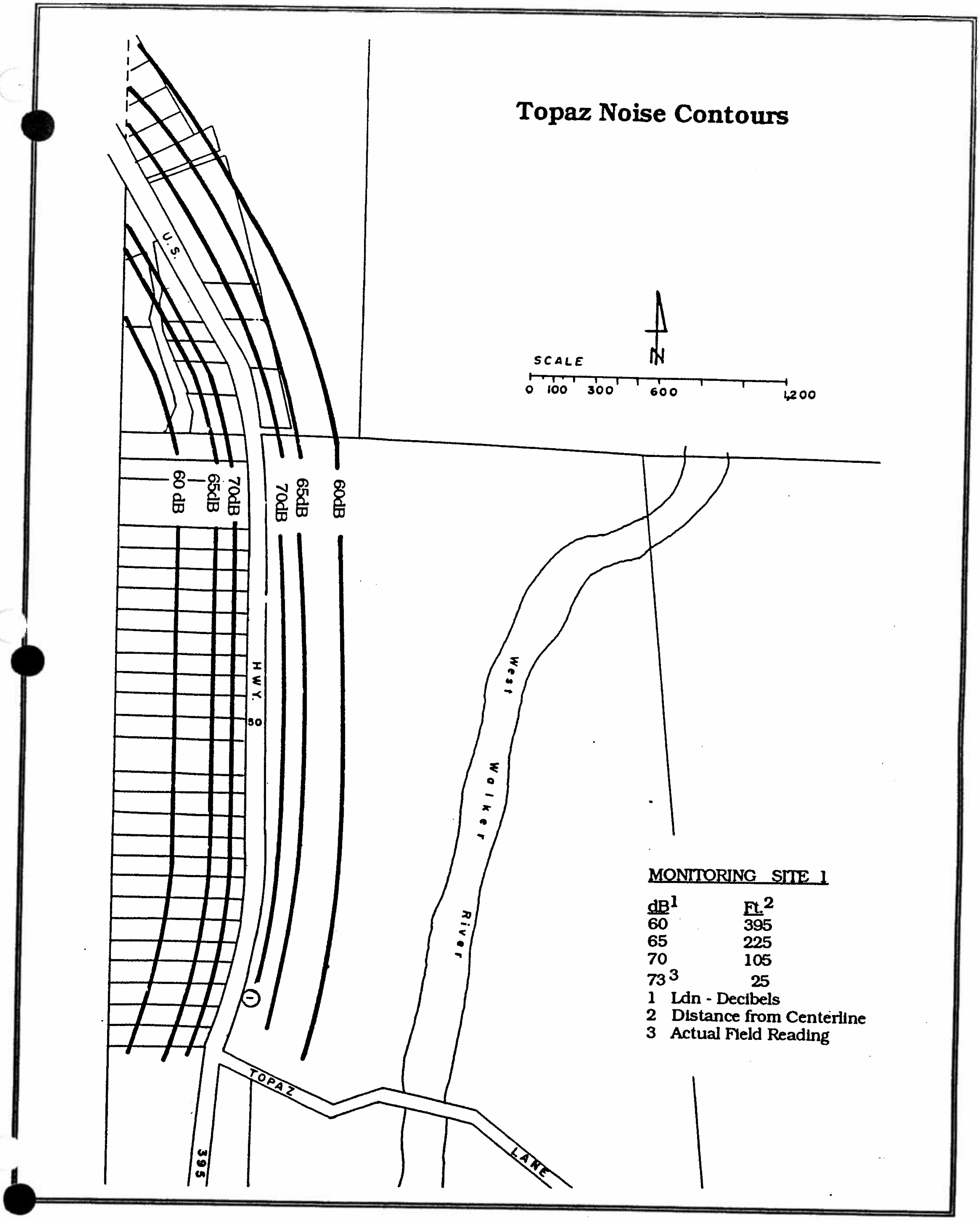
MONO COUNTY MEA

FIGURE 21 J
SHALLOW GROUND WATER

Figure 27

Noise Contours

A. Topaz Noise Contours
B. Coleville Noise Contours
C. Walker Noise Contours
D. Walker Noise Contours
E. Bridgeport Noise Contours
F. Lee Vining Noise Contours
G. Lee Vining Airport Existing Noise Contours
H. June Lake Village Noise Contours
I. June Lake Down Canyon – East Portion
J. June Lake Down Canyon – West Portion
K. Long Valley Noise Contours
L. McGee Creek Noise Contours
M. Hilton Creek Noise Contours
N. Sunny Slopes Noise Contours
O. Chalfant Valley Noise Contours
P. Hammil Valley Noise Contours
Q. Benton Noise Contours



MONO COUNTY MEA

FIGURE 27 A
NOISE CONTOURS

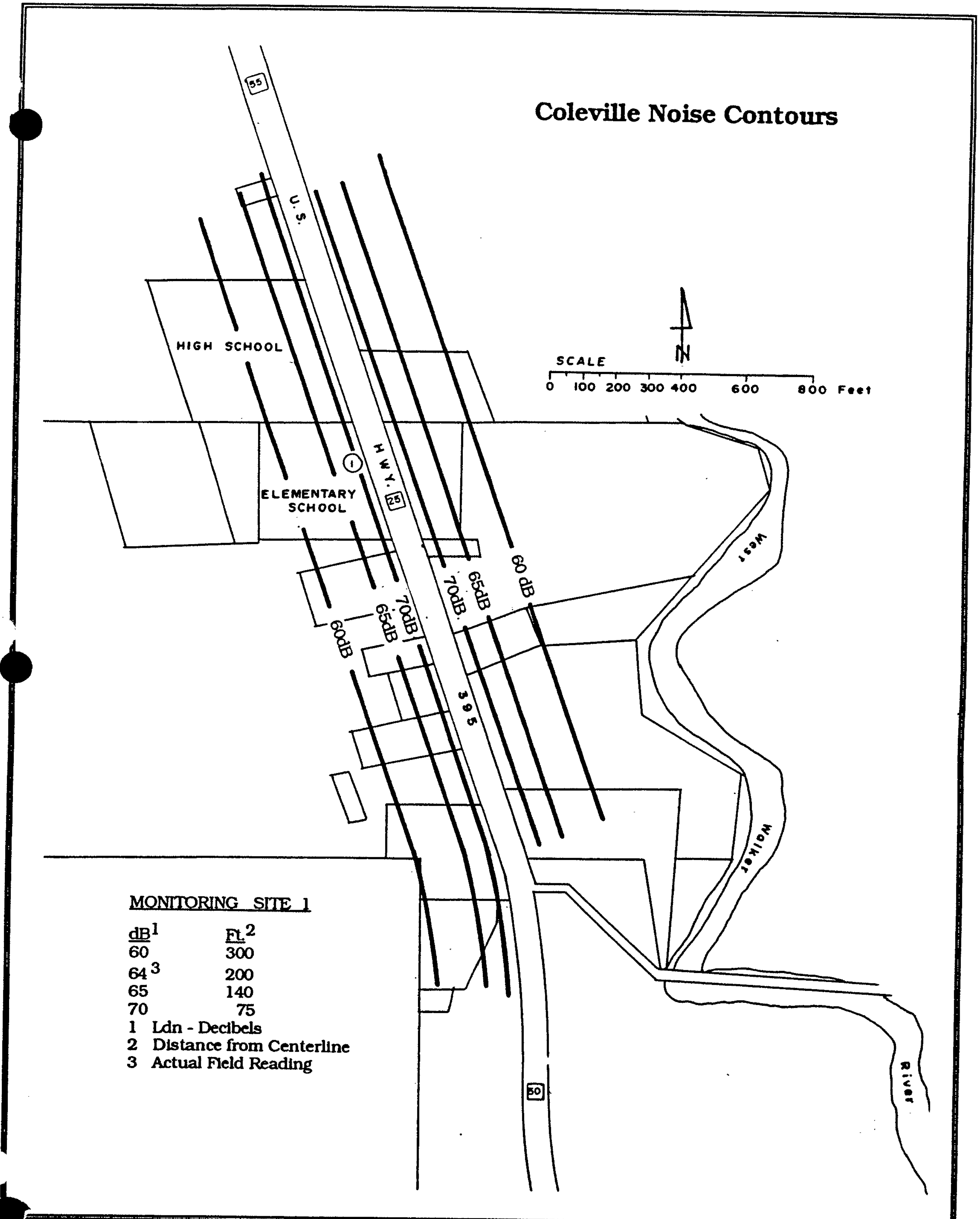


FIGURE 27 B
NOISE CONTOURS

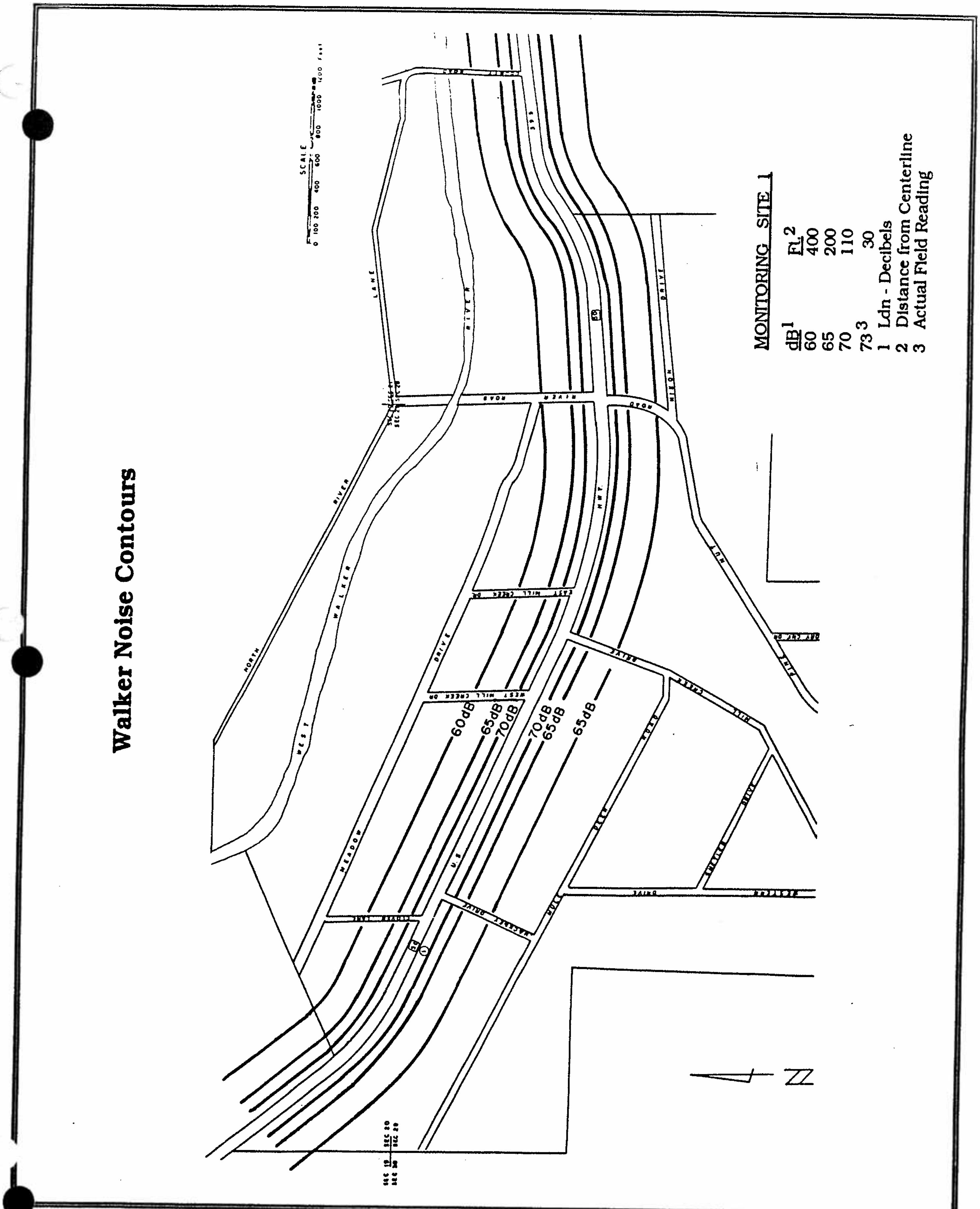


FIGURE 27 C
NOISE CONTOURS

Walker Noise Contours

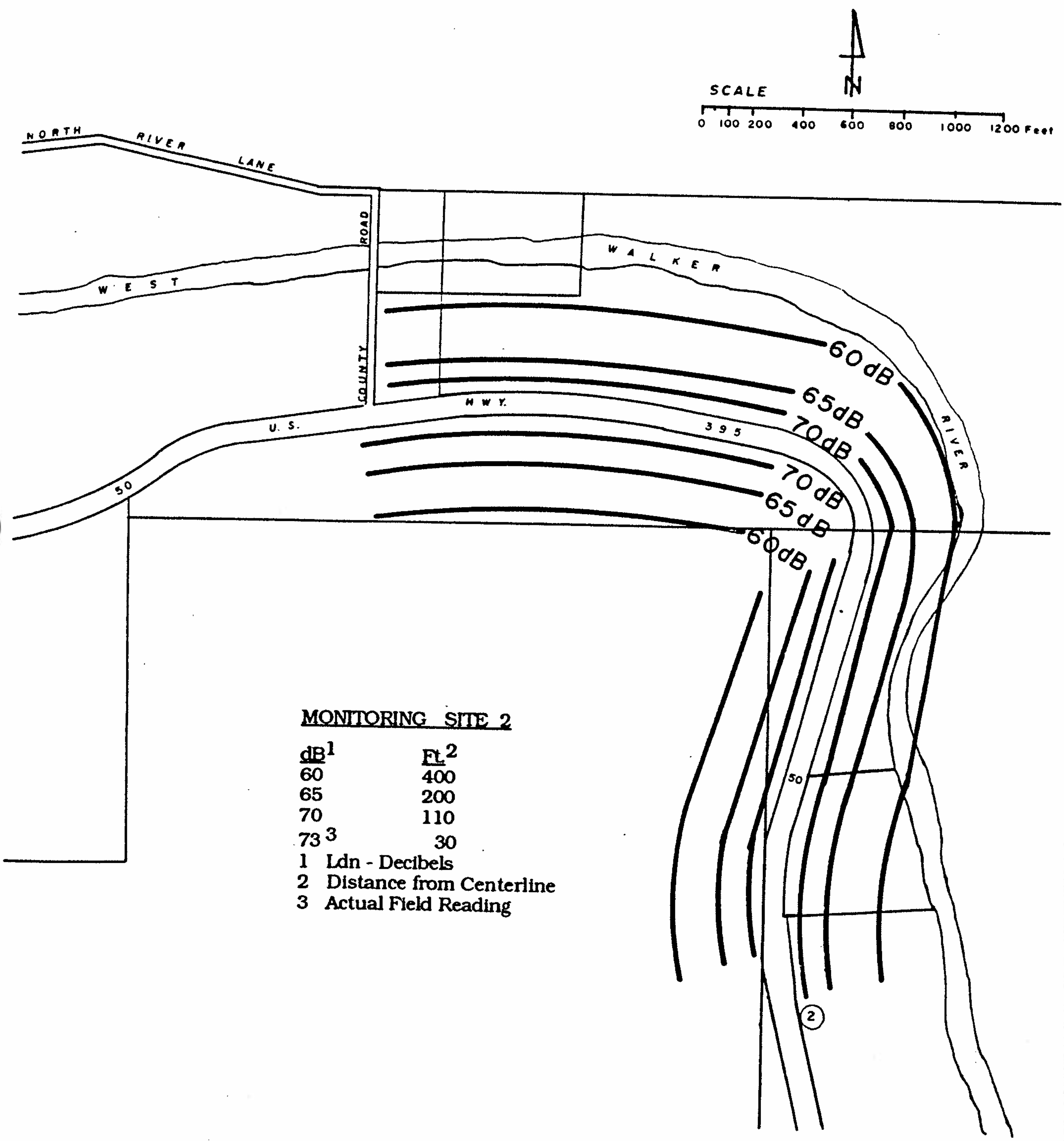
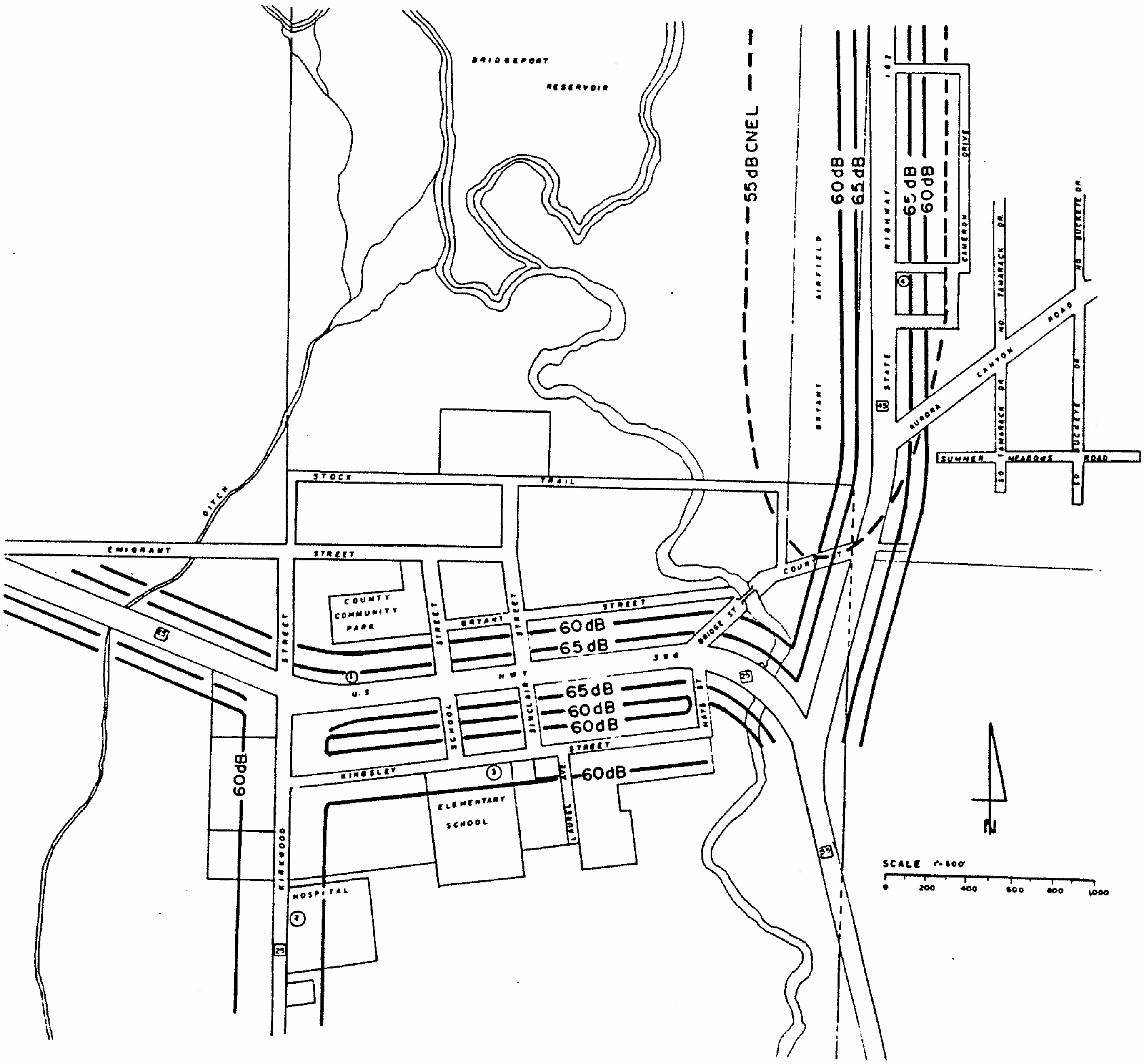


FIGURE 27 D
NOISE CONTOURS

Bridgeport Noise Contours



MONITORING SITES:

SITE 1

dB[1]	Ft.[2]
60	185
65	110
67[3]	40

SITE 2

dB[1]	Ft.[2]
58[3]	129
60	199

SITE 3

dB1	Ft.[2]
60	115
62[3]	45

SITE 4

dB[1]	Ft.[2]
60	210
65	135
67[3]	65

1 Ldn - Decibels 2 Distance from Centerline 3 Actual Field Reading

FIGURE 27 E
NOISE CONTOURS

Lee Vining Noise Contours

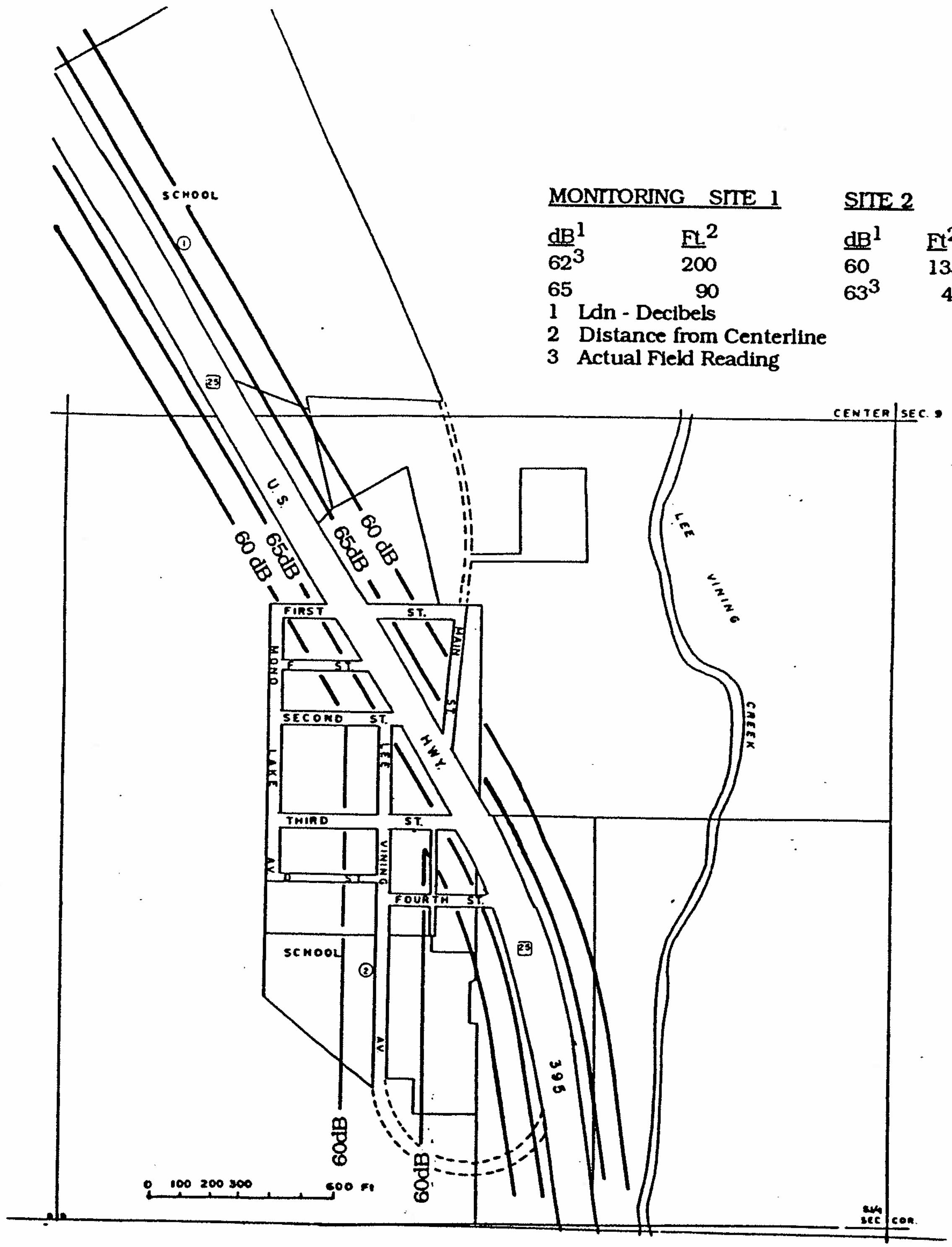


FIGURE 27 F
NOISE CONTOURS

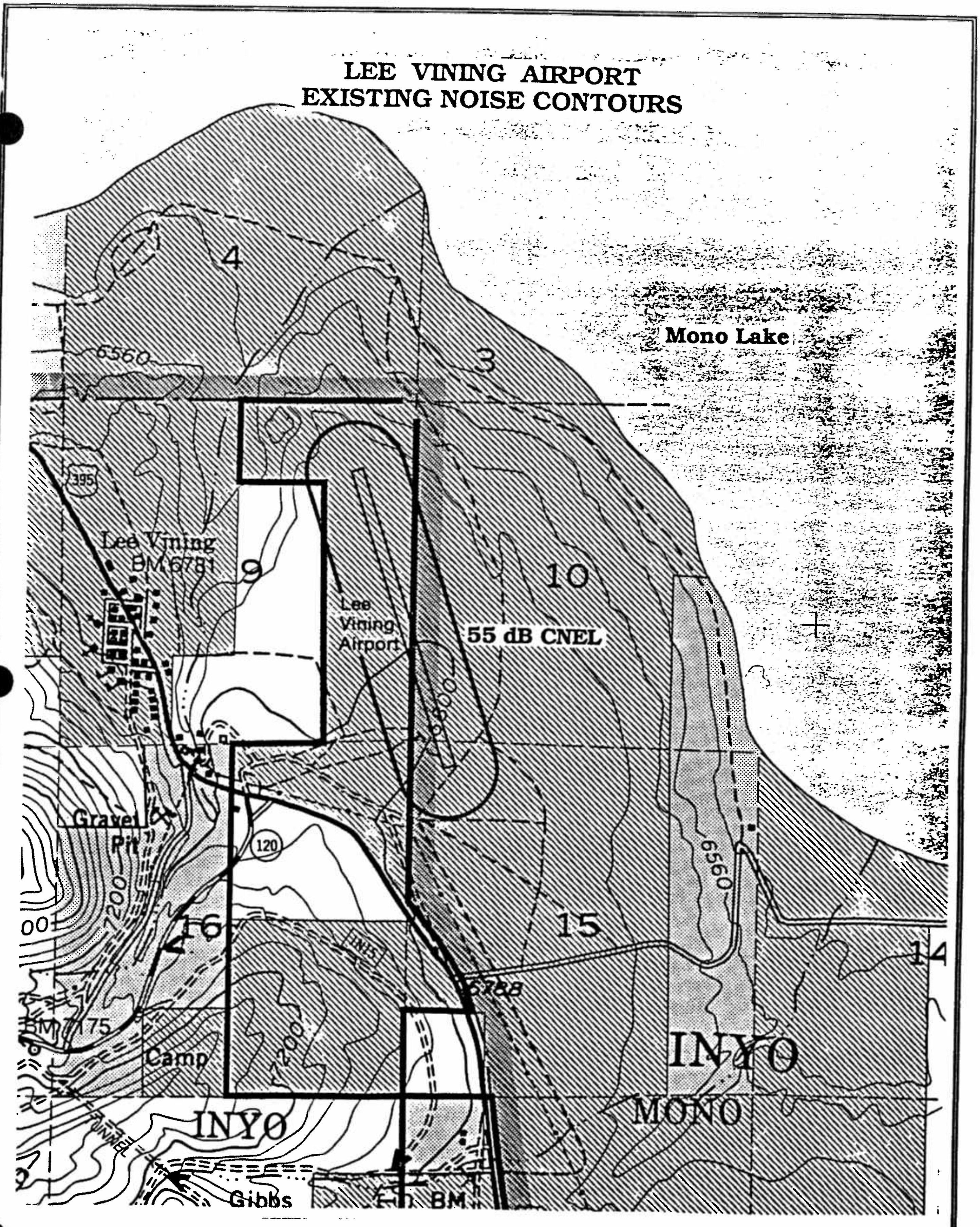
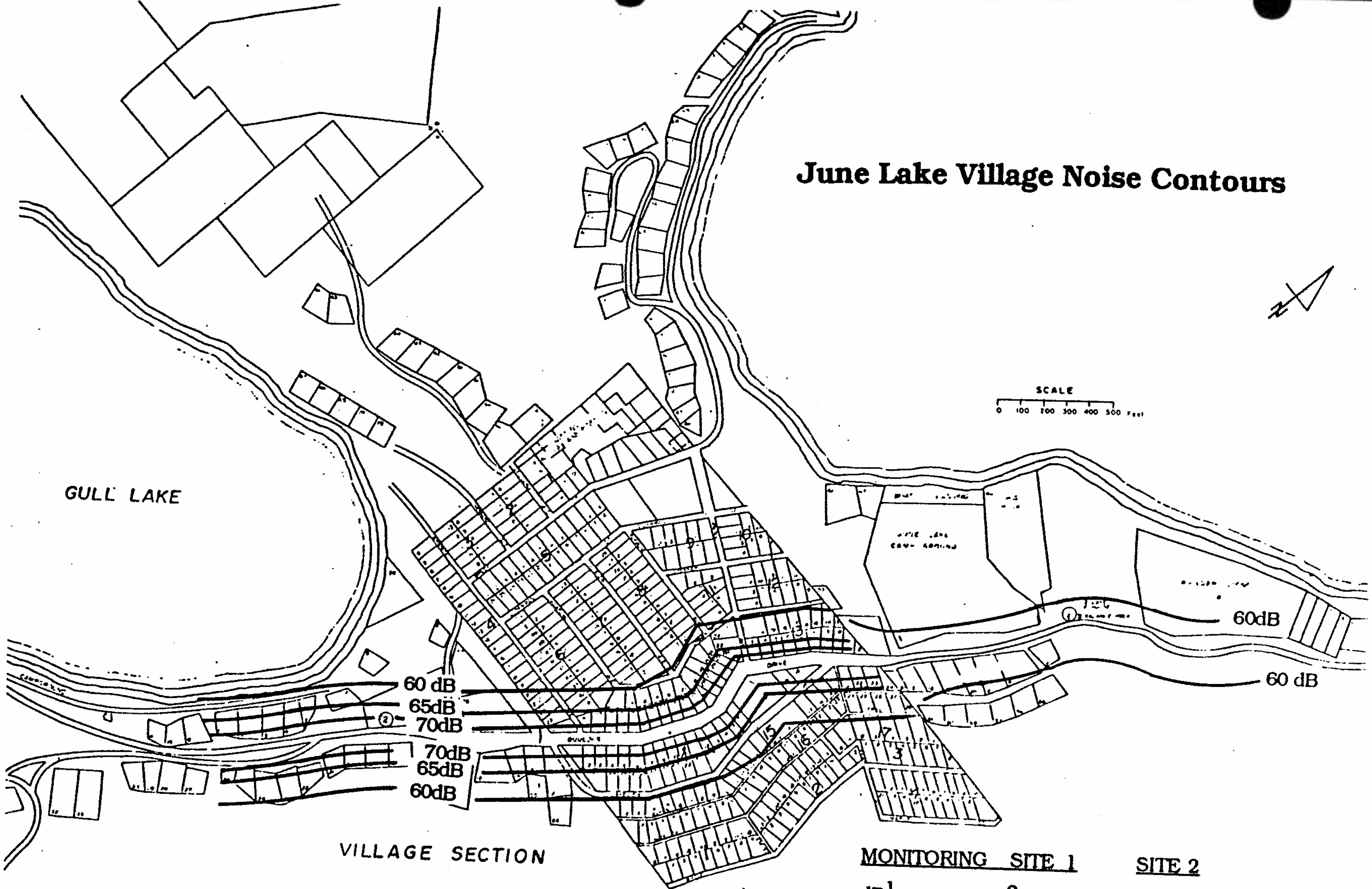


FIGURE 27 G
NOISE CONTOURS

June Lake Village Noise Contours



MONITORING SITE 1

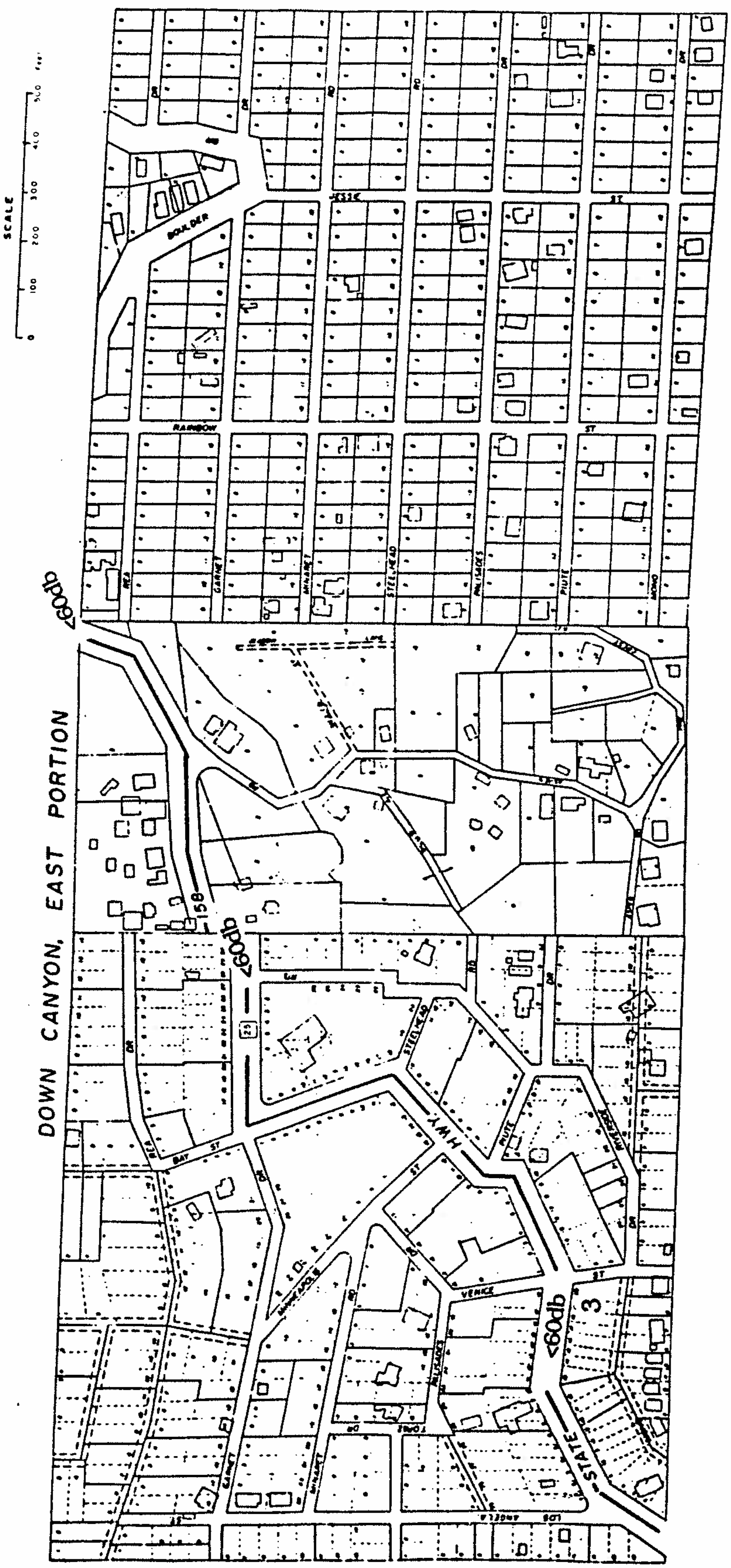
dB[1]	Ft.[2]
60	120
62[3]	50

SITE 2

dB[1]	Ft[2]
60	295
65	150
70	85
71[3]	25

1 Ldn - Decibels
2 Distance from Centerline
3 Actual Field Reading

June Lake Down Canyon
East Portion Noise Contours

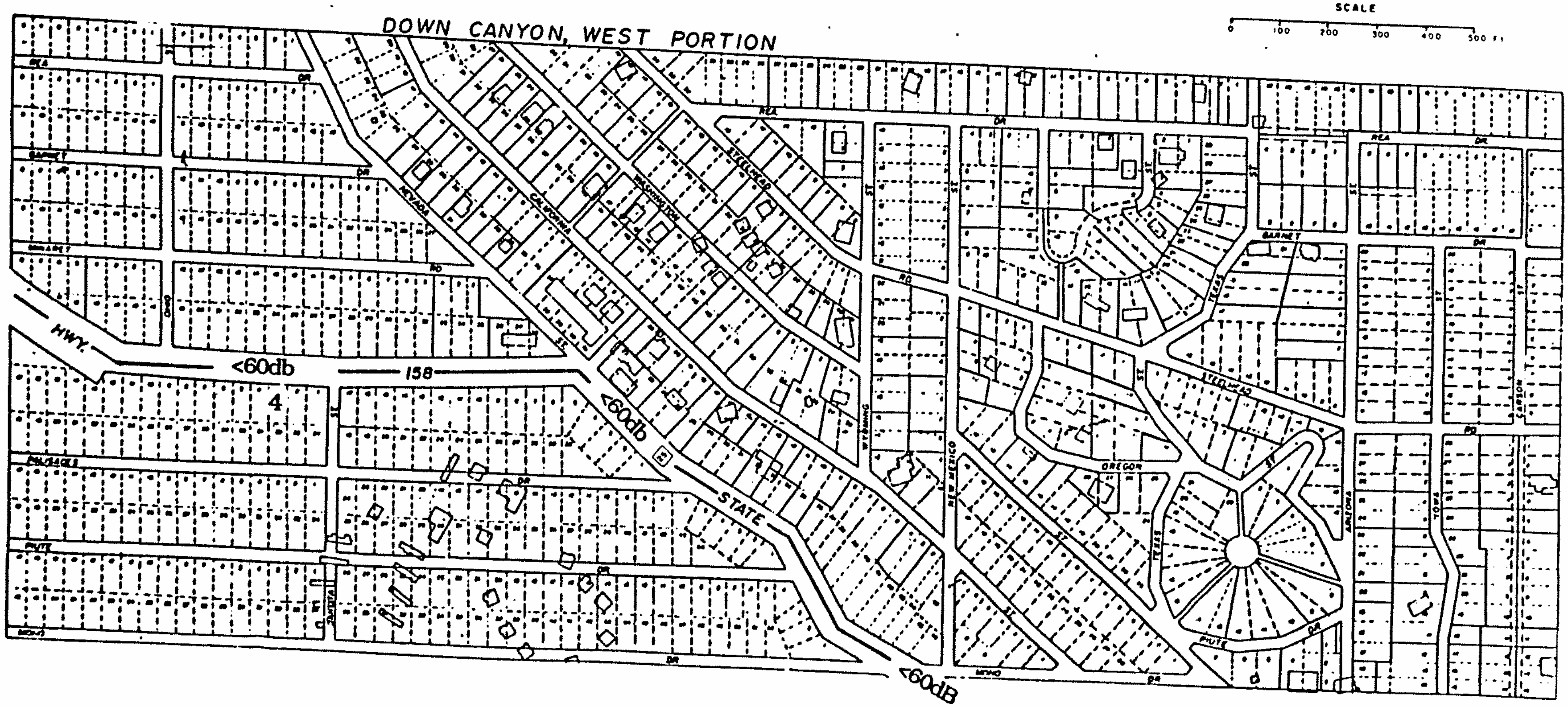


MONITORING SITE 3

dB[1]	Ft[2]
61[3]	25

1 Ldn - Decibels
2 Distance from Centerline
3 Actual Field Reading

June Lake Down Canyon
West Portion Noise Contours

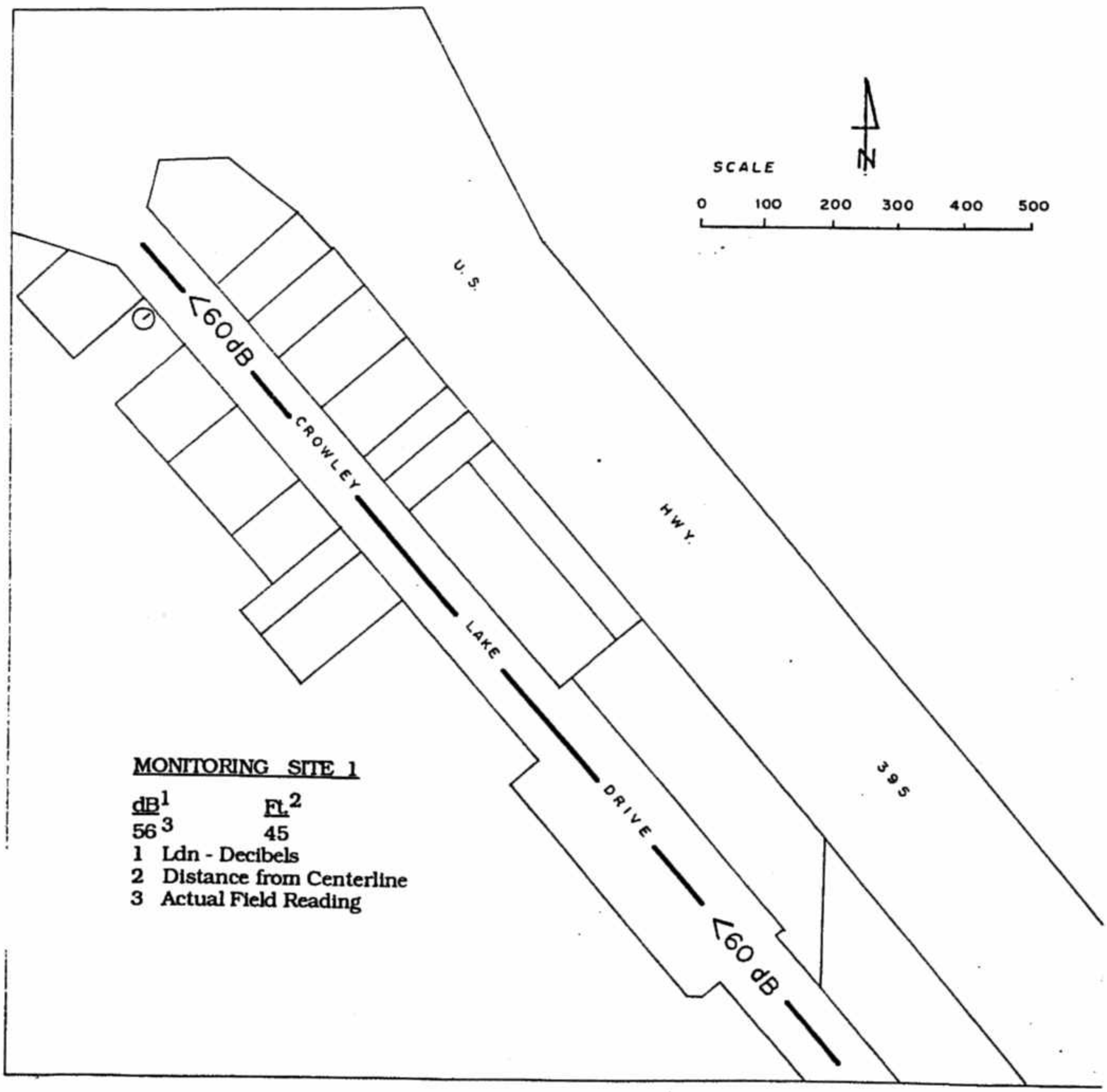


<u>MONITORING SITE 4</u>

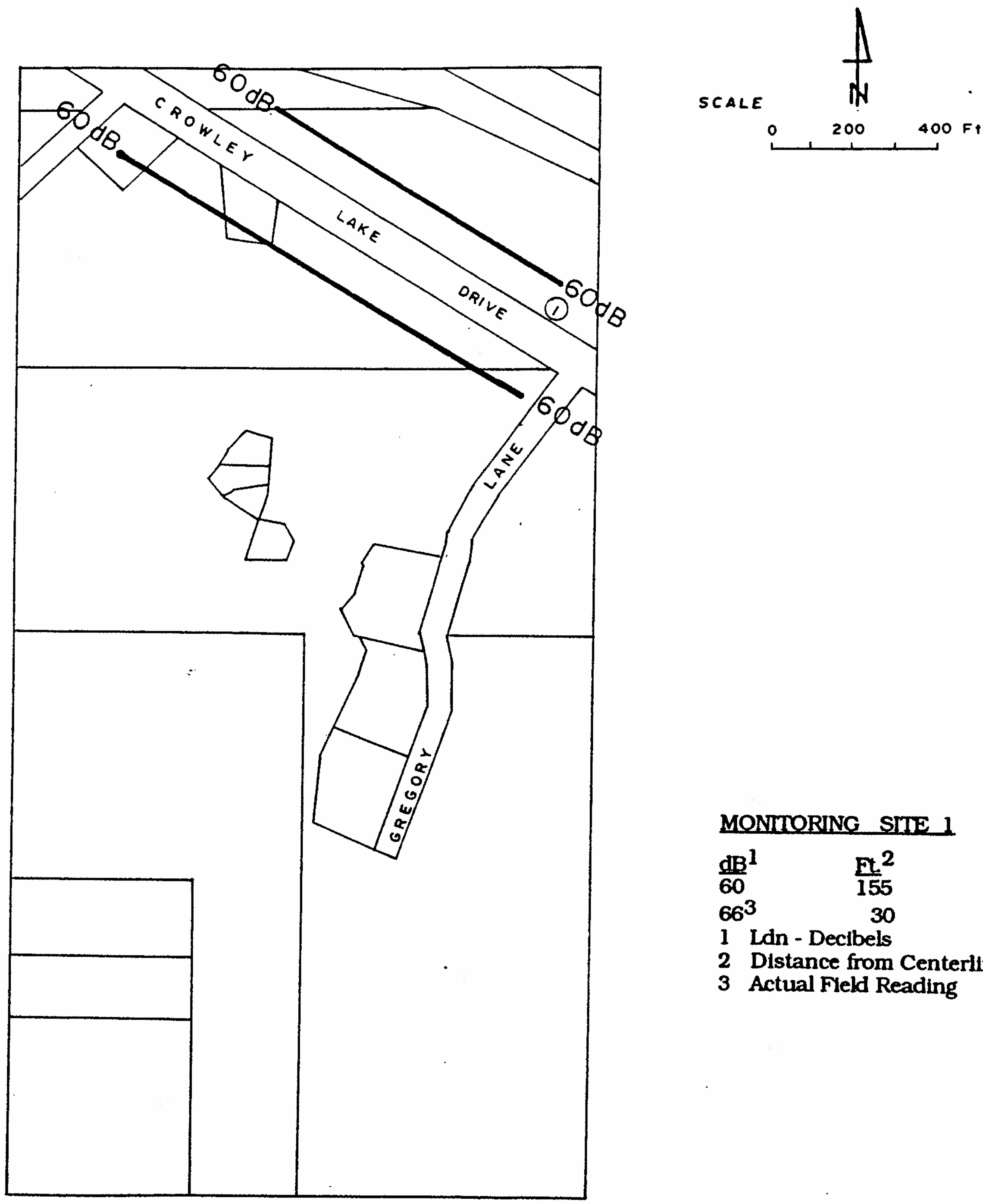
dB[1]	Ft.[2]
53[3]	45

1 Ldn - Decibels
2 Distance from Centerline
3 Actual Field Reading

Long Valley Noise Contours



Mc Gee Creek Noise Contours

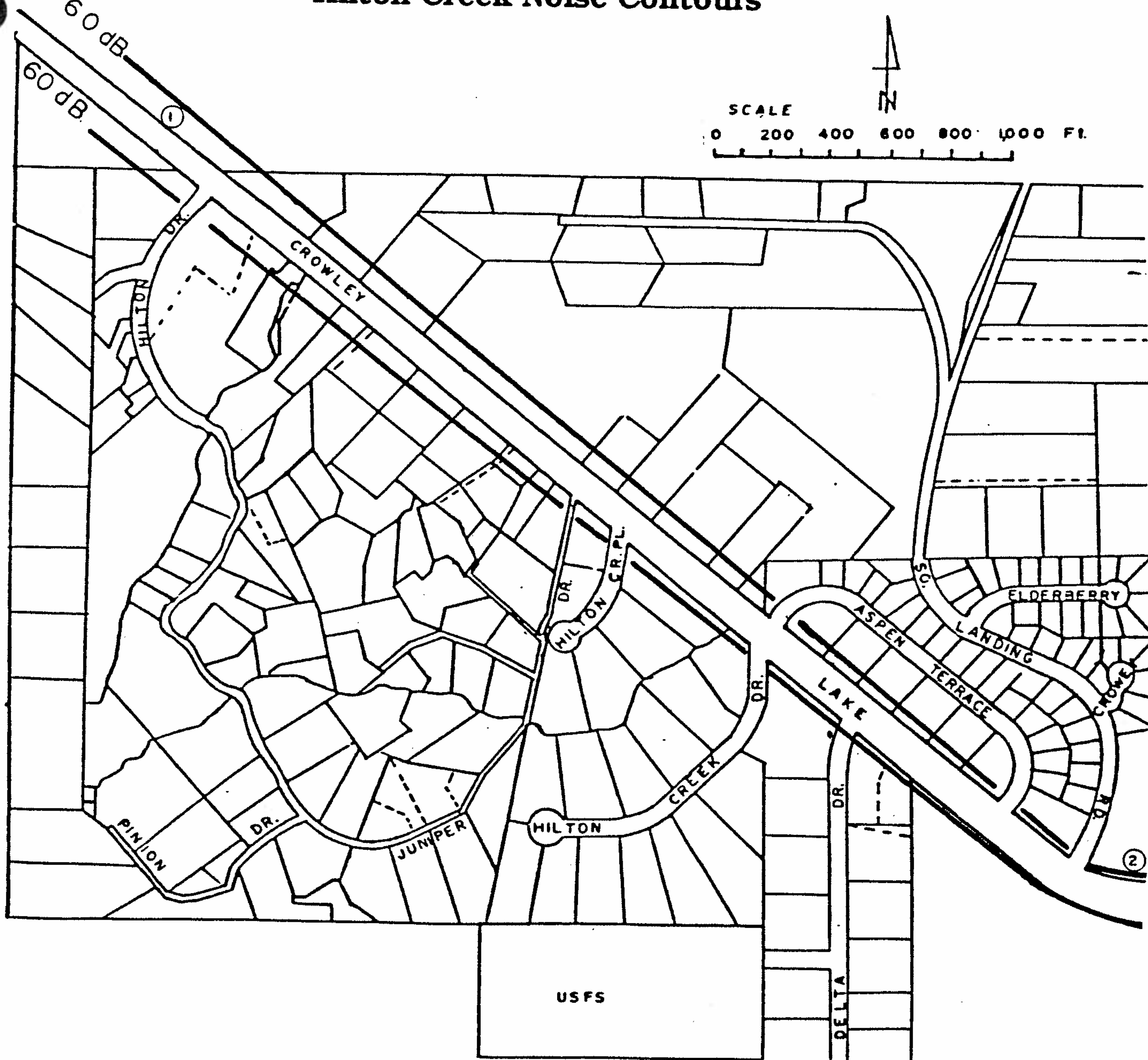


MONITORING SITE 1

dB[1]	Ft.[2]
60	155
66[3]	30

1 Ldn - Decibels
2 Distance from Centerline
3 Actual Field Reading

Hilton Creek Noise Contours



MONITORING SITE 1	
dB[1]	Ft.[2]
60	115
62[3]	45

SITE 2	
dB[1]	Ft.[2]
60	102
63	22

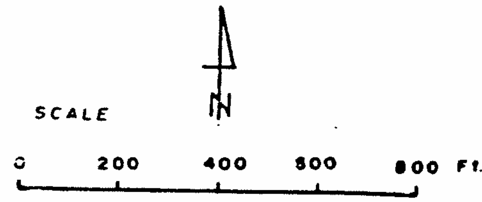
1 Ldn - Decibels
2 Distance from Centerline
3 Actual Field Reading

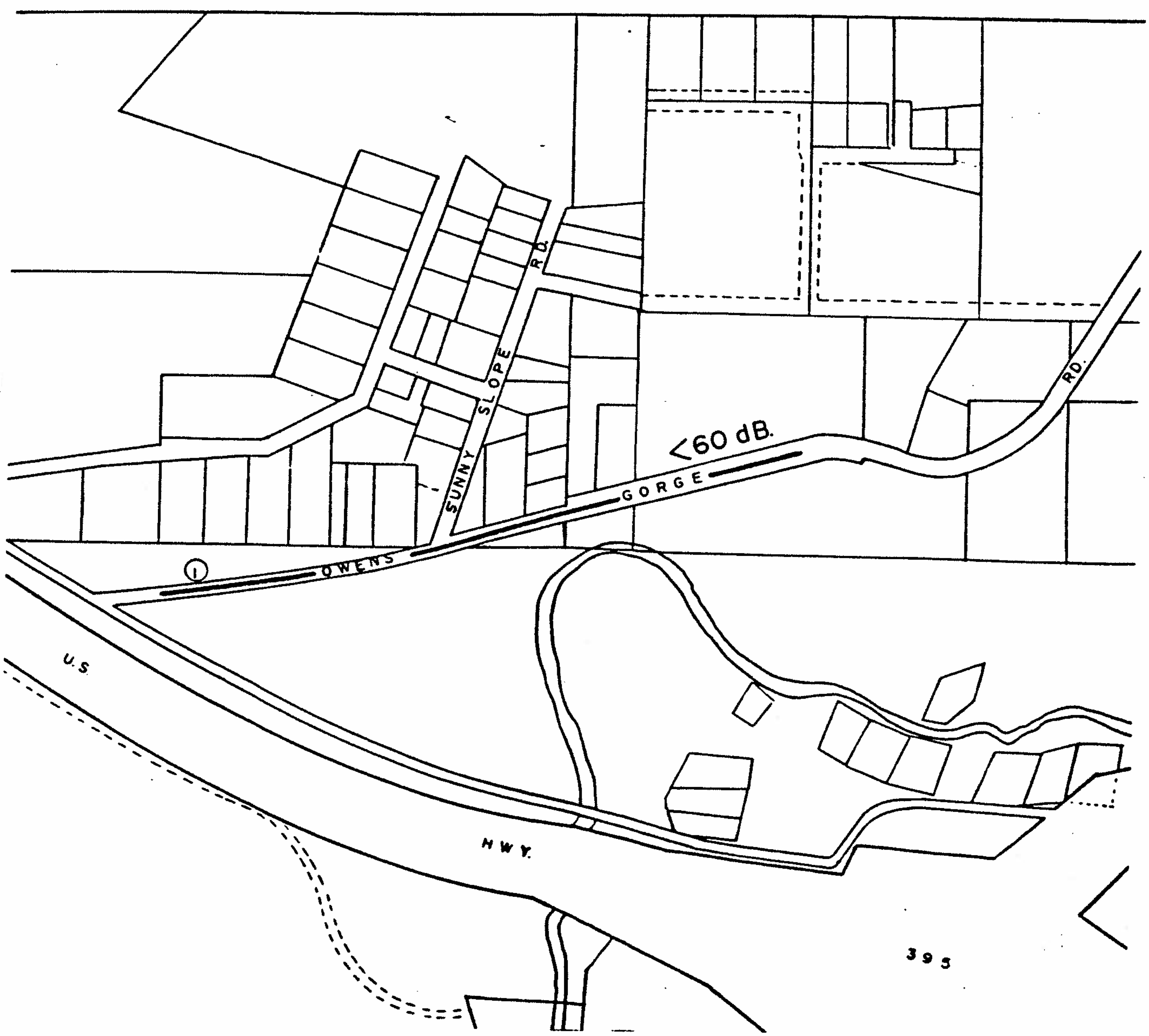
Sunny Slopes Noise Contours

MONITORING SITE 1

dB[1]	Ft.[2]
57[3]	15

1 Ldn - Decibels
2 Distance from Centerline
3 Actual Field Reading



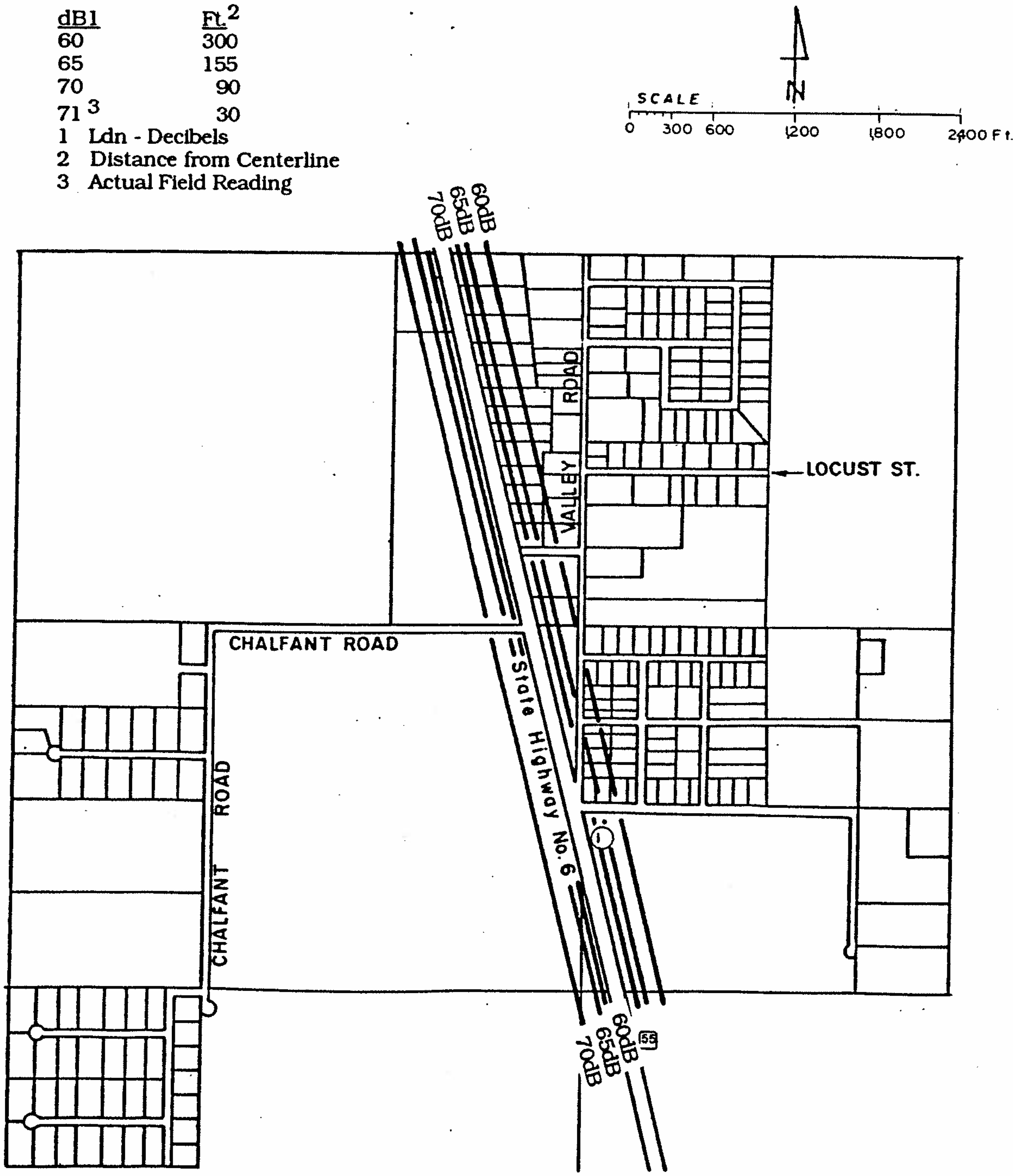


Chalfant Valley Noise Contours

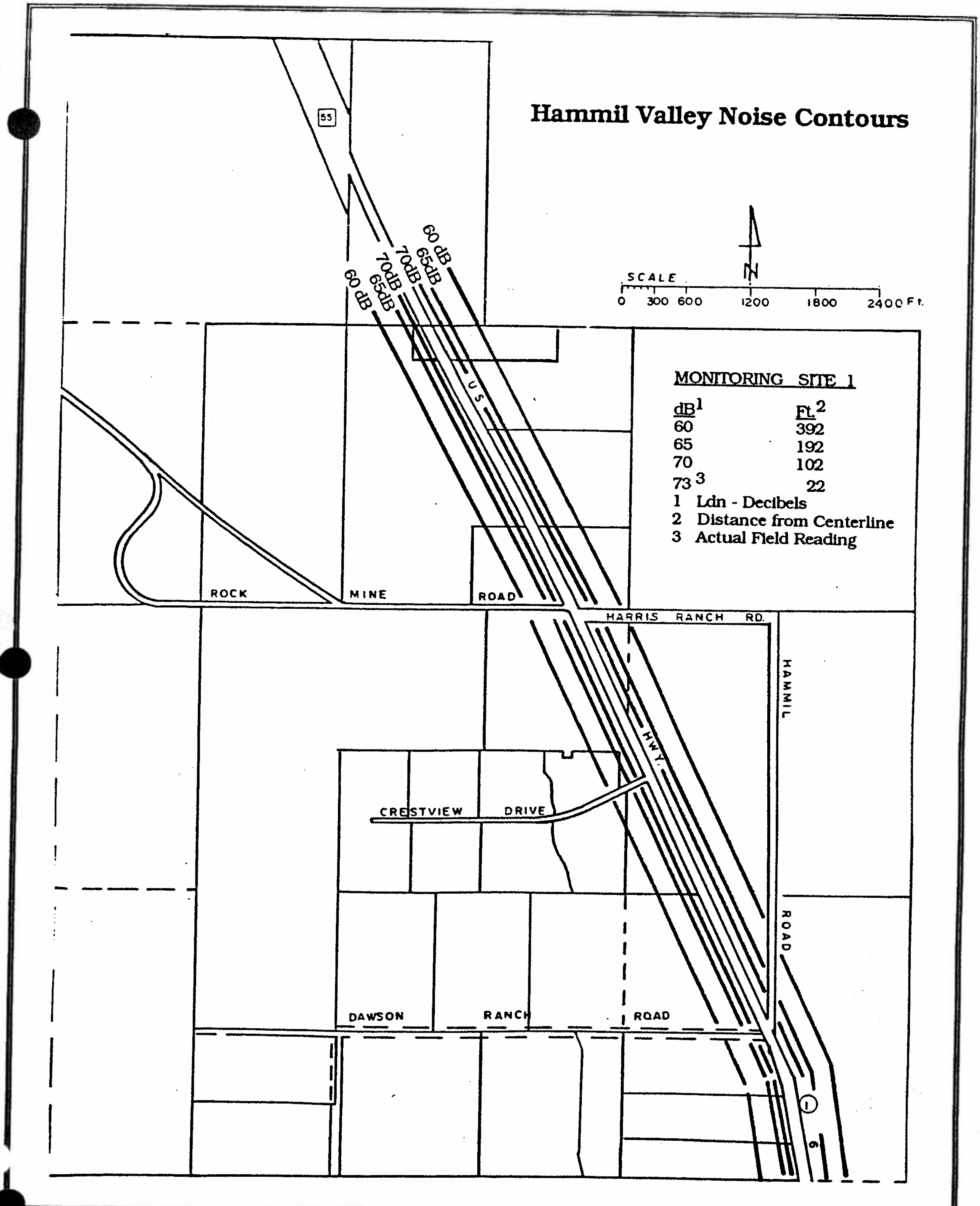
MONITORING SITE 1

dB[1]	Ft.[2]
60	300
65	155
70	90
71[3]	30

1 Ldn - Decibels
2 Distance from Centerline
3 Actual Field Reading



Hammil Valley Noise Contours



MONITORING SITE 1

dB[1]	Ft.[2]
60	392
65	192
70	102
73[3]	22

1 Ldn - Decibels
2 Distance from Centerline
3 Actual Field Reading

FIGURE 27 P
NOISE CONTOURS

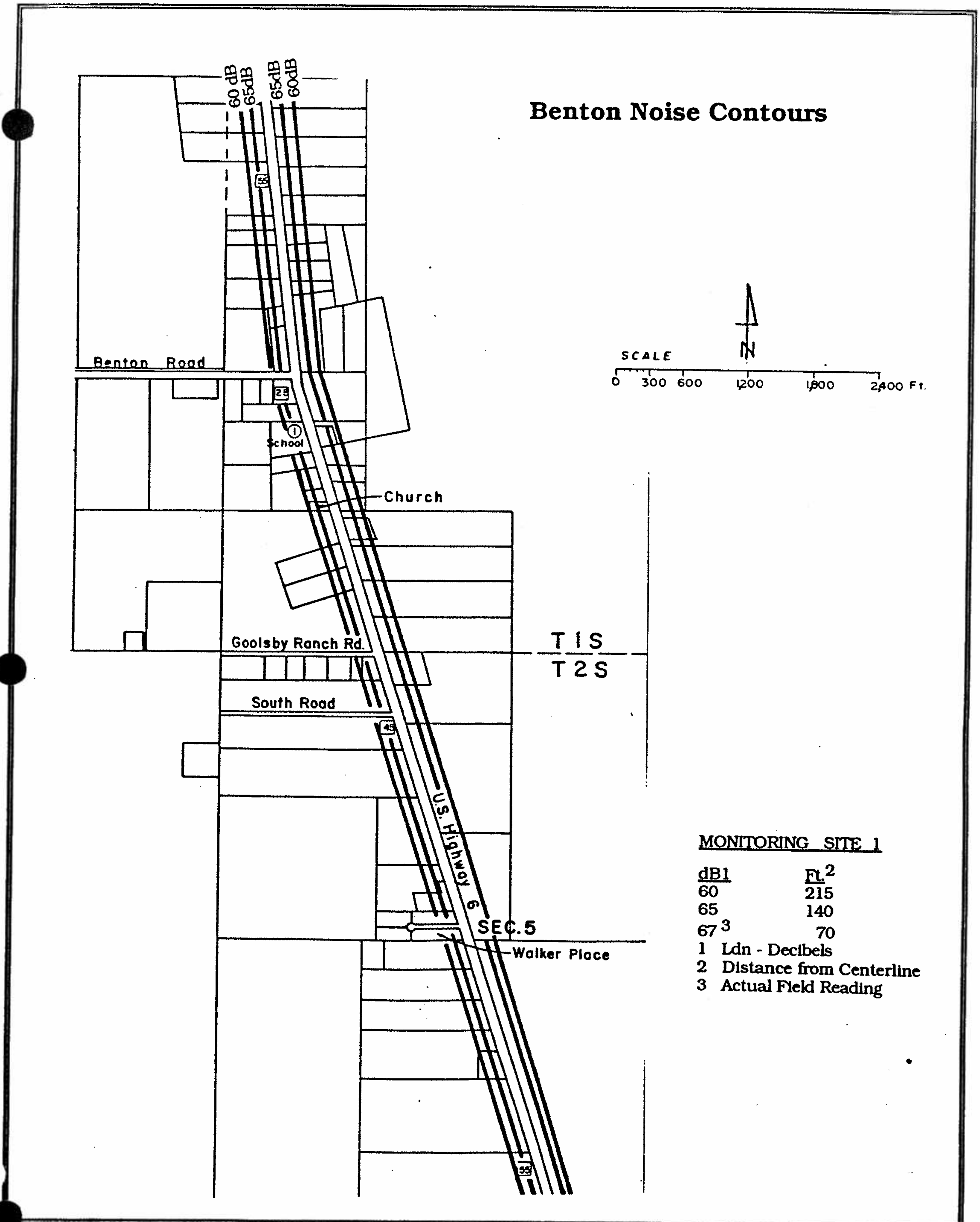
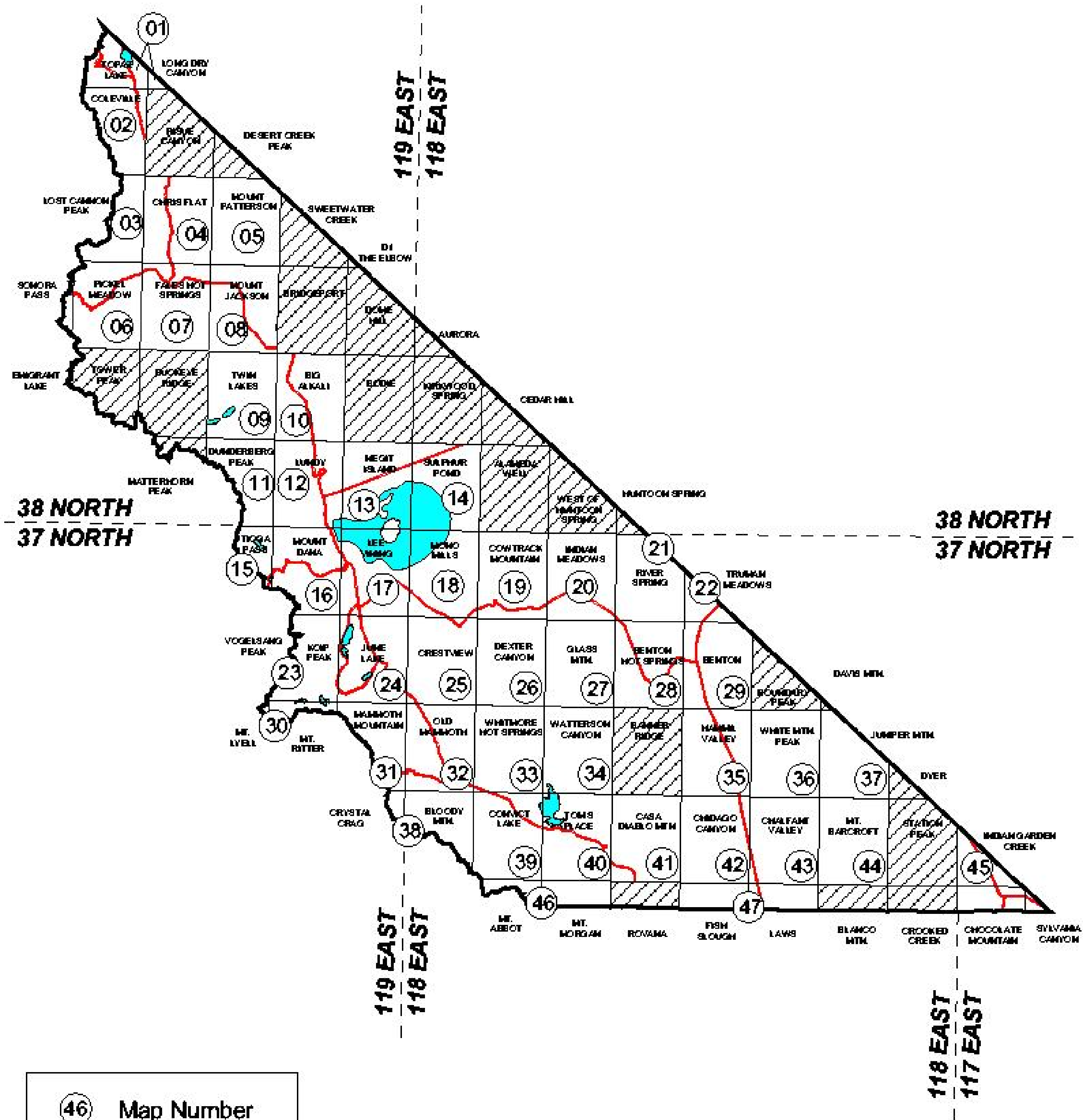


FIGURE 27 Q
NOISE CONTOURS

MEA Special Status Species
Area Overview



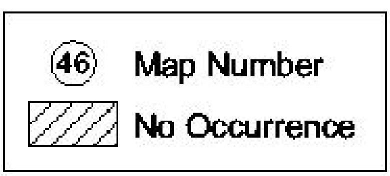
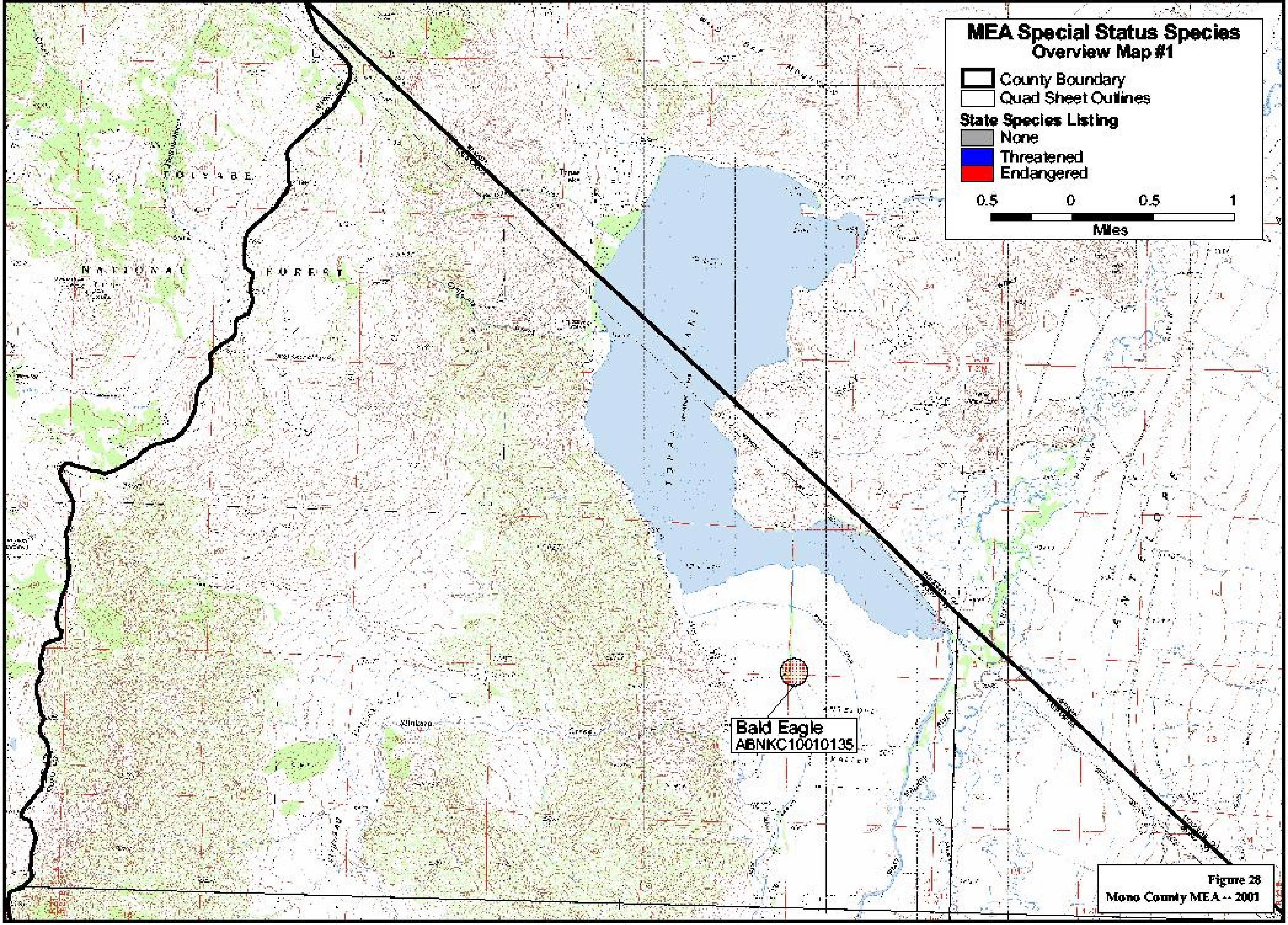
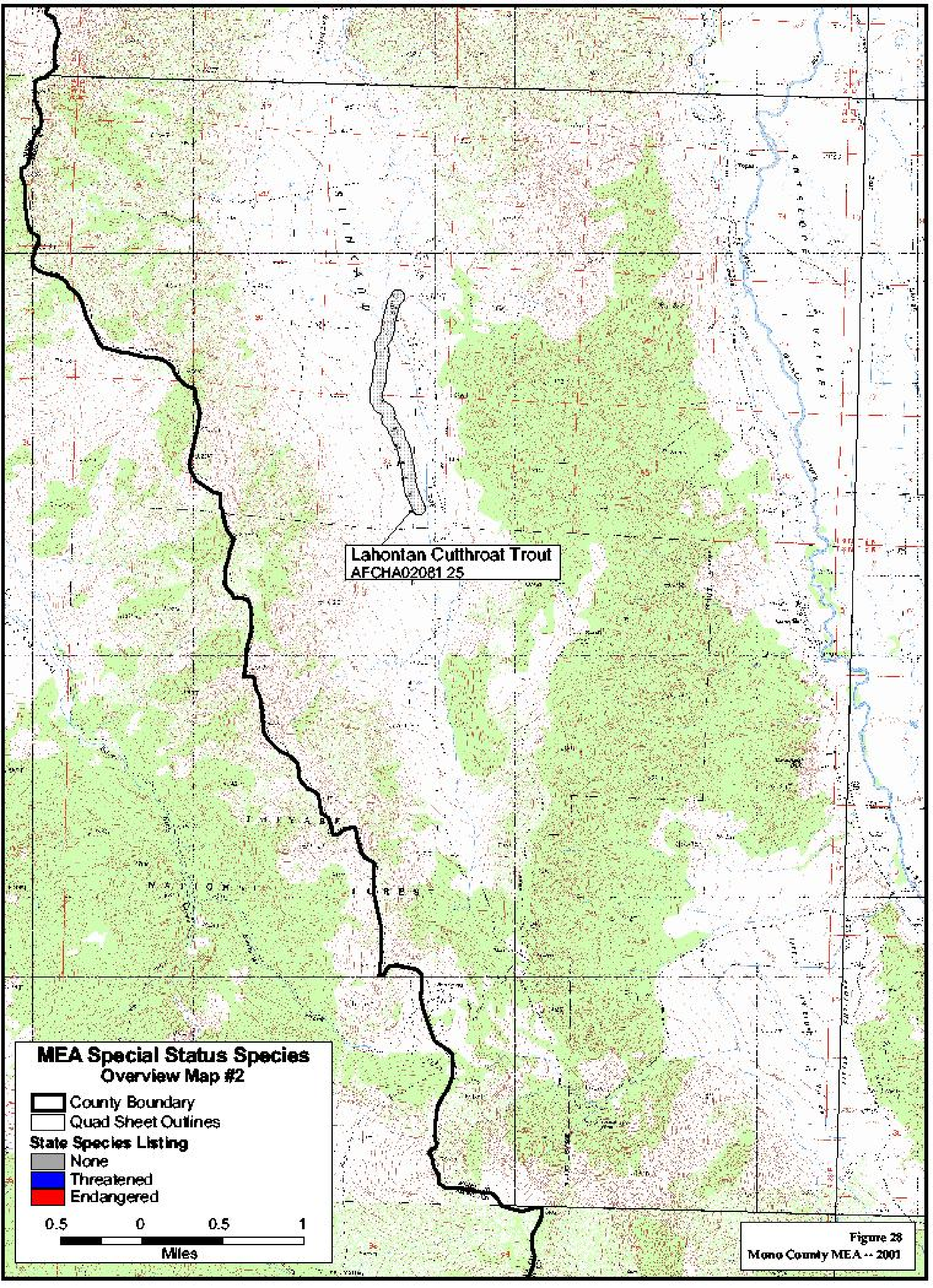


Figure 28
Mono County MEA – 2001


MEA Special Status Species
Overview Map #1
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5
0
0.5
1
Miles
Bald Eagle
ABNKC10010135
Figure 28
Mono County MEA -- 2001


Lahontan Cutthroat Trout
AFCHA02081 25
MEA Special Status Species
Overview Map #2
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Figure 28
Mono County MEA -- 2001

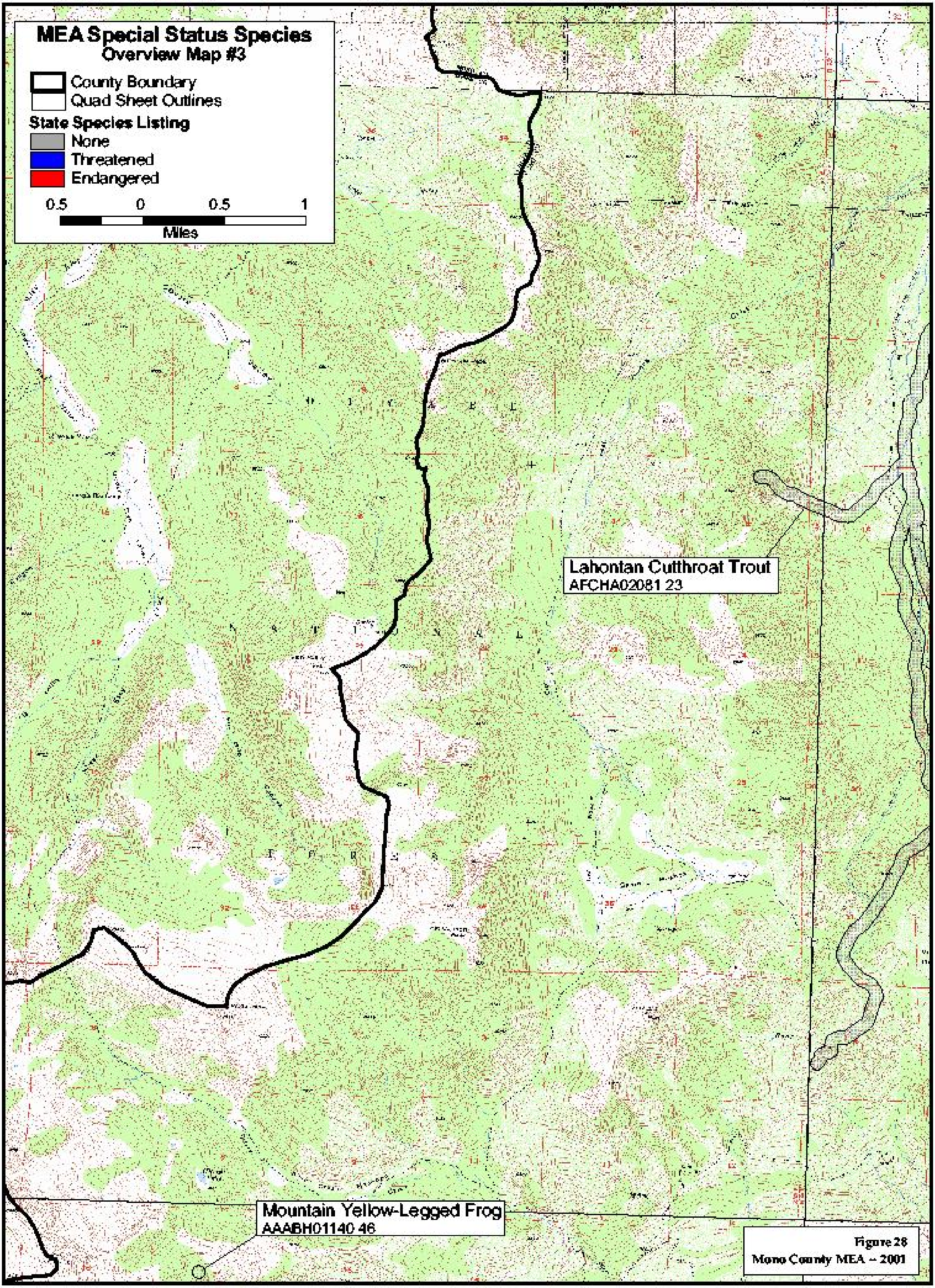


Figure 28
Mono County MEA -- 2001

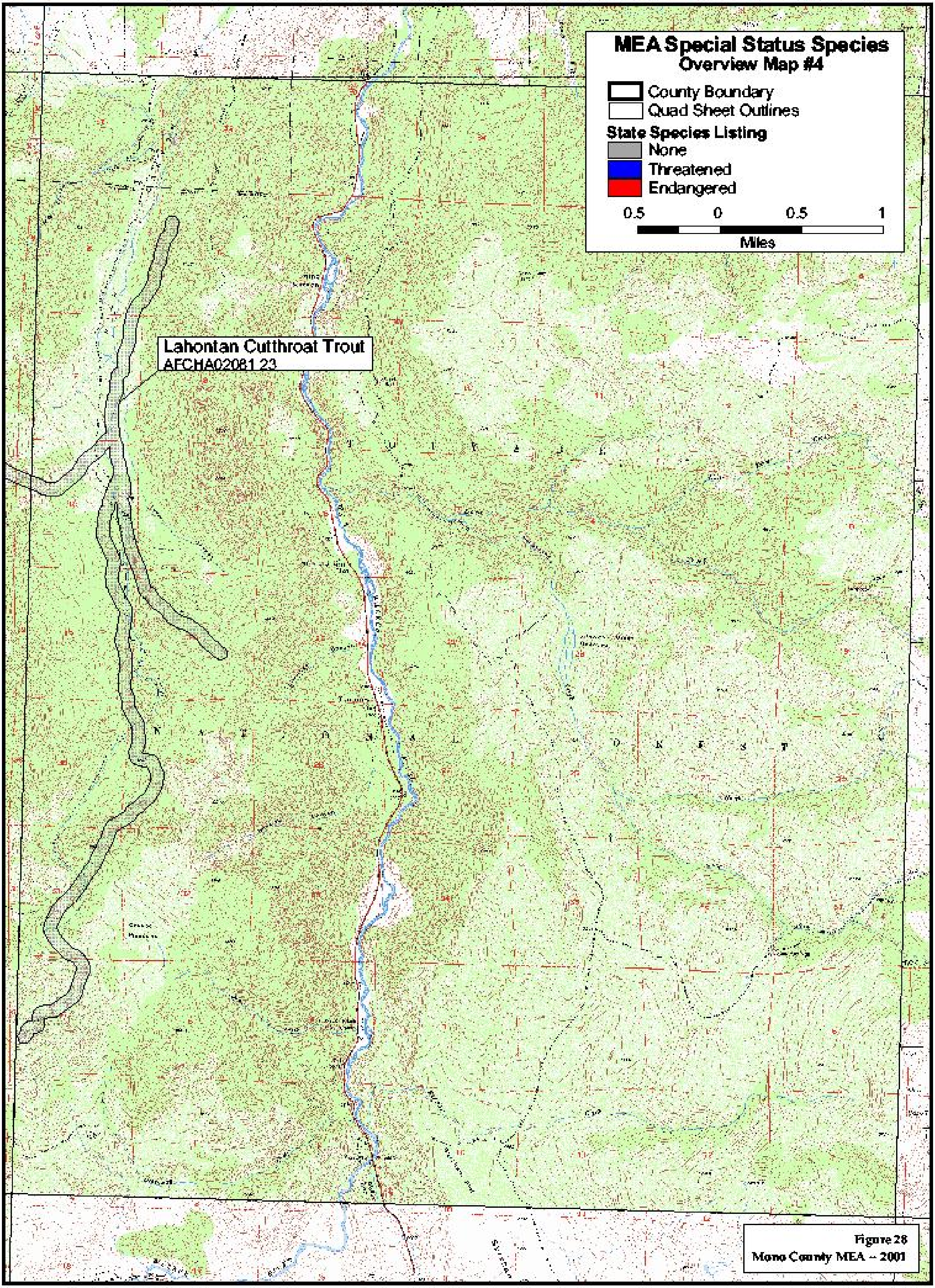


Figure 28
Mono County MEA -- 2001

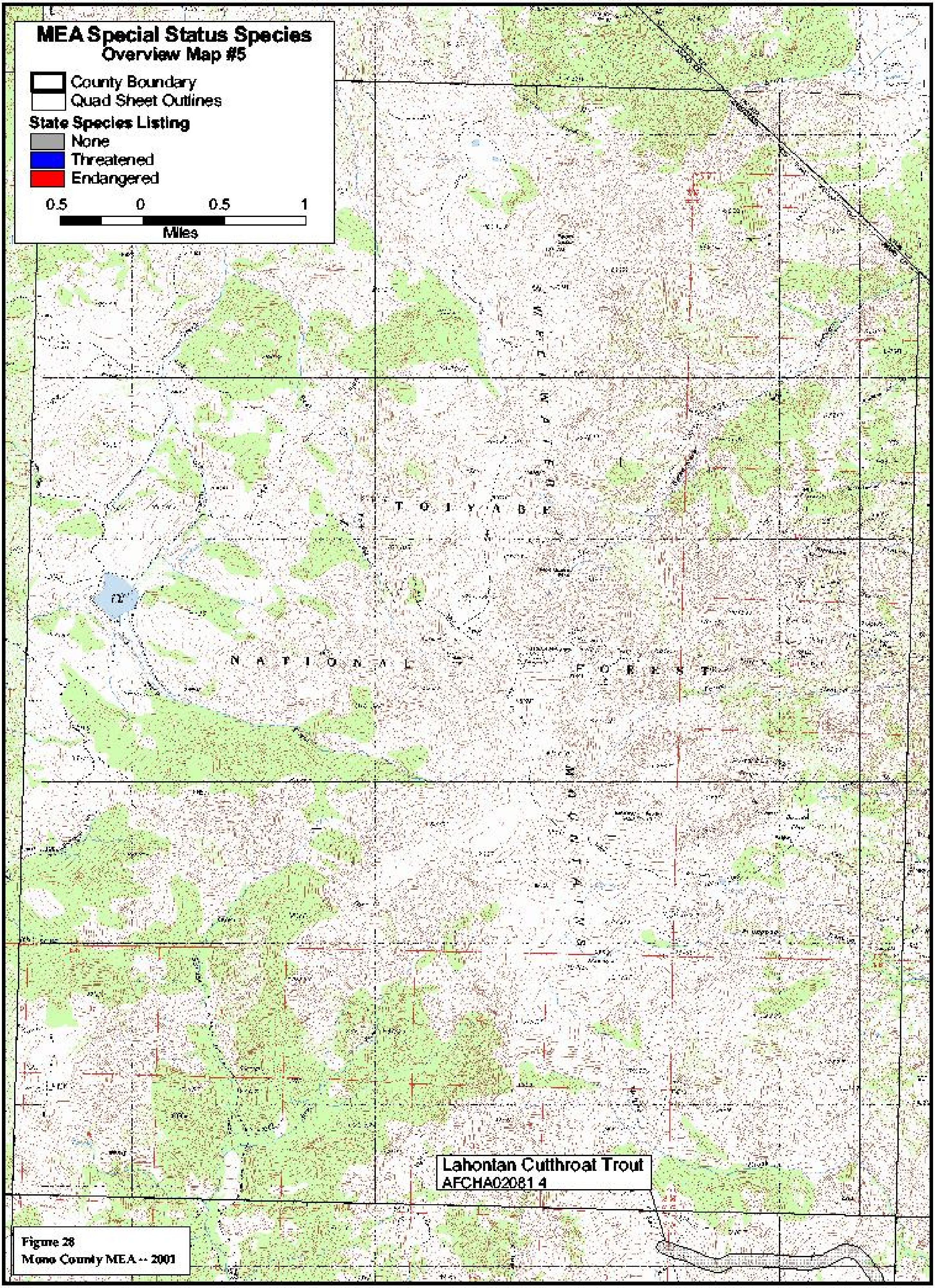


Figure 28
Mono County MEA -- 2001

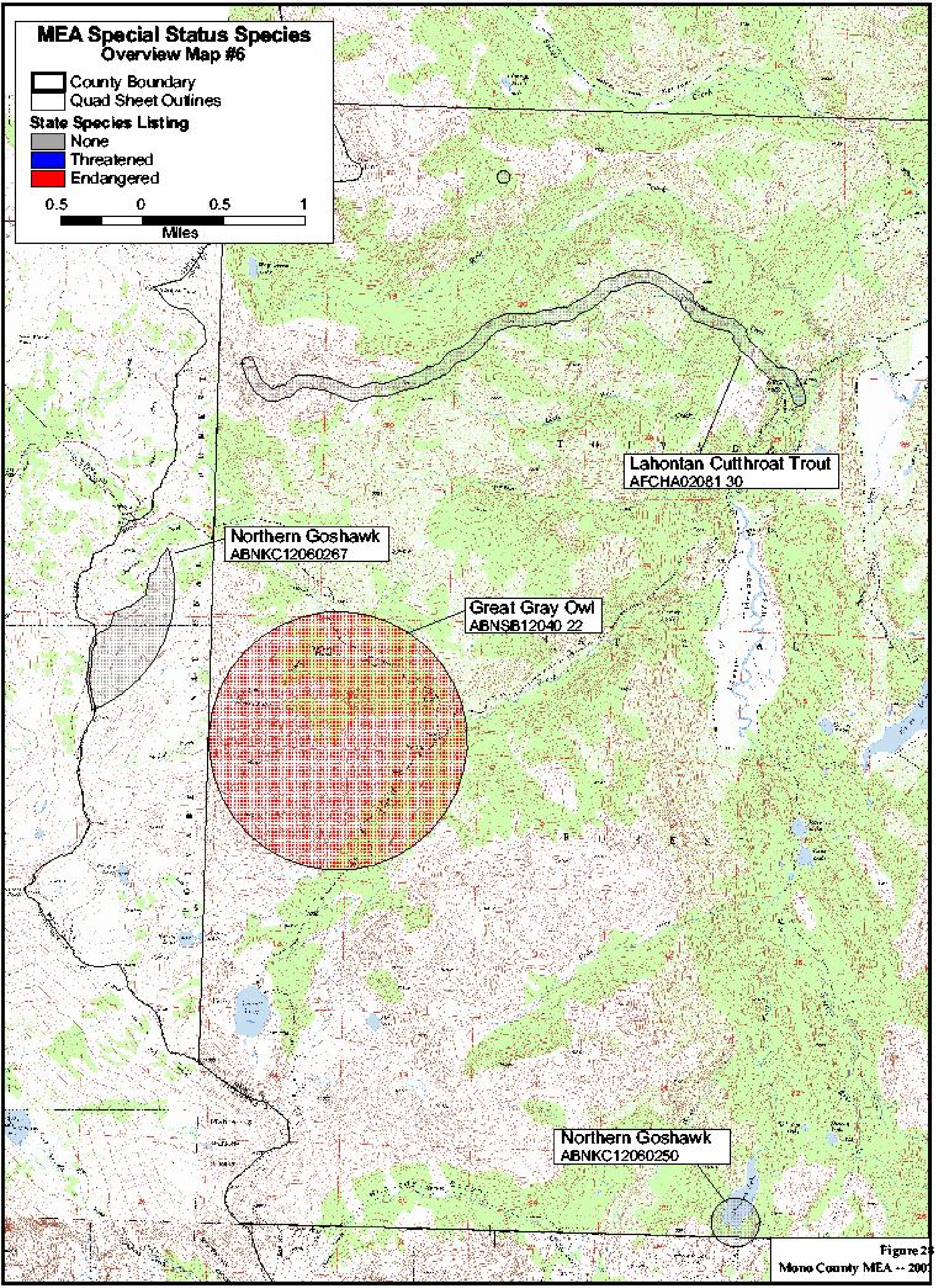


Figure 2
Mono County MEA -- 200

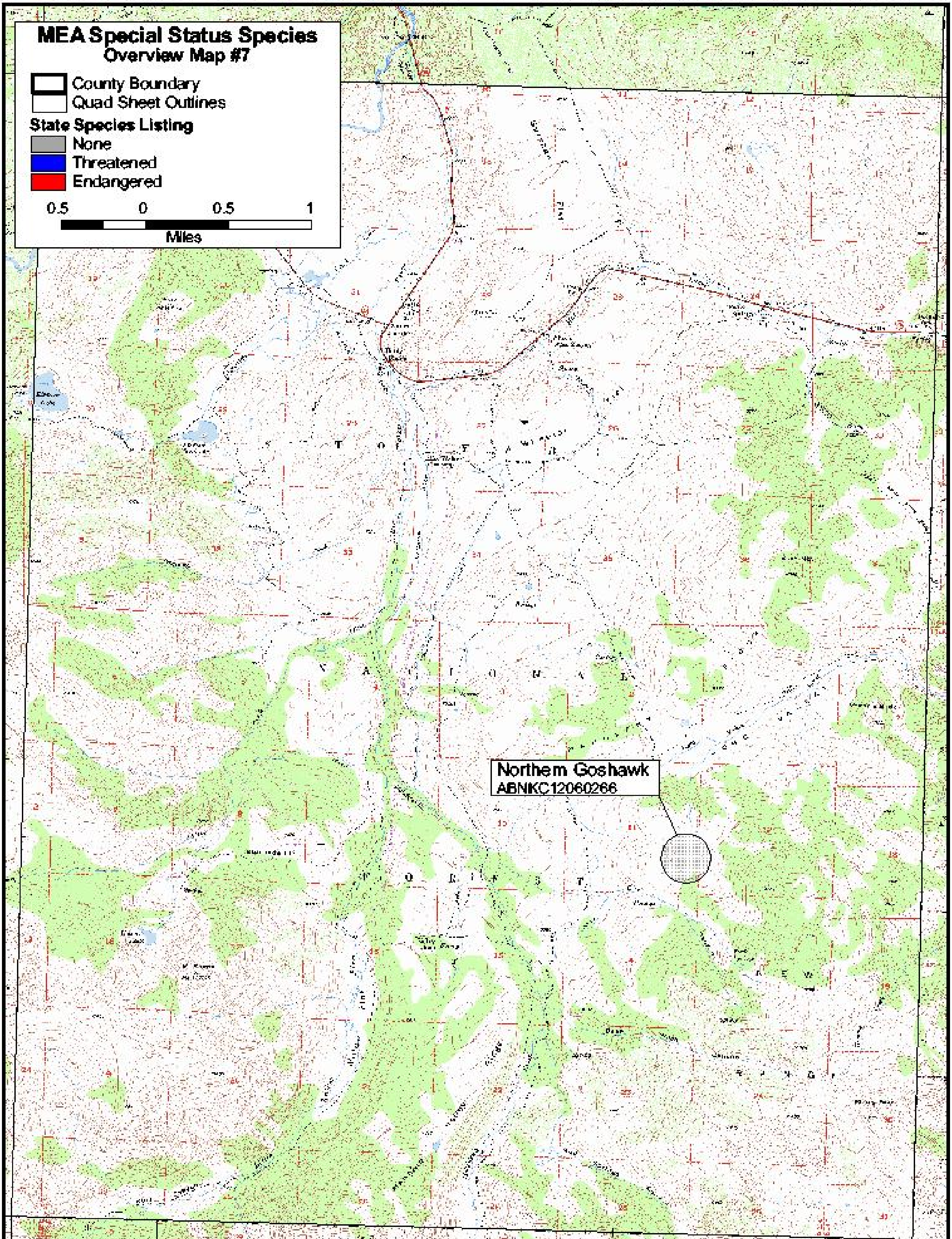


Figure 28
Mono County MEA – 2001

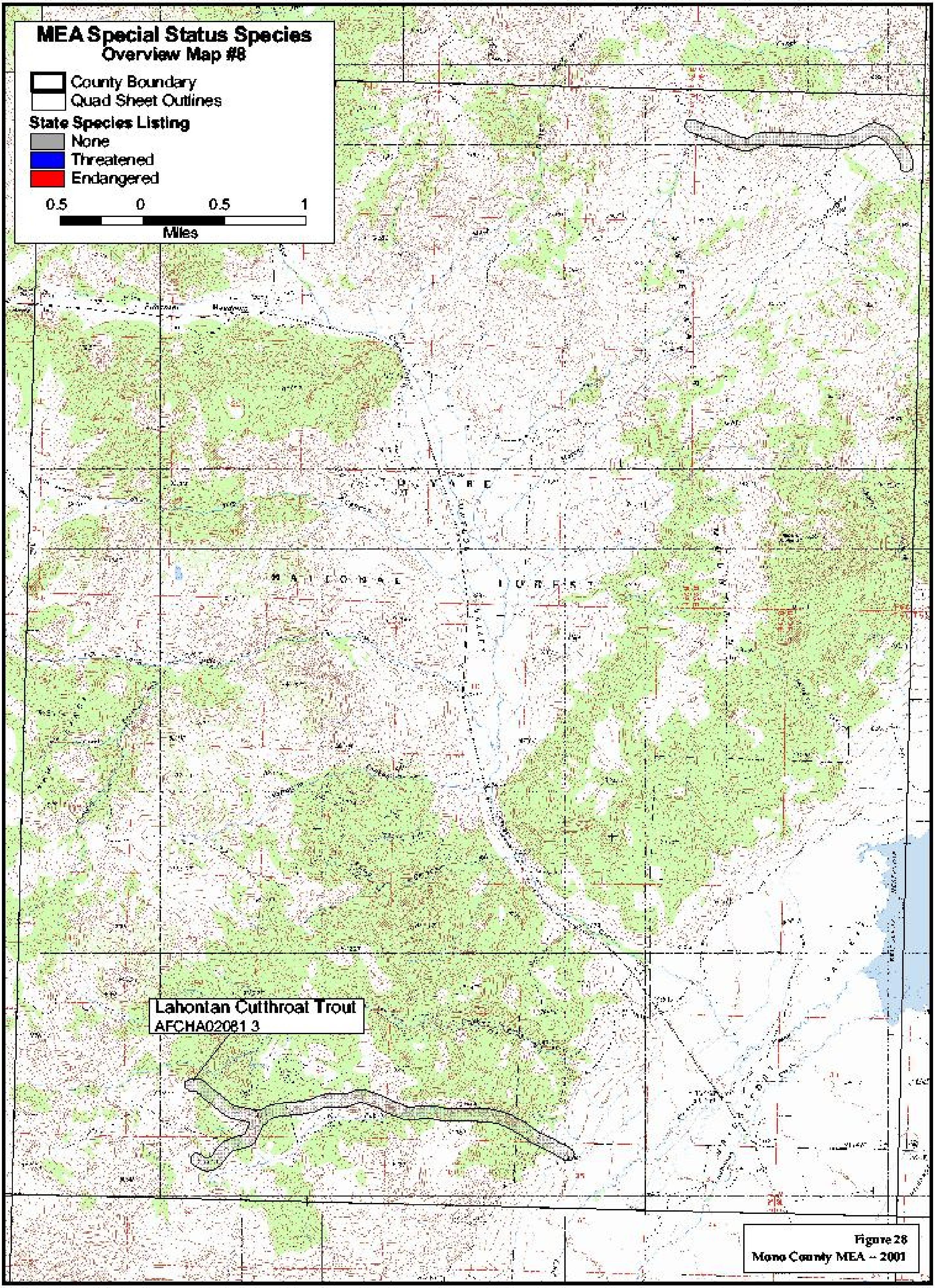


Figure 28
Mono County MEA – 2001

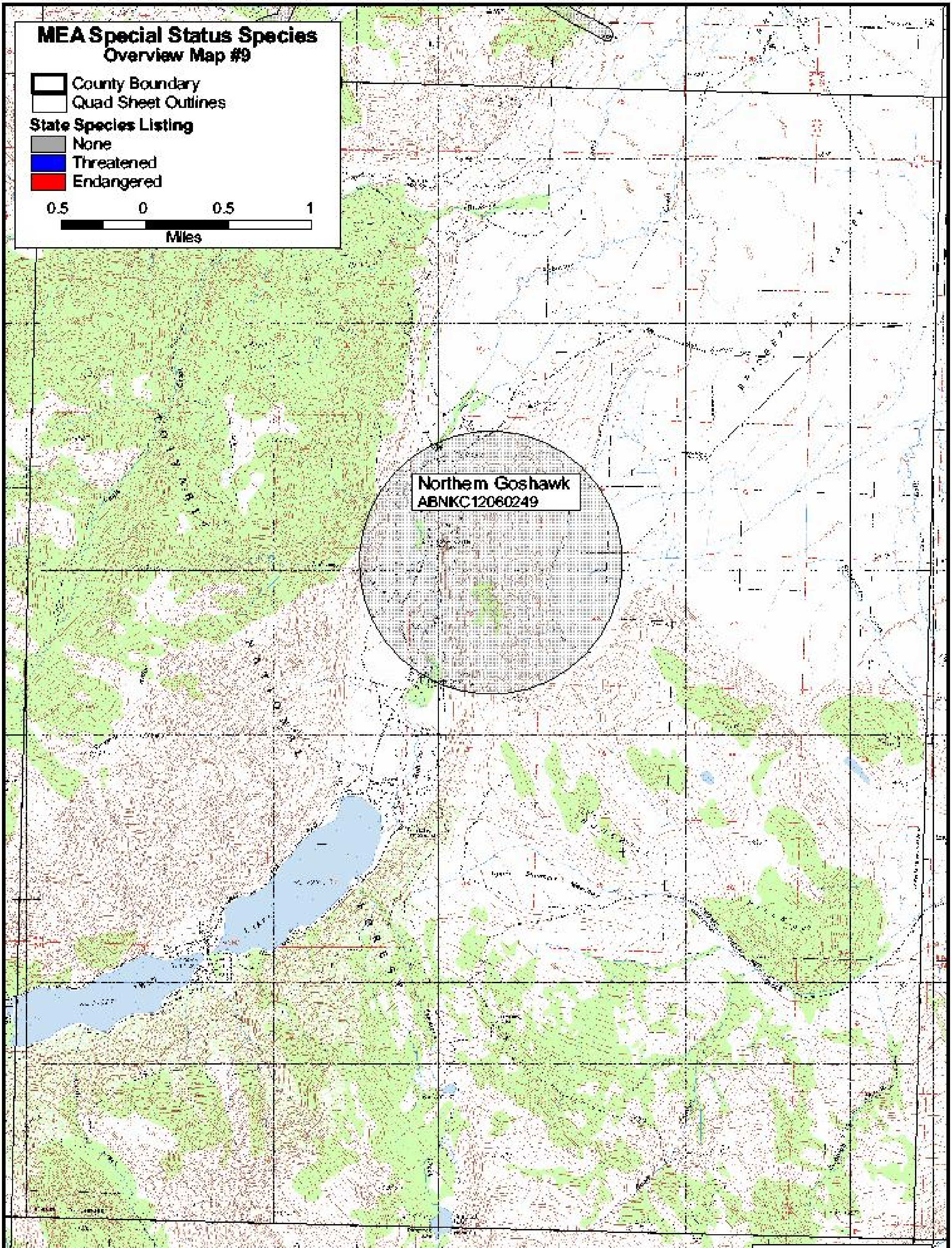
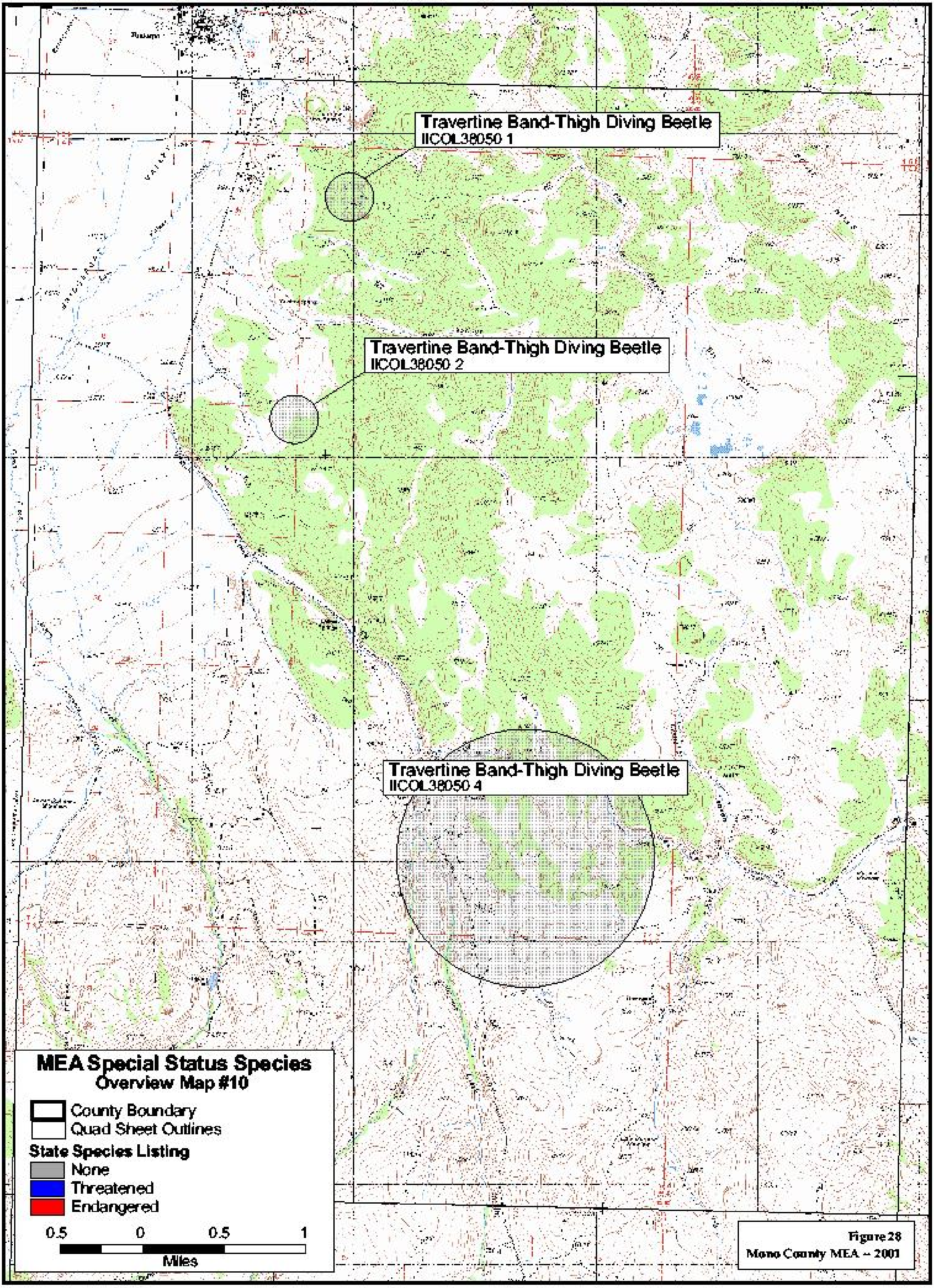
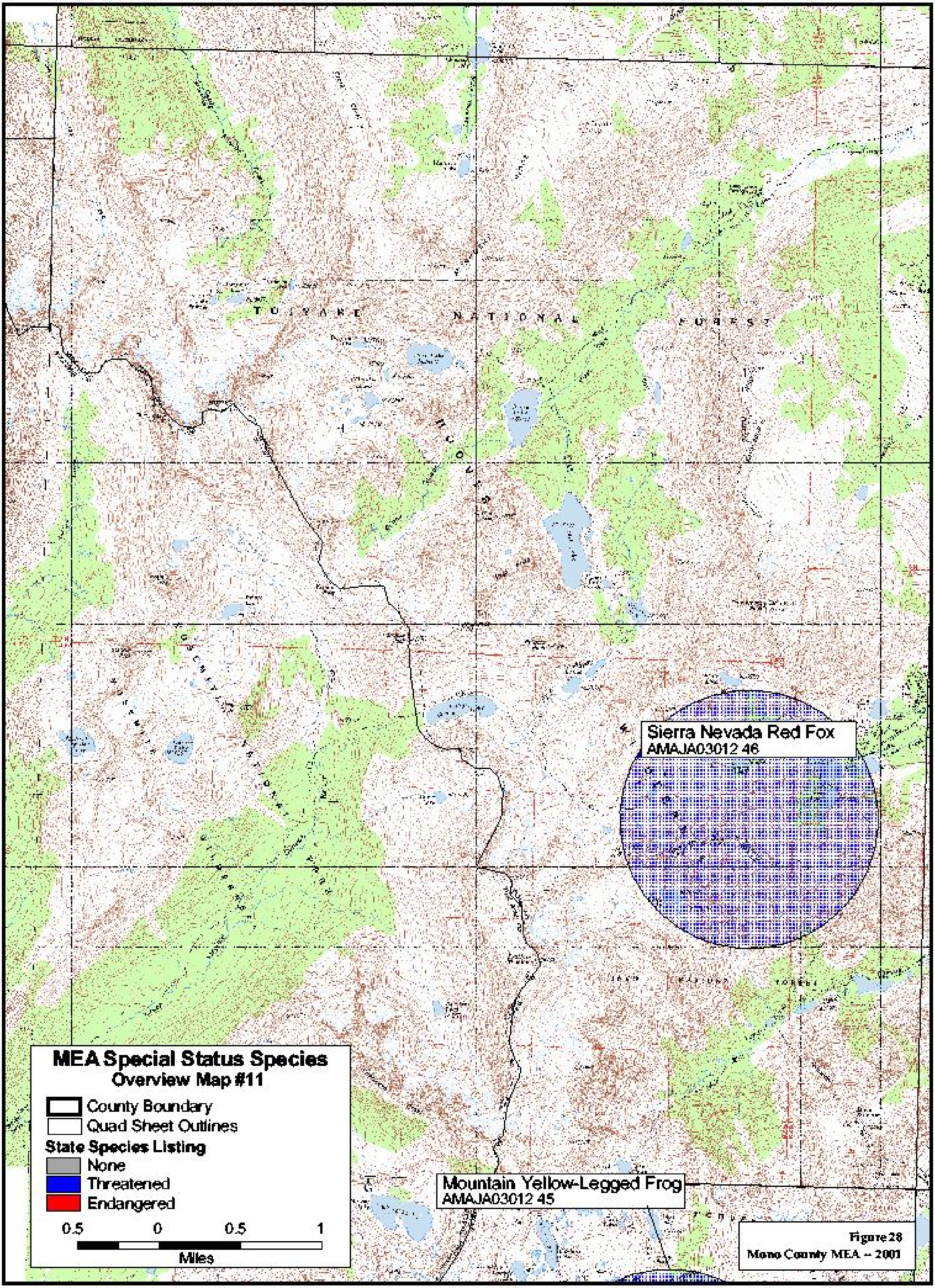


Figure 28
Mono County MEA -- 2001


Travertine Band-Thigh Diving Beetle
IICOL38050 1
Travertine Band-Thigh Diving Beetle
IICOL38050 2
Travertine Band-Thigh Diving Beetle
IICOL38050 4
MEA Special Status Species
Overview Map #10
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5
0
0.5
1
Miles
Figure 28
Mono County MEA -- 2001


TOIYABE NATIONAL FOREST
Sierra Nevada Red Fox
AMAJA03012 46
Mountain Yellow-Legged Frog
AMAJA03012 45
MEA Special Status Species
Overview Map #11
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Figure 28
Mono County MEA ~ 2001

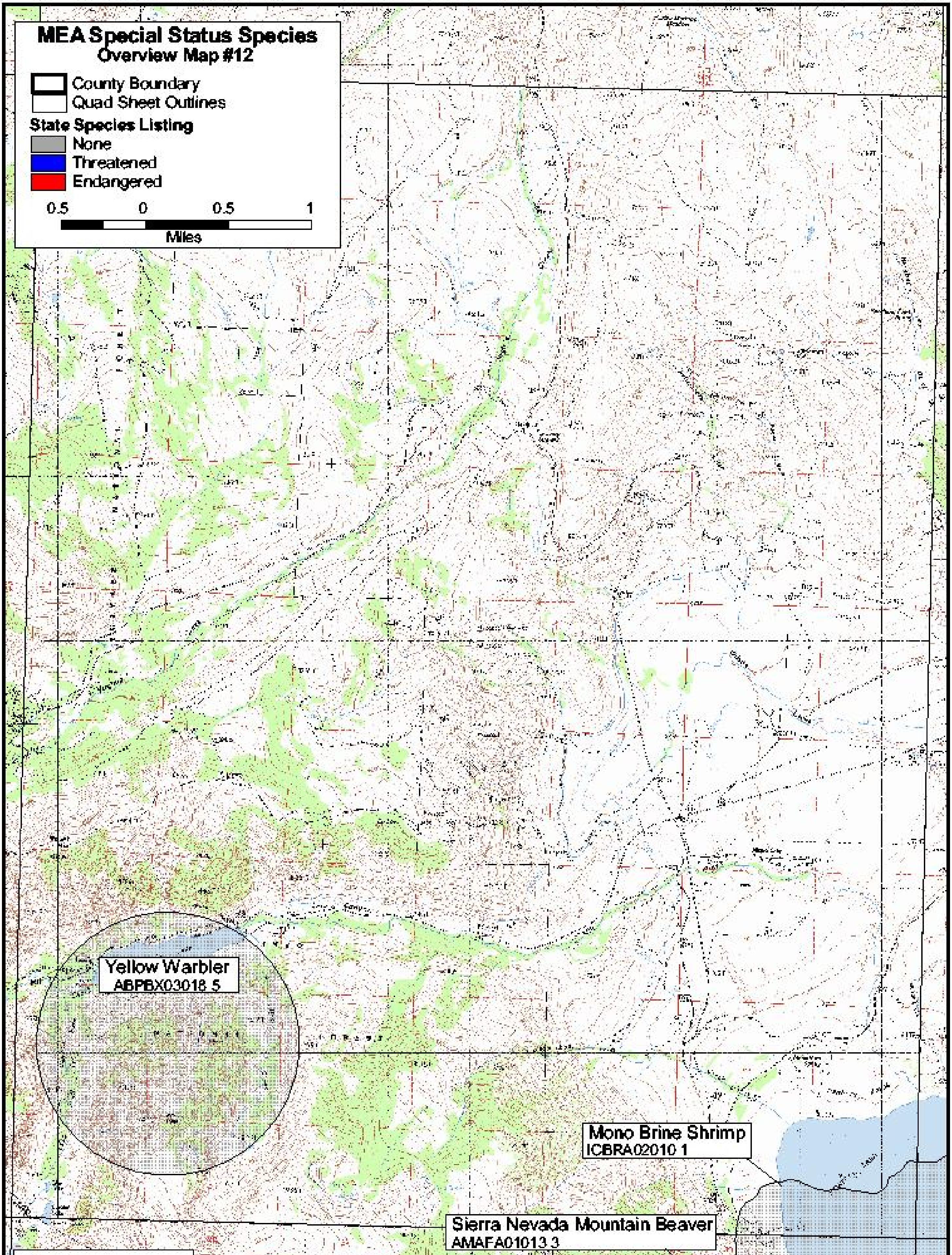
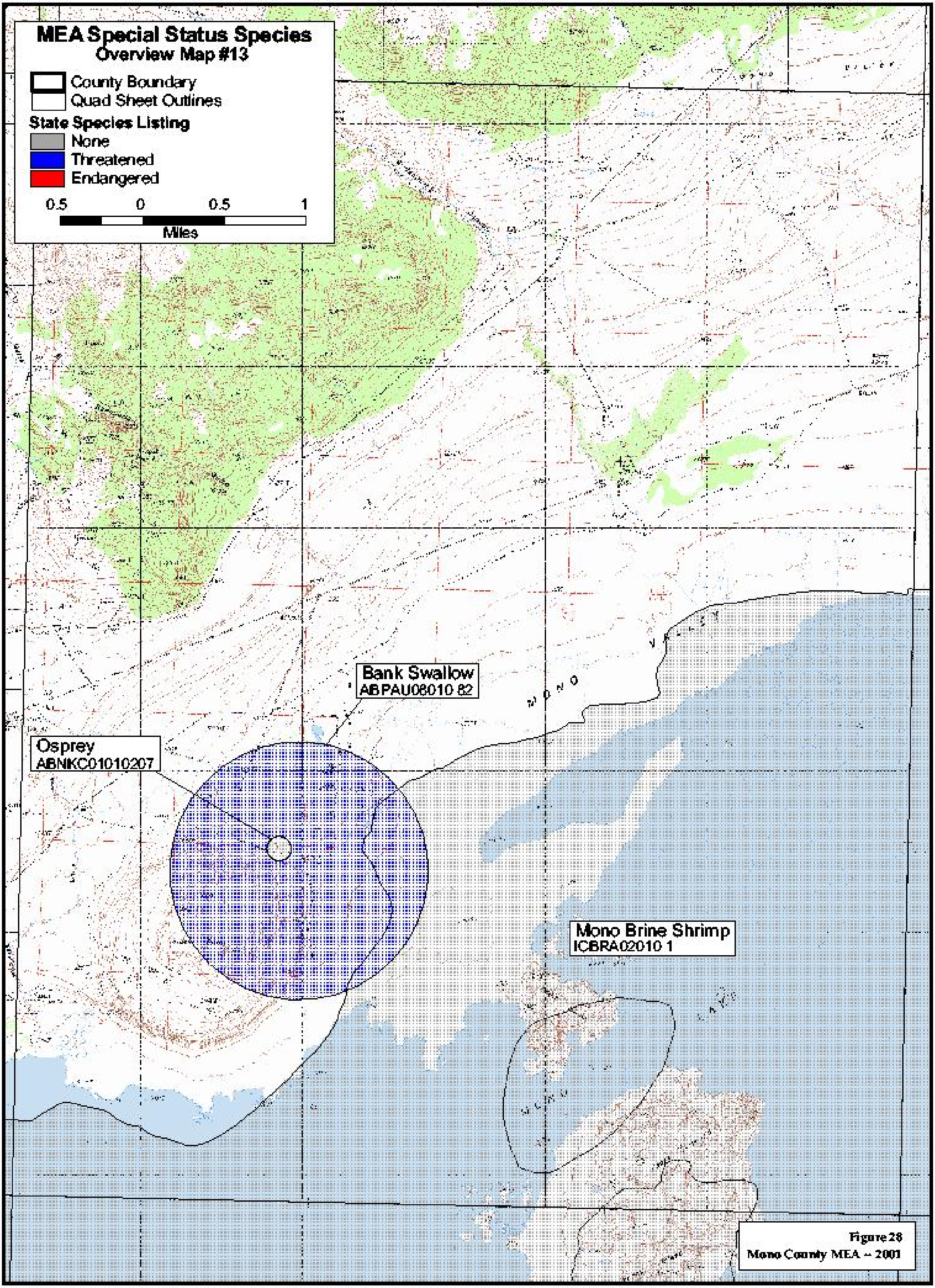


Figure 28
Mono County MEA -- 2001



MEA Special Status Species
Overview Map #13
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Bank Swallow
ABPAU08010 82
Osprey
ABNKC01010207
MONO VALLEY
Mono Brine Shrimp
ICBRA02010 1
Figure 28
Mono County MEA -- 2001

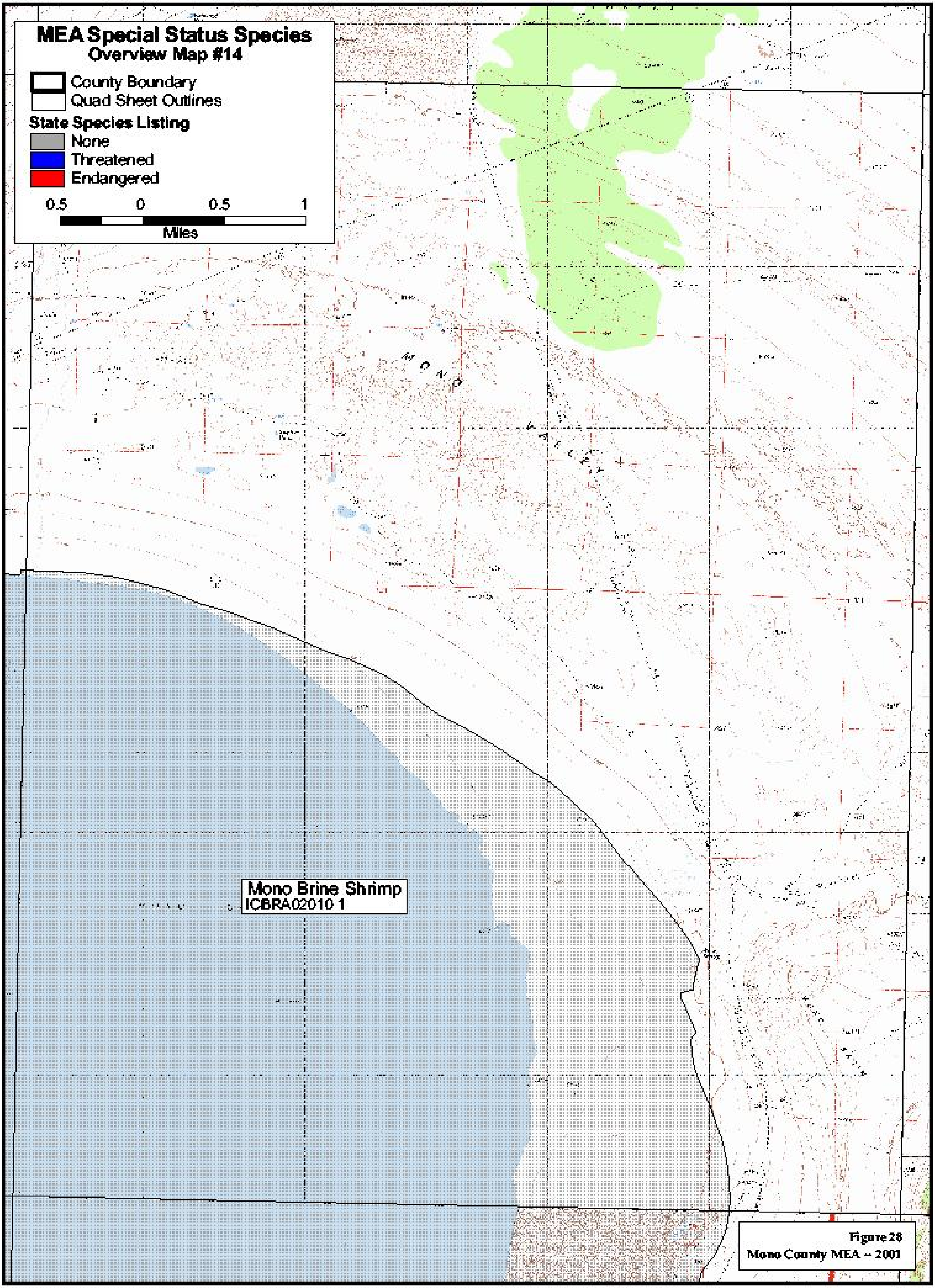


Figure 28
Mono County MEA – 2001

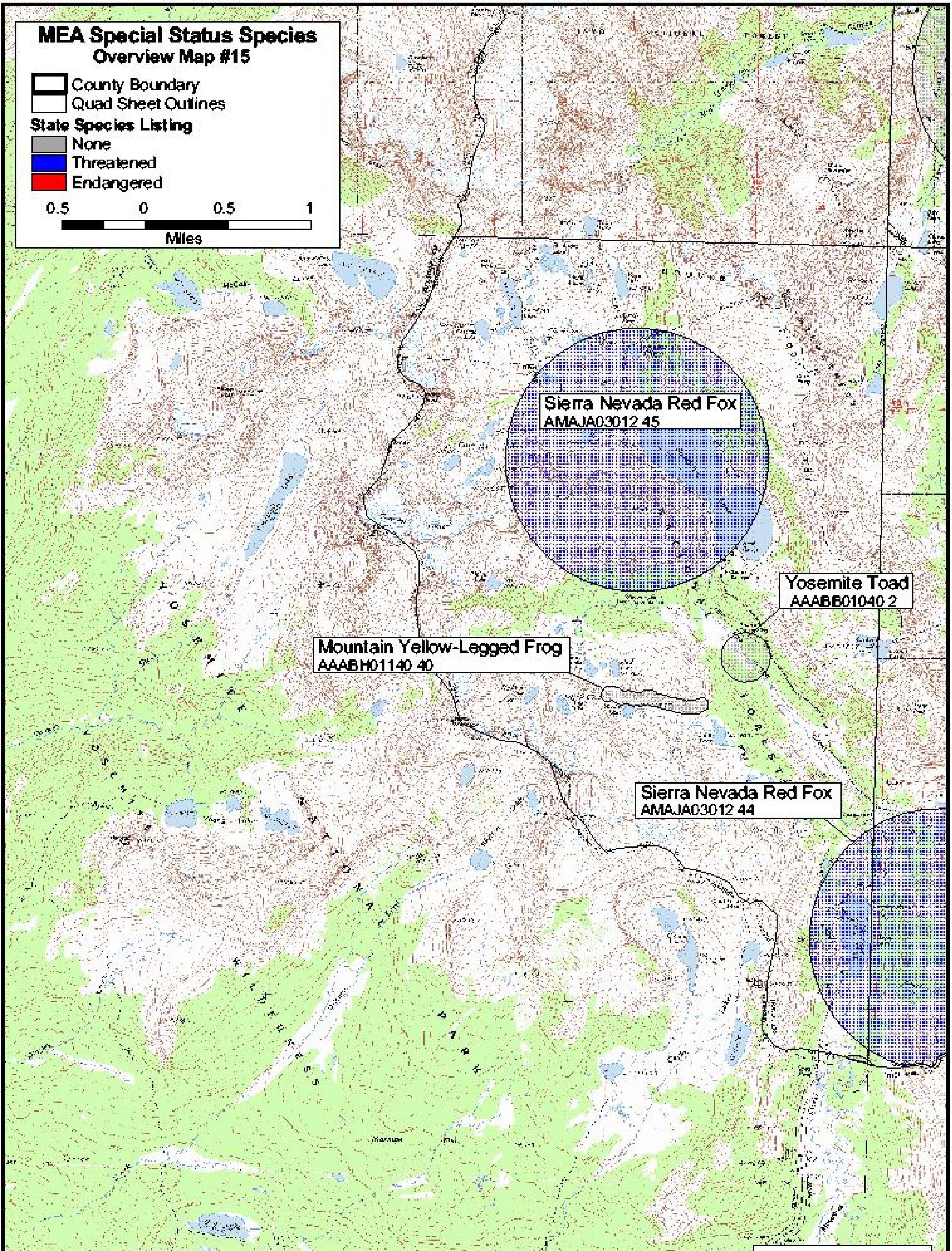
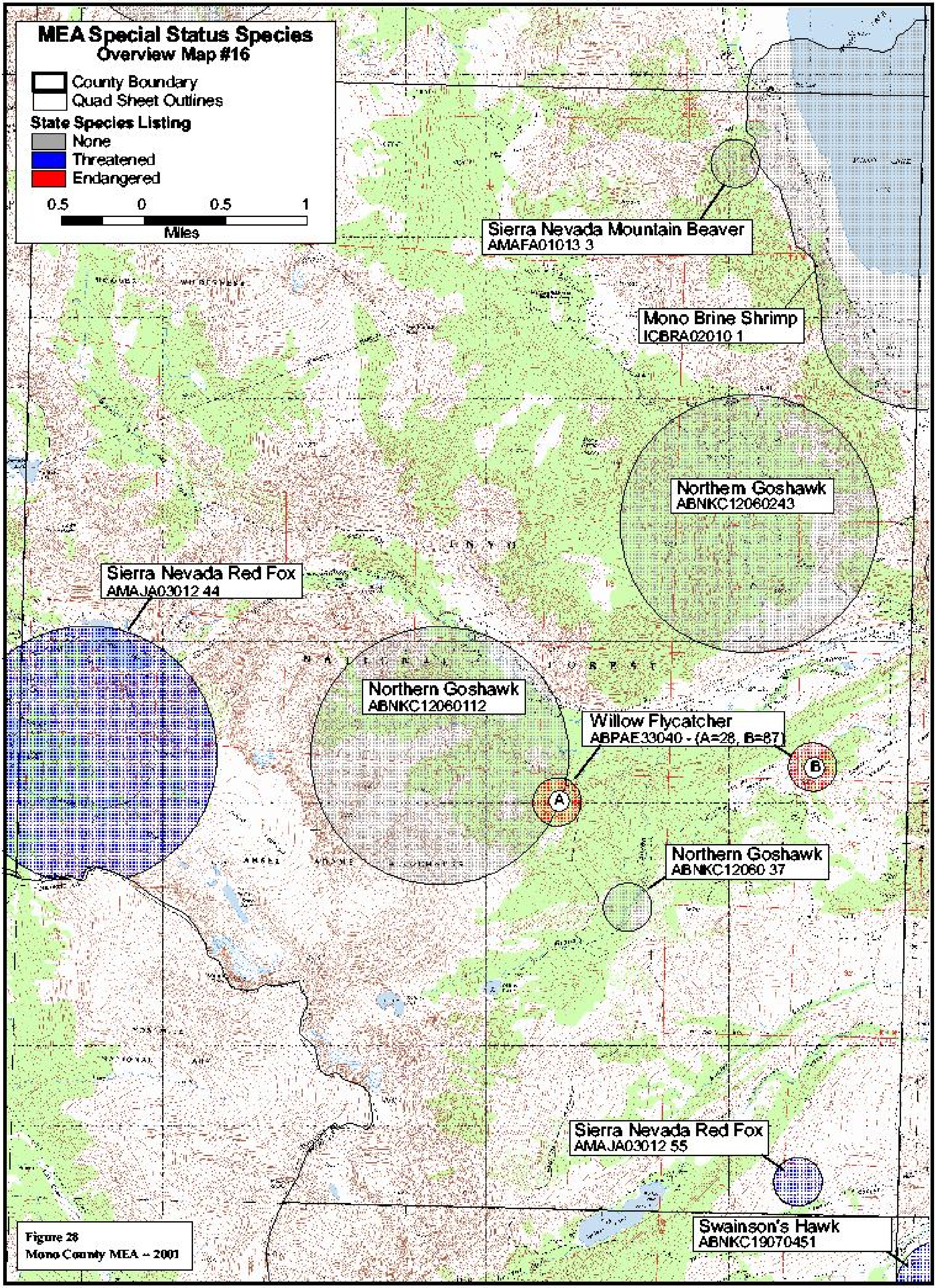
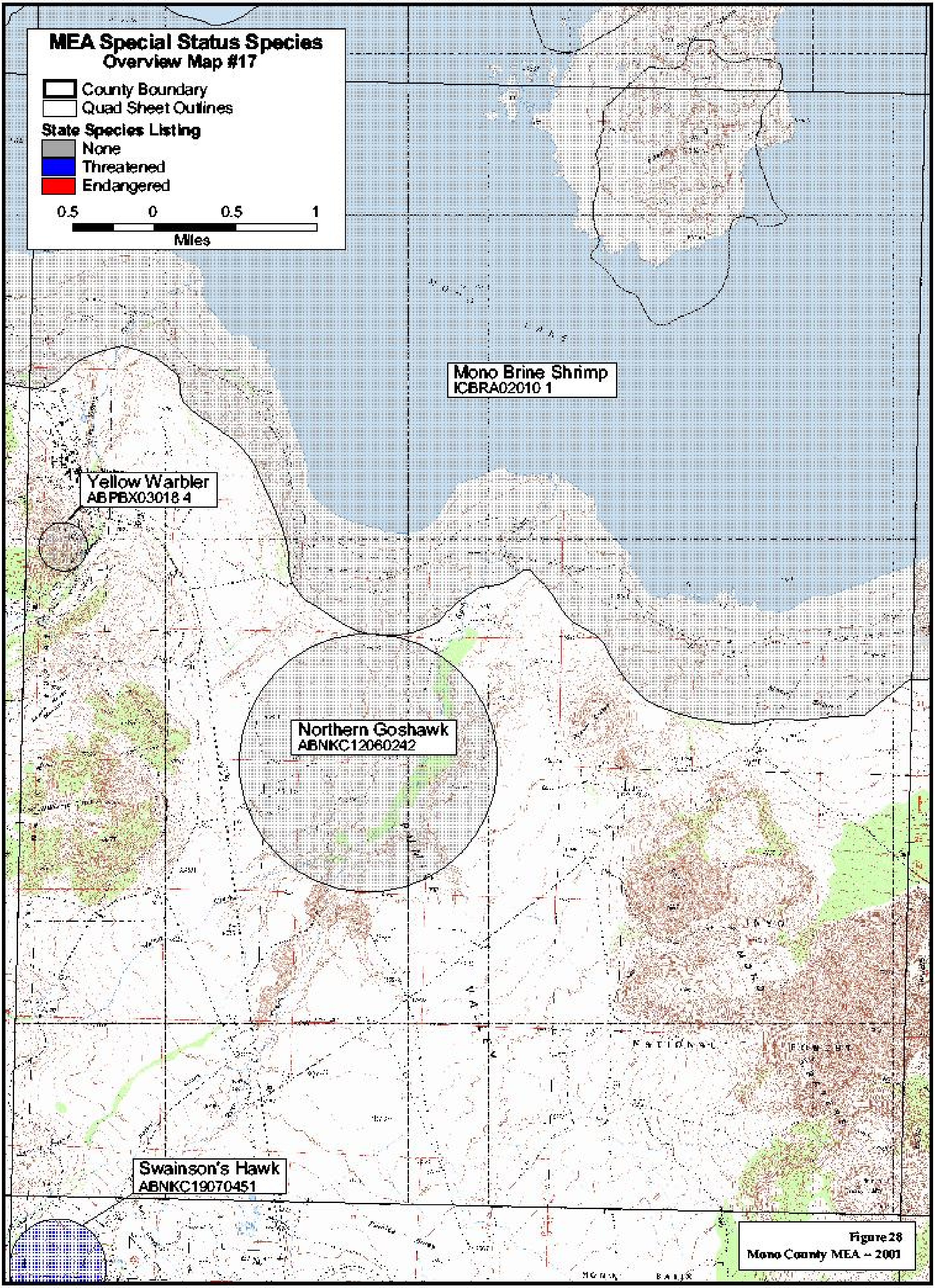
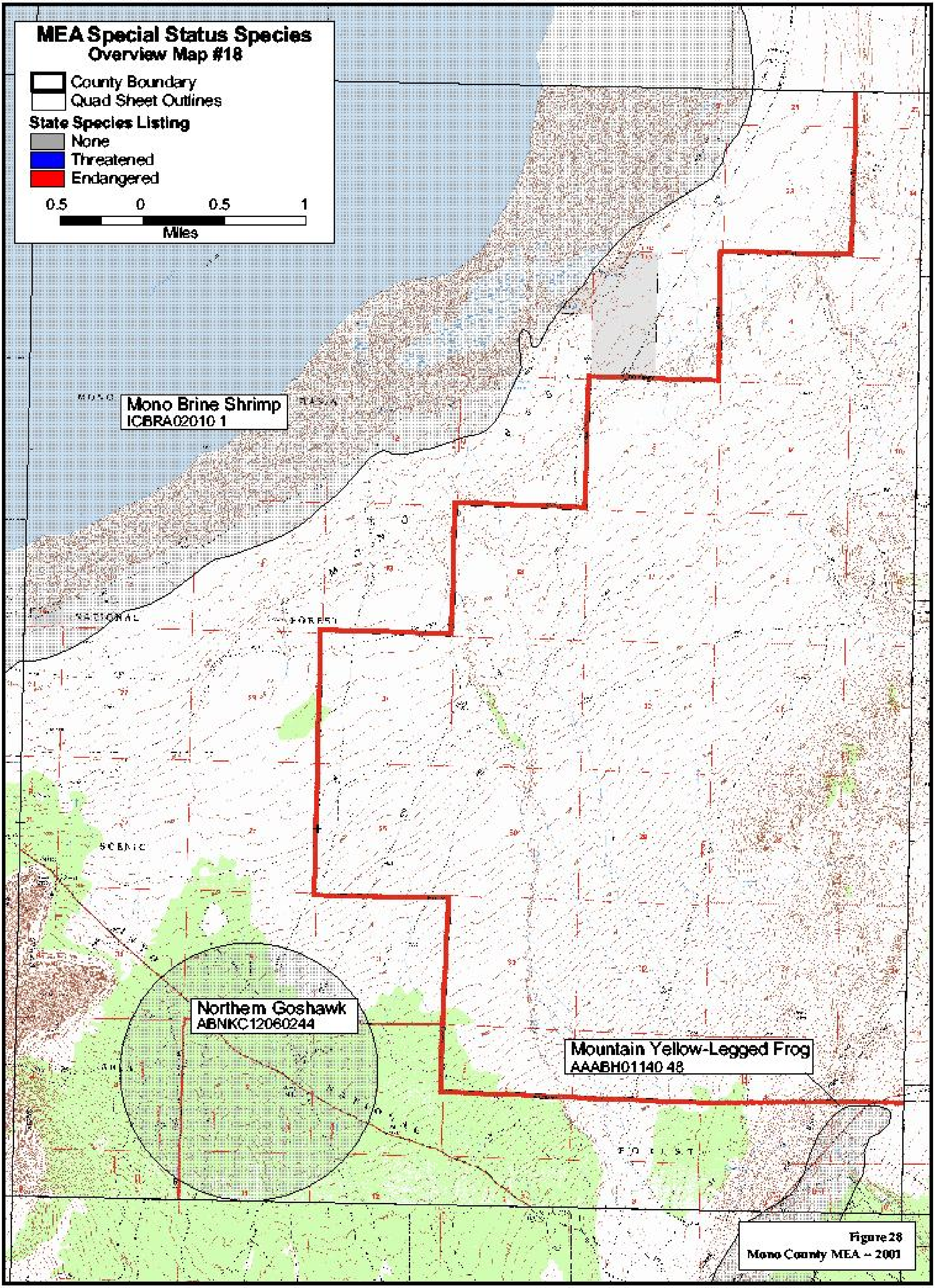


Figure 28
Mono County MEA -- 2001



MEA Special Status Species
Overview Map #16
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Sierra Nevada Mountain Beaver
AMAFA01013 3
Mono Brine Shrimp
ICBRA02010 1
Northern Goshawk
ABNKC12060243
Sierra Nevada Red Fox
AMAJA03012 44
Northern Goshawk
ABNKC12060112
Willow Flycatcher
ABPAE33040 - (A=28, B=87)
A
B
Northern Goshawk
ABNKC12060 37
Sierra Nevada Red Fox
AMAJA03012 55
Swainson's Hawk
ABNKC19070451
Figure 28
Mono County MEA -- 2001


MEA Special Status Species
Overview Map #17
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Mono Brine Shrimp
ICBRA02010 1
Yellow Warbler
ABPBX03018 4
Northern Goshawk
ABNKC12060242
Swainson's Hawk
ABNKC19070451
Figure 28
Mono County MEA ~ 2001


MEA Special Status Species
Overview Map #18
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Mono Brine Shrimp
ICBRA02010 1
Northern Goshawk
ABNKC12060244
Mountain Yellow-Legged Frog
AAABH01140 48
Figure 28
Mono County MEA – 2001

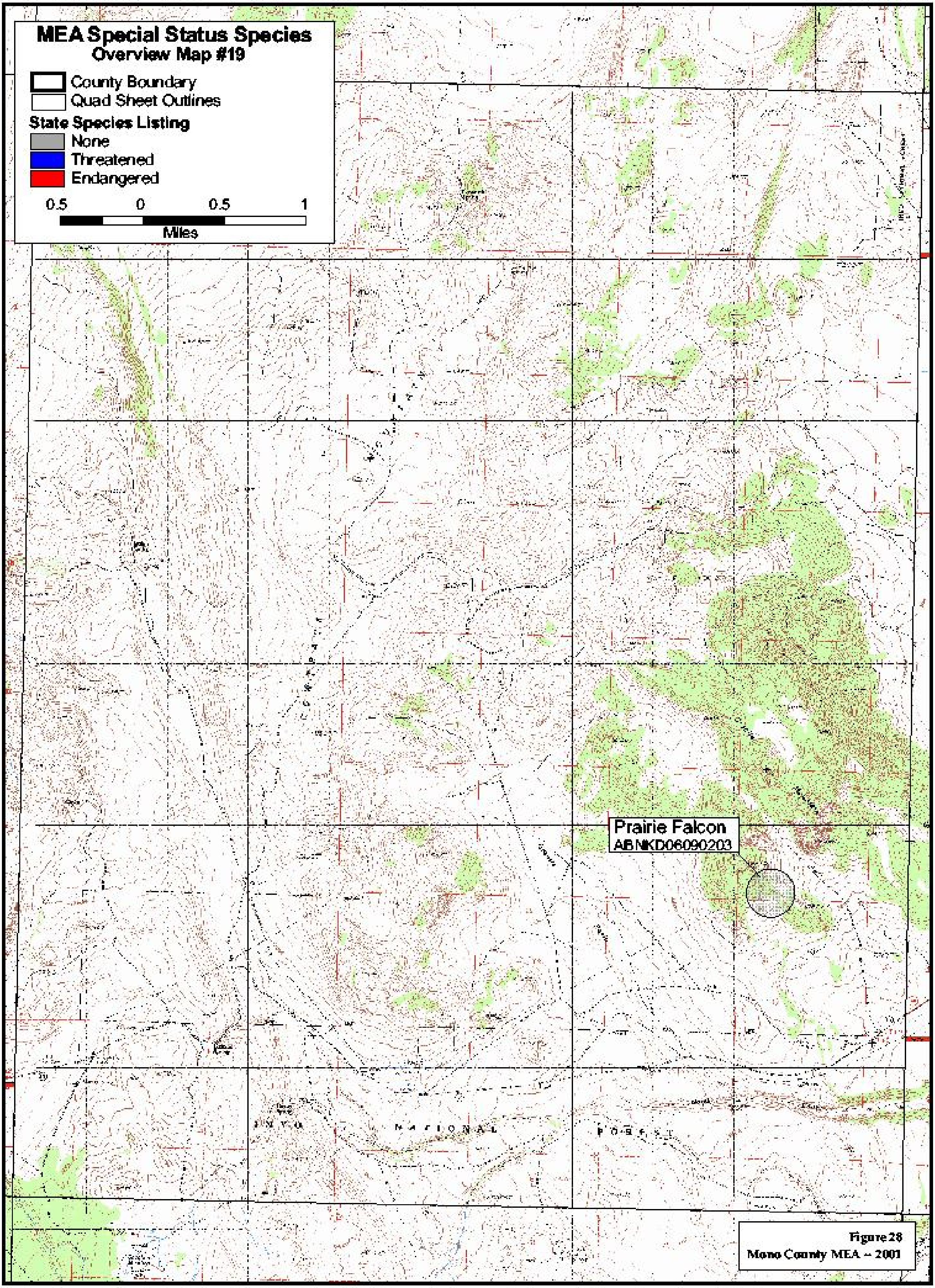
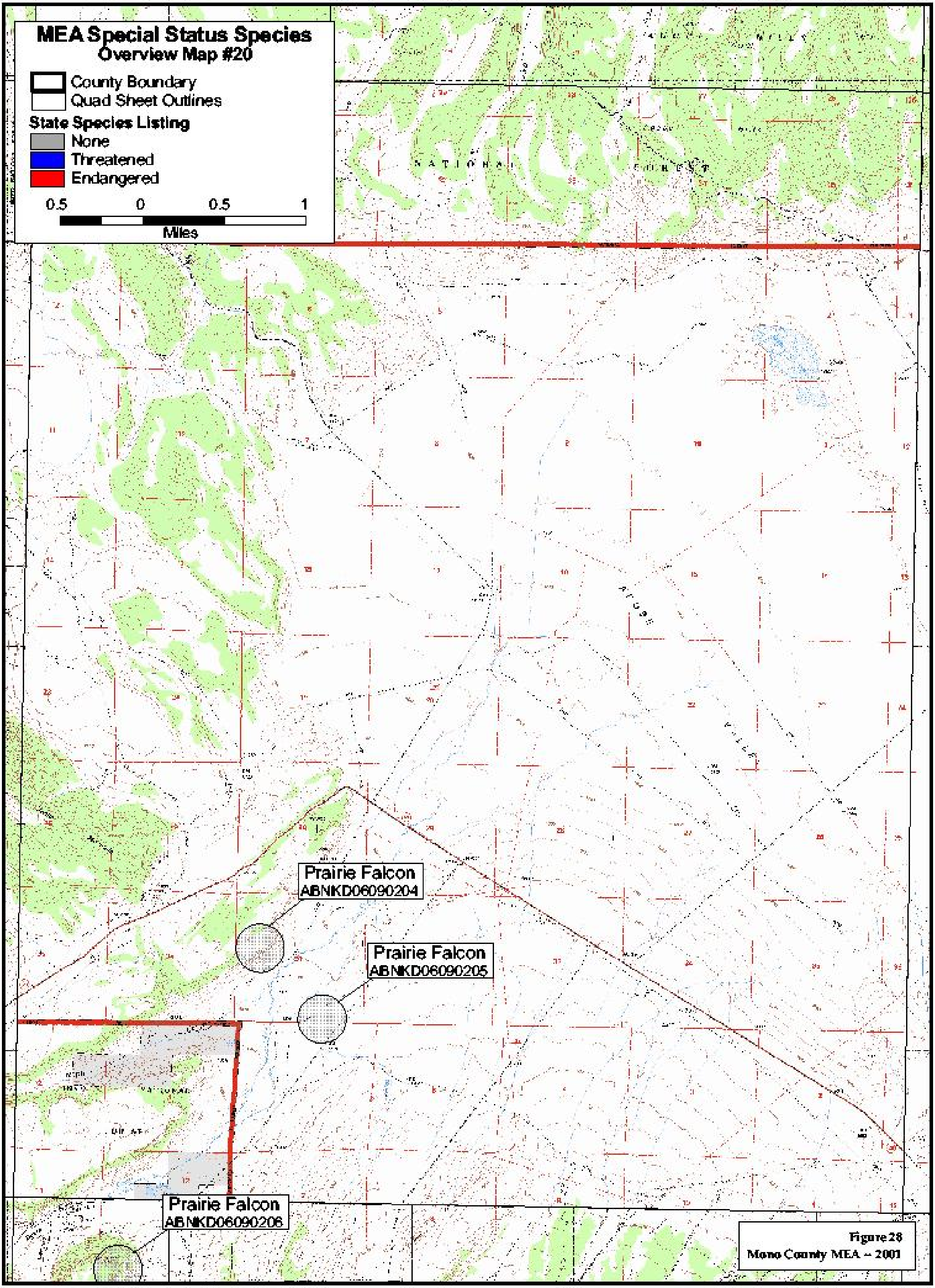
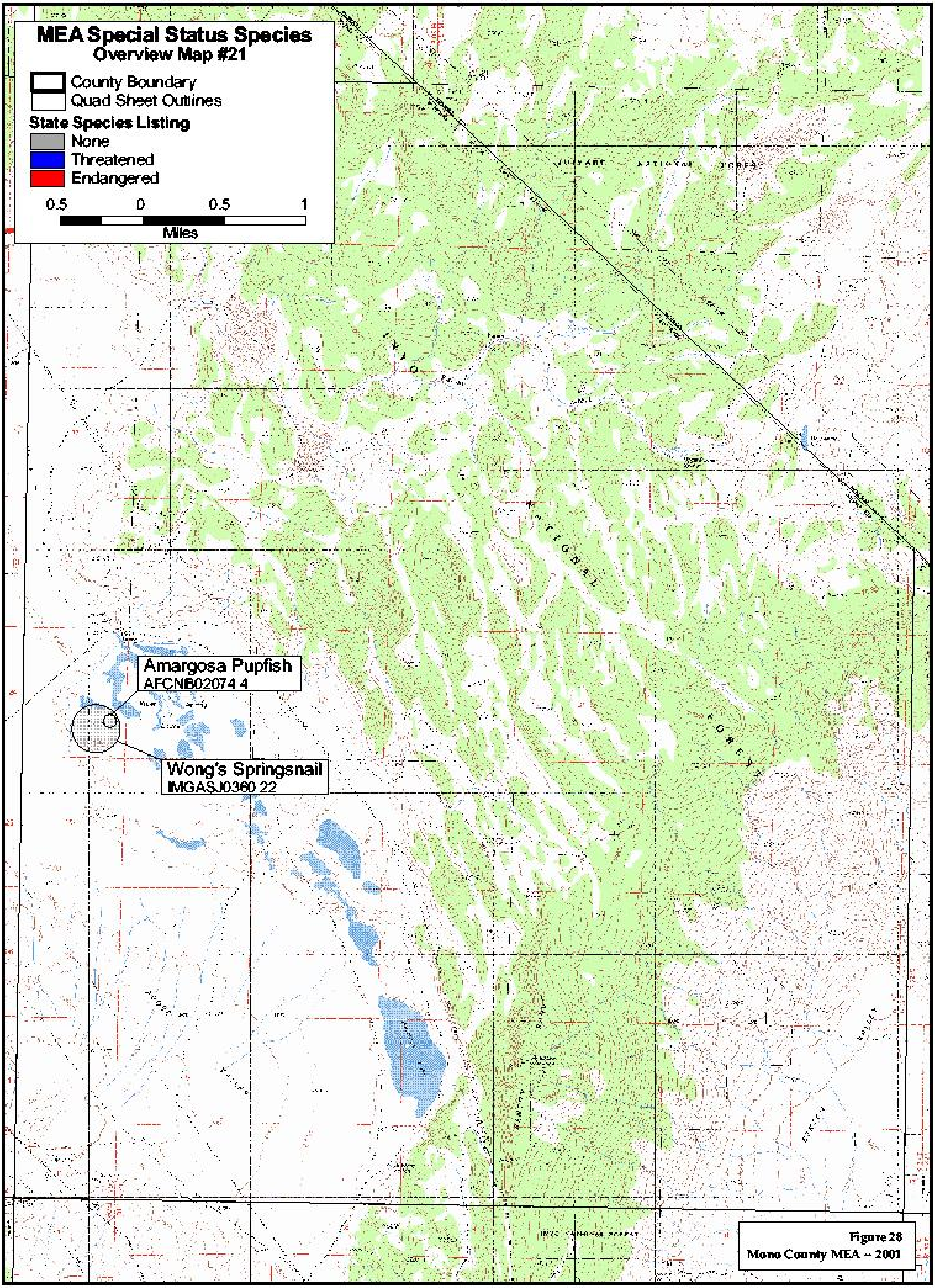


Figure 28
Mono County MEA ~ 2001



MEA Special Status Species
Overview Map #20
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5
0
0.5
1
Miles
Prairie Falcon
ABNKD06090204
Prairie Falcon
ABNKD06090205
Prairie Falcon
ABNKD06090206
Figure 28
Mono County MEA – 2001



MEA Special Status Species
Overview Map #21
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Amargosa Pupfish
AFCNB02074 4
Wong's Springsnail
IMGASJ0360 22
Figure 28
Mono County MEA -- 2001

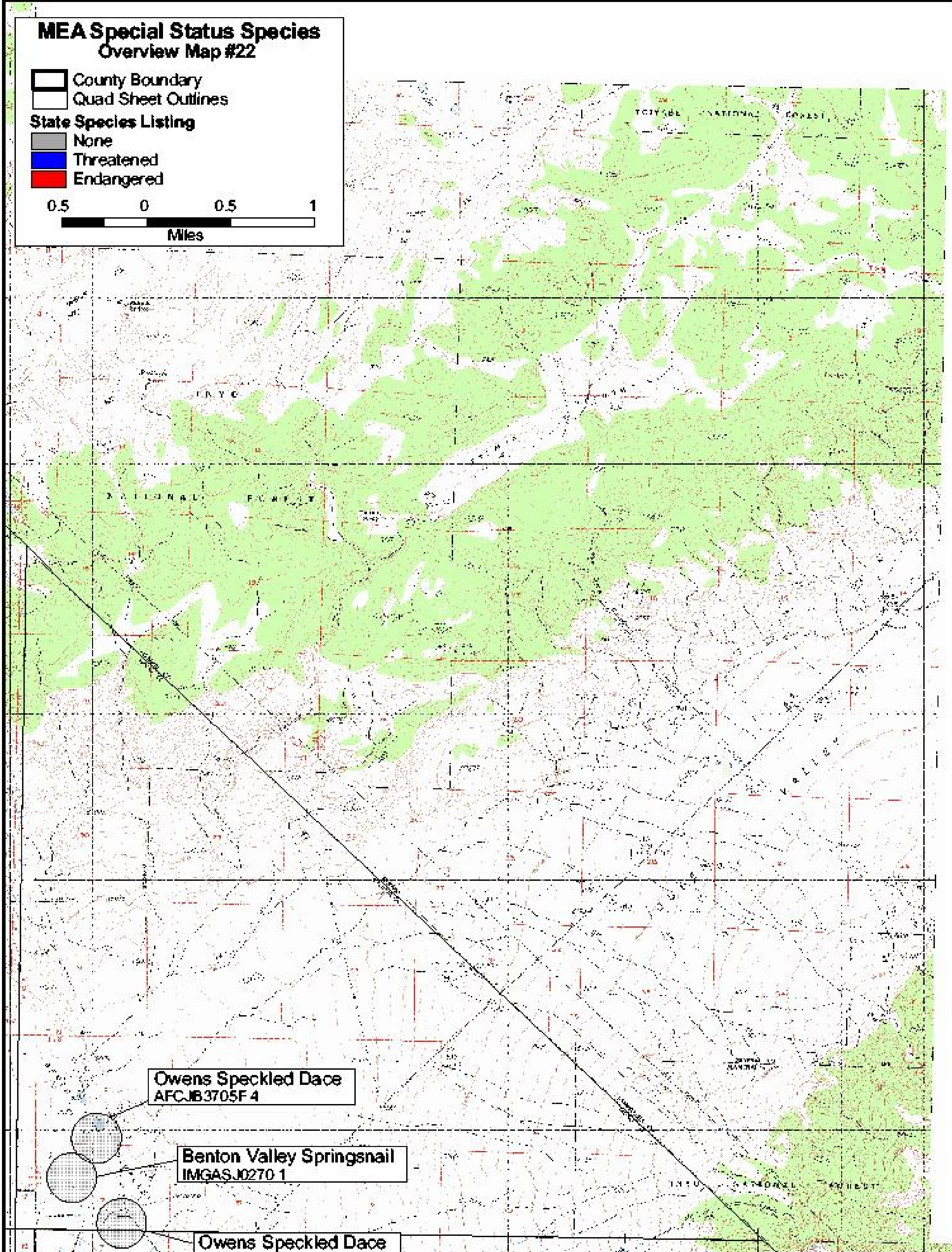


Figure 28
Mono County MEA – 2001

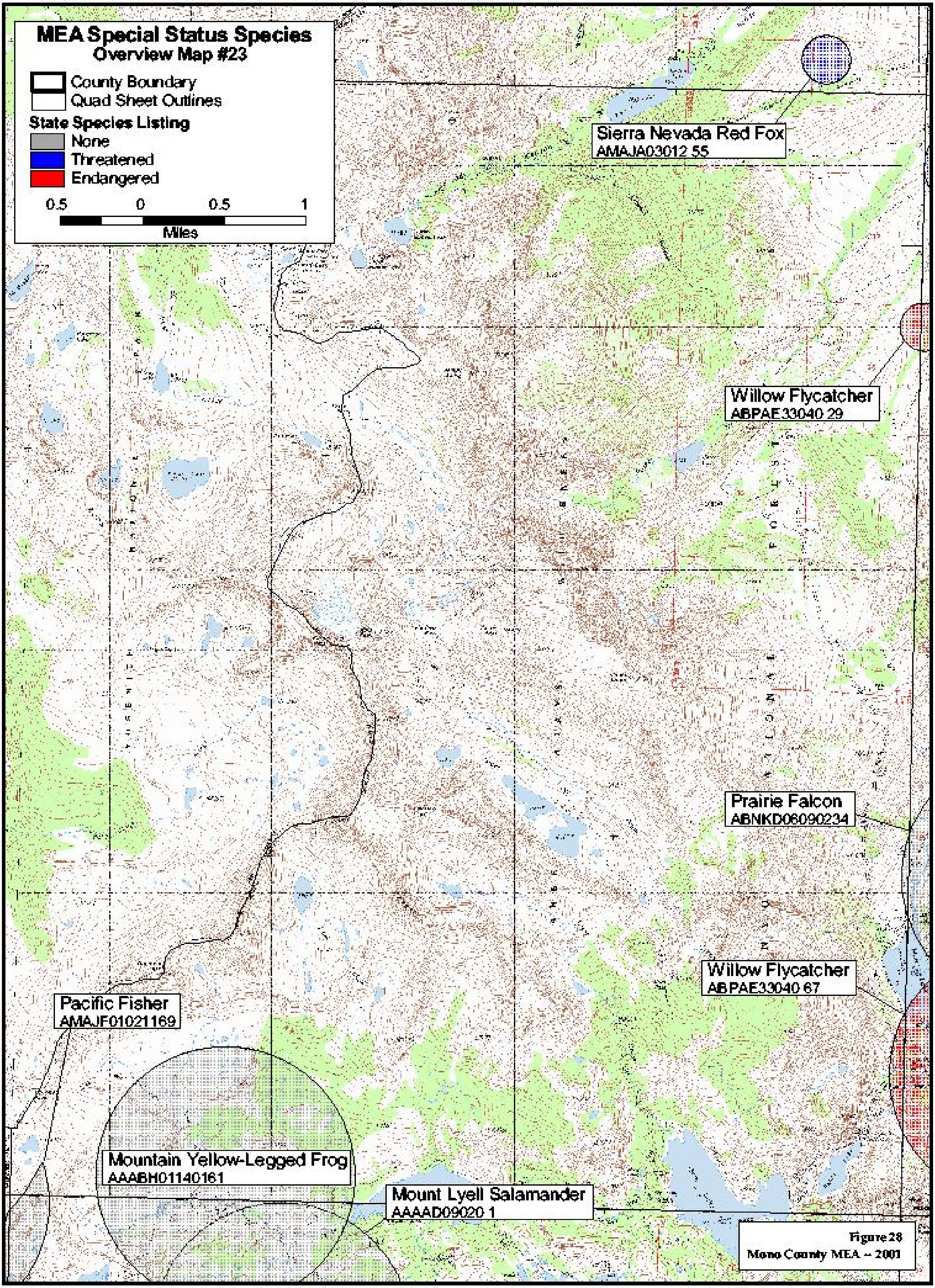


Figure 28
Mono County MEA – 2001

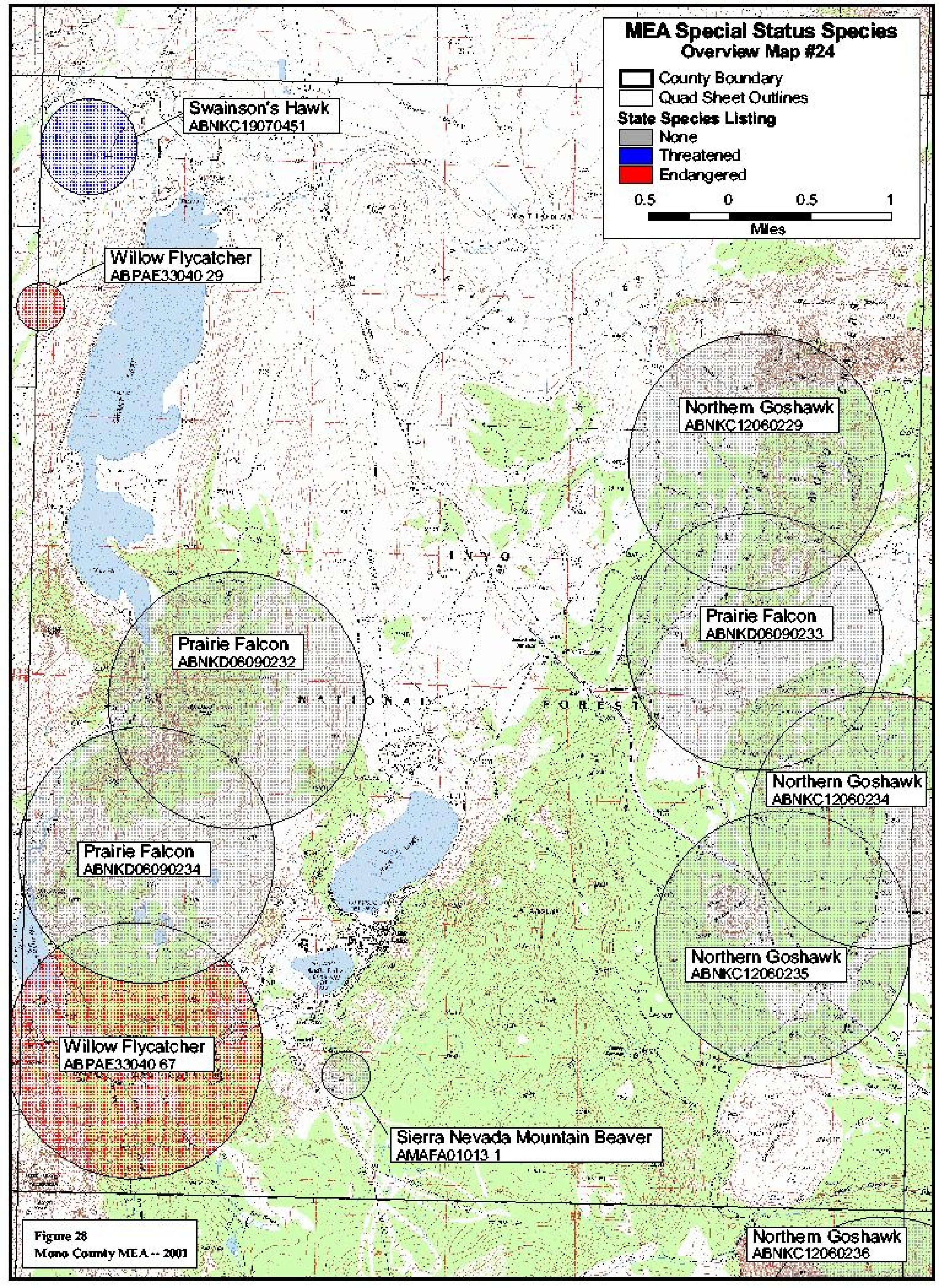
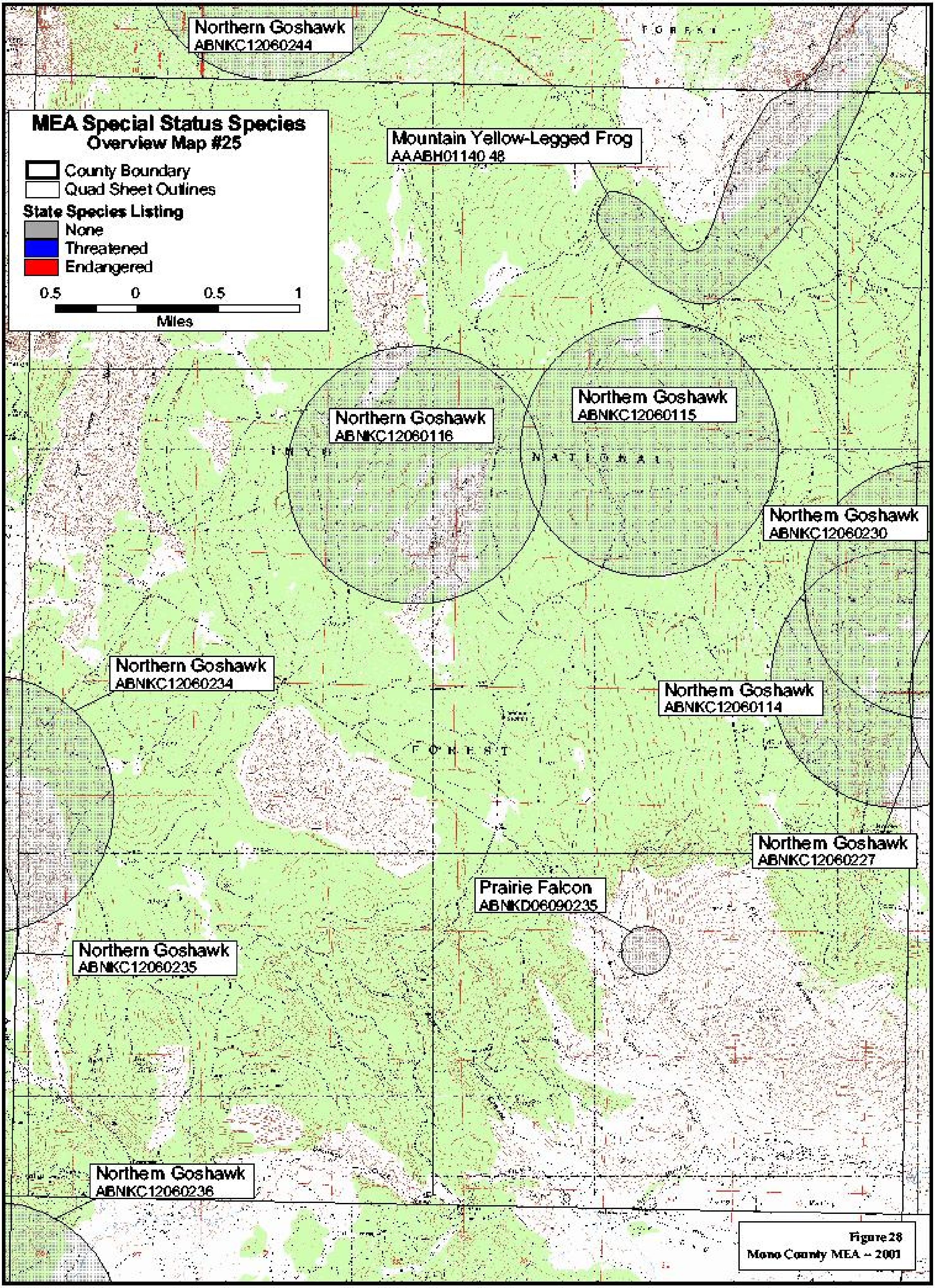


Figure 28
Mono County MEA -- 2001


MEA Special Status Species
Overview Map #25
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Northern Goshawk
ABNKC12060244
Mountain Yellow-Legged Frog
AAABH01140 48
Northern Goshawk
ABNKC12060116
Northern Goshawk
ABNKC12060115
Northern Goshawk
ABNKC12060230
Northern Goshawk
ABNKC12060234
Northern Goshawk
ABNKC12060114
Northern Goshawk
ABNKC12060227
Prairie Falcon
ABNKD06090235
Northern Goshawk
ABNKC12060235
Northern Goshawk
ABNKC12060236
INYO NATIONAL FOREST
Figure 28
Mono County MEA -- 2001

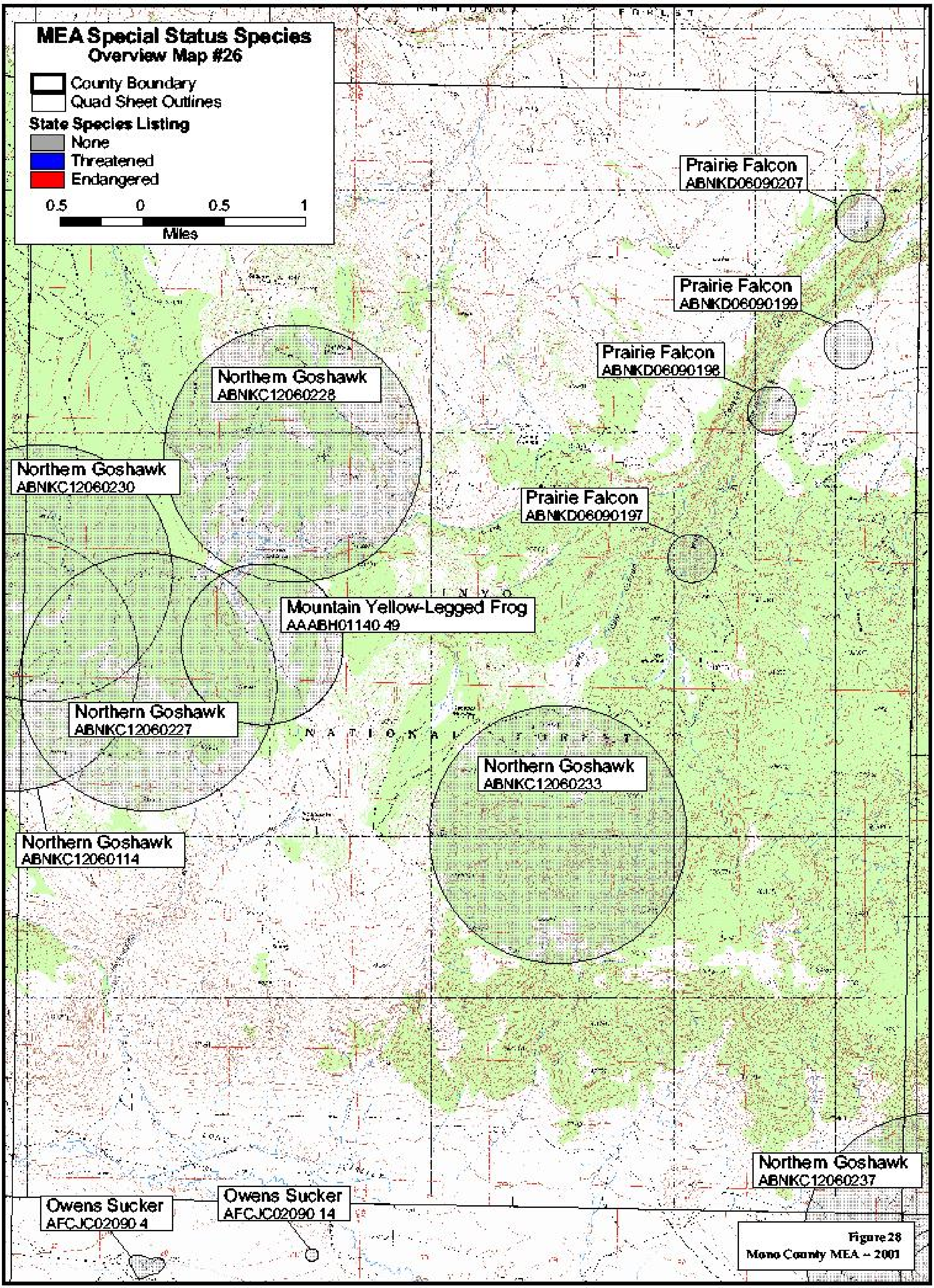
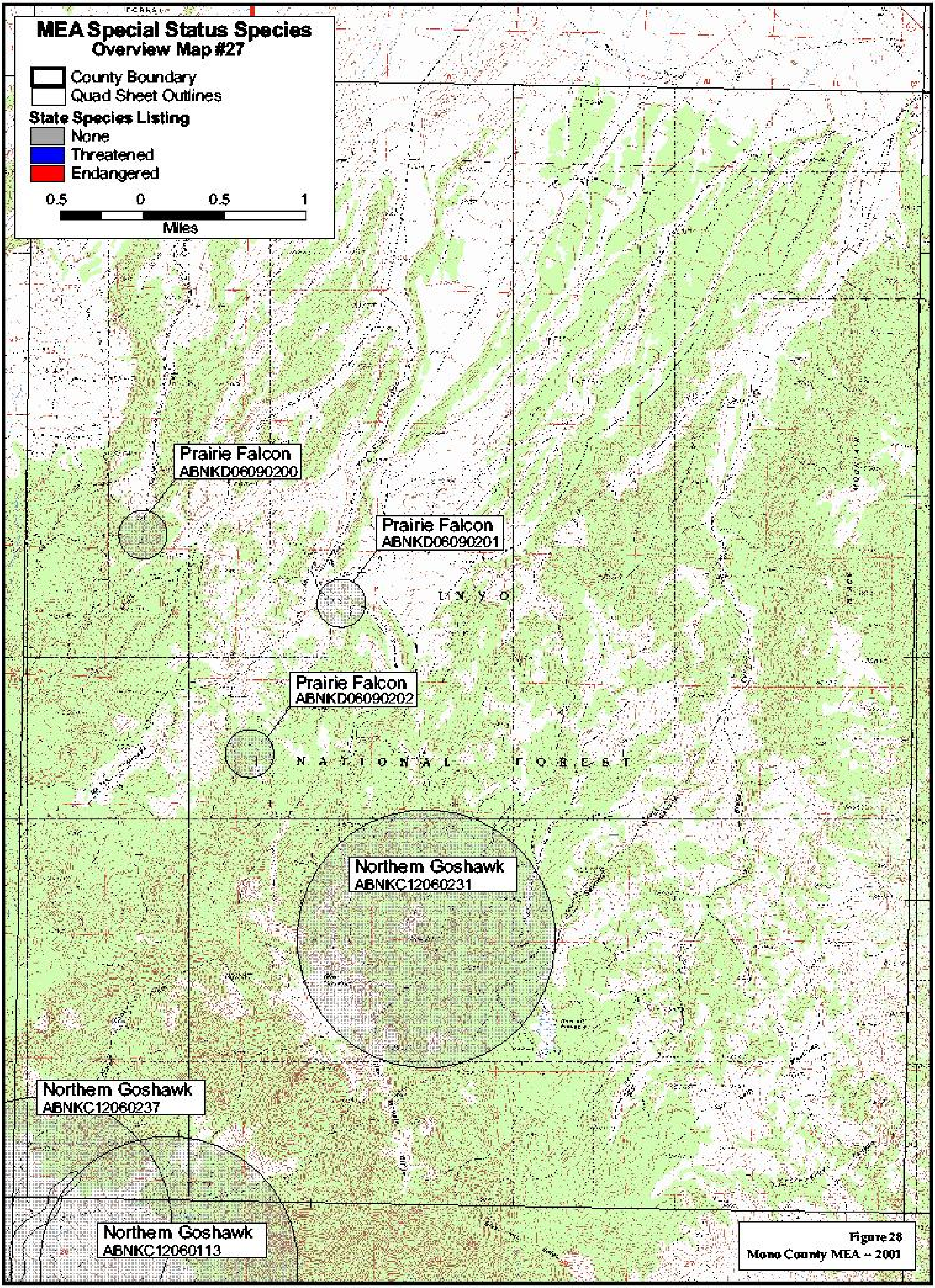
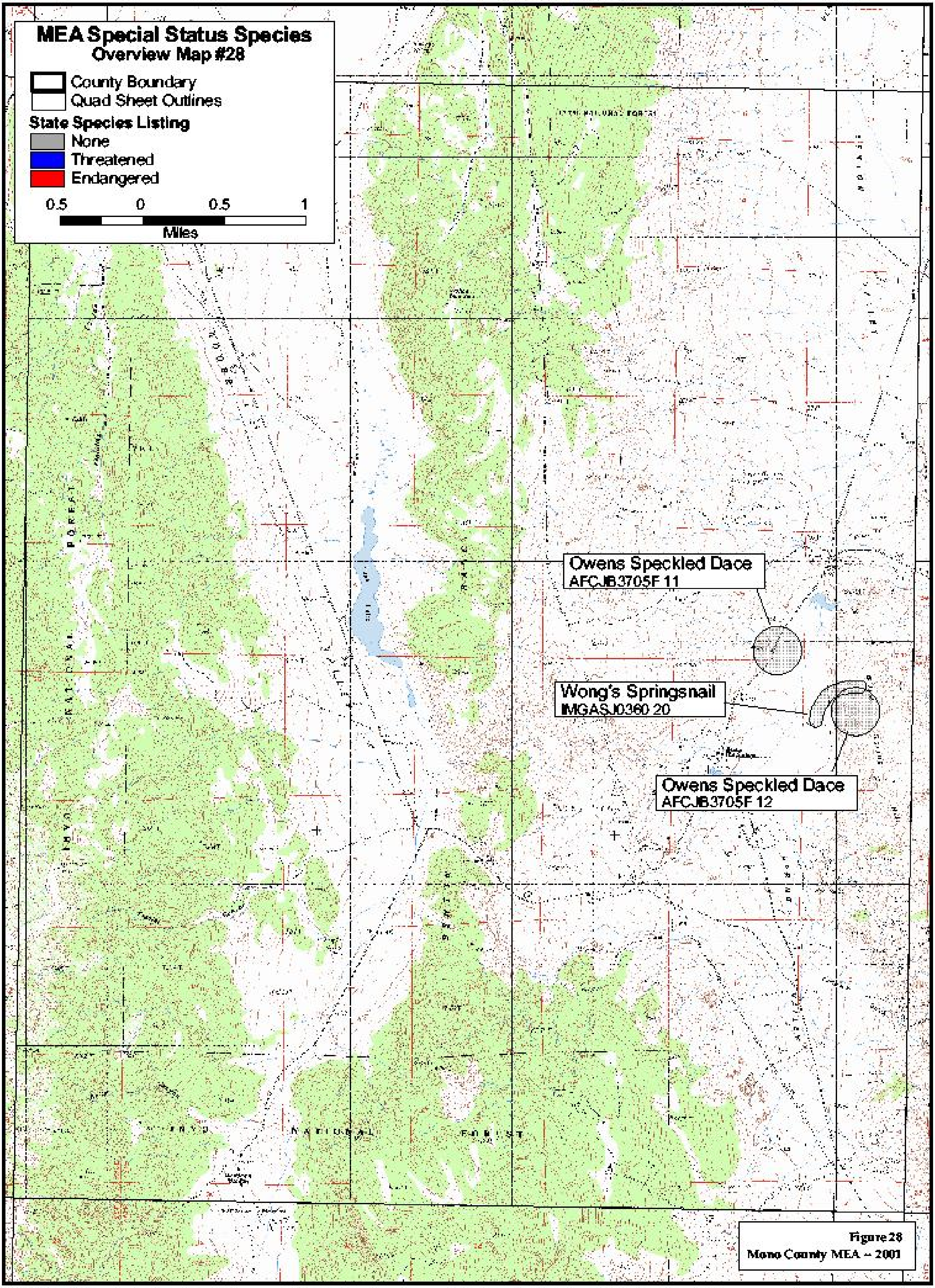
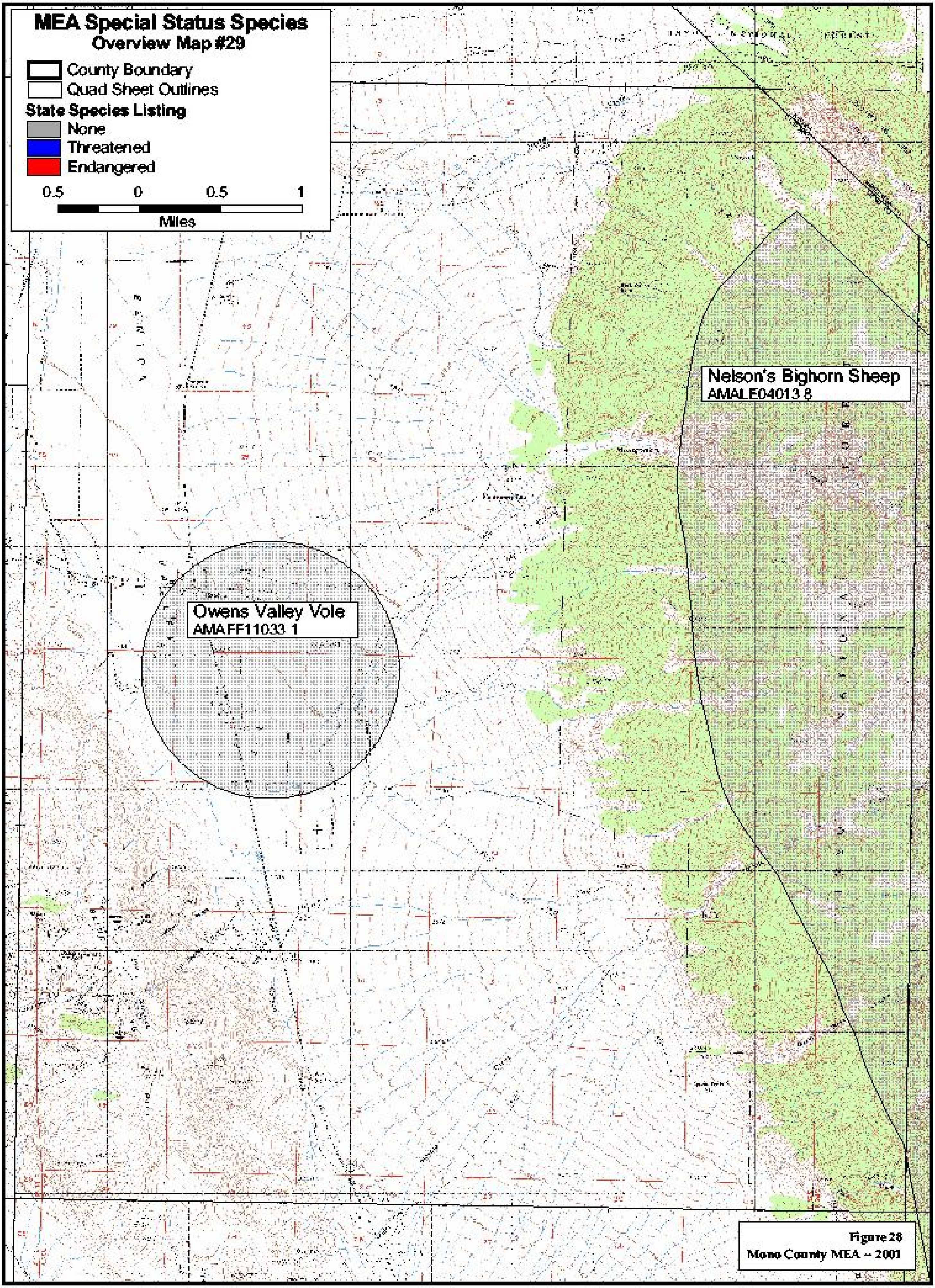


Figure 28
Mono County MEA -- 2001


MEA Special Status Species
Overview Map #27
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5
0
0.5
1
Miles
Prairie Falcon
ABNKD06090200
Prairie Falcon
ABNKD06090201
INYO
Prairie Falcon
ABNKD06090202
NATIONAL FOREST
Northern Goshawk
ABNKC12060231
Northern Goshawk
ABNKC12060237
Northern Goshawk
ABNKC12060113
Figure 28
Mono County MEA – 2001



MEA Special Status Species
Overview Map #28
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Owens Speckled Dace
AFCJB3705F 11
Wong's Springsnail
IMGASJ0360 20
Owens Speckled Dace
AFCJB3705F 12
Figure 28
Mono County MEA – 2001



MEA Special Status Species
Overview Map #29
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Nelson's Bighorn Sheep
AMALE04013 8
Owens Valley Vole
AMAFF11033 1
Figure 28
Mono County MEA -- 2001

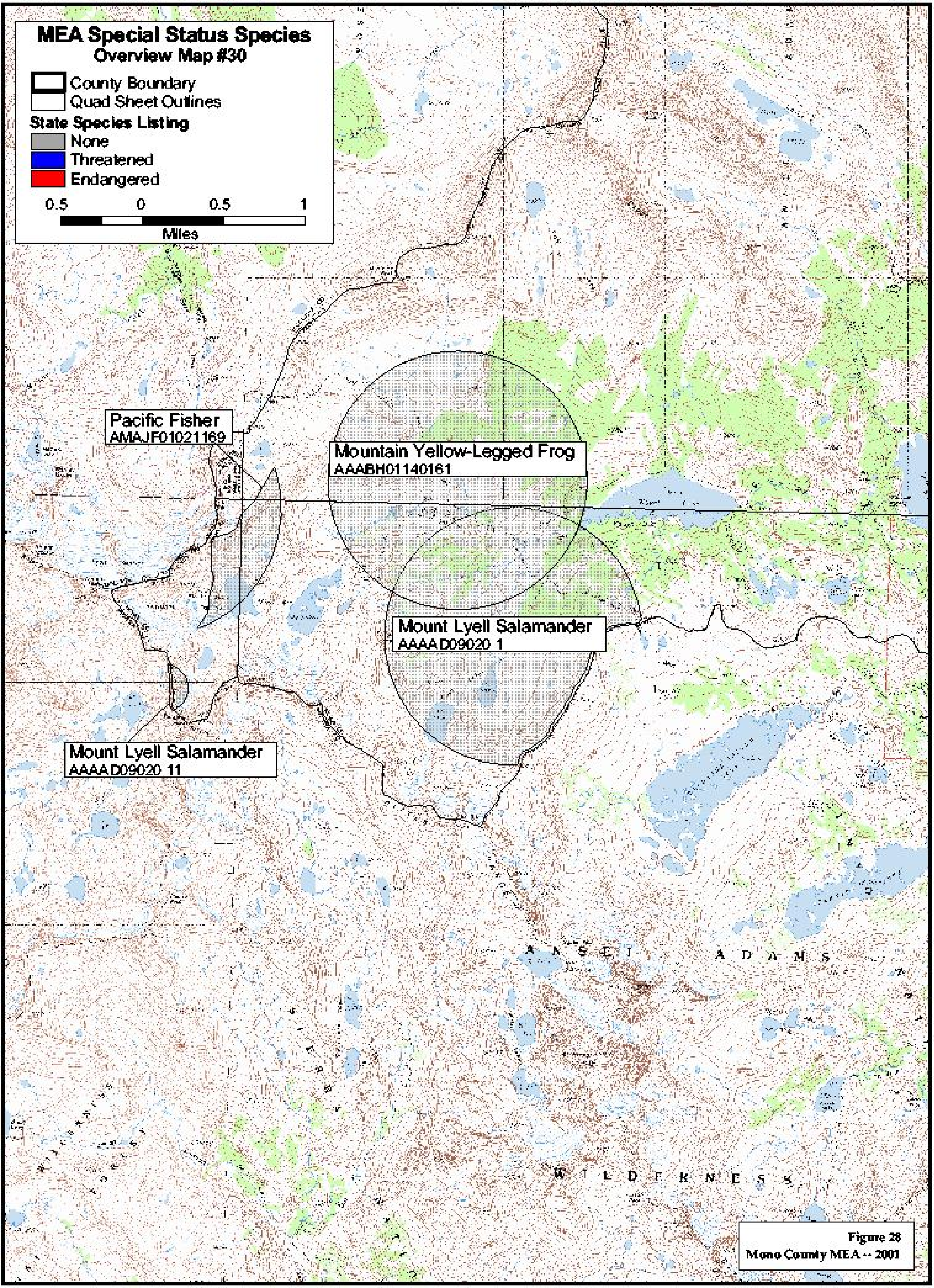


Figure 28
Mono County MEA -- 2001

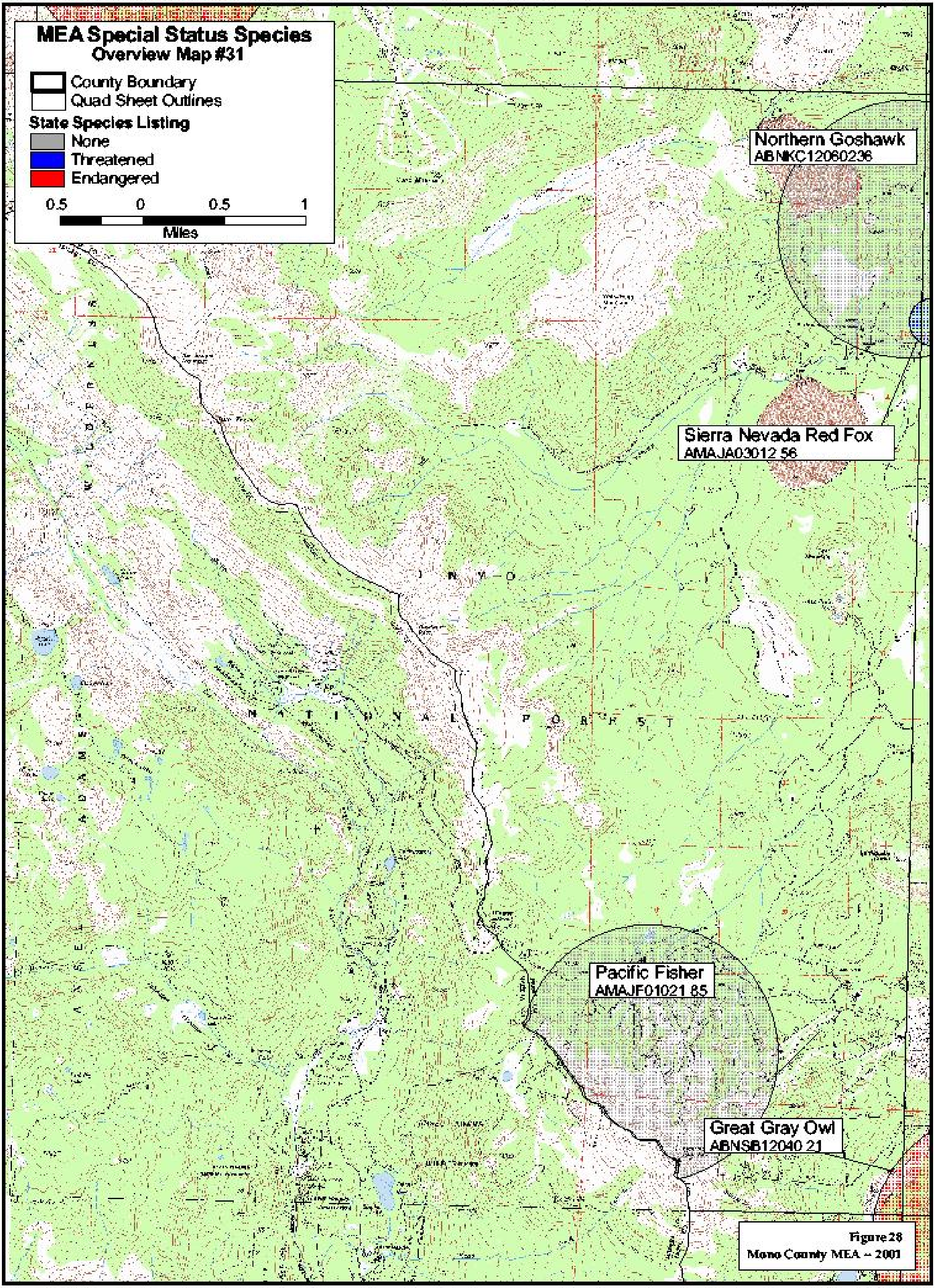


Figure 28
Mono County MEA – 2001

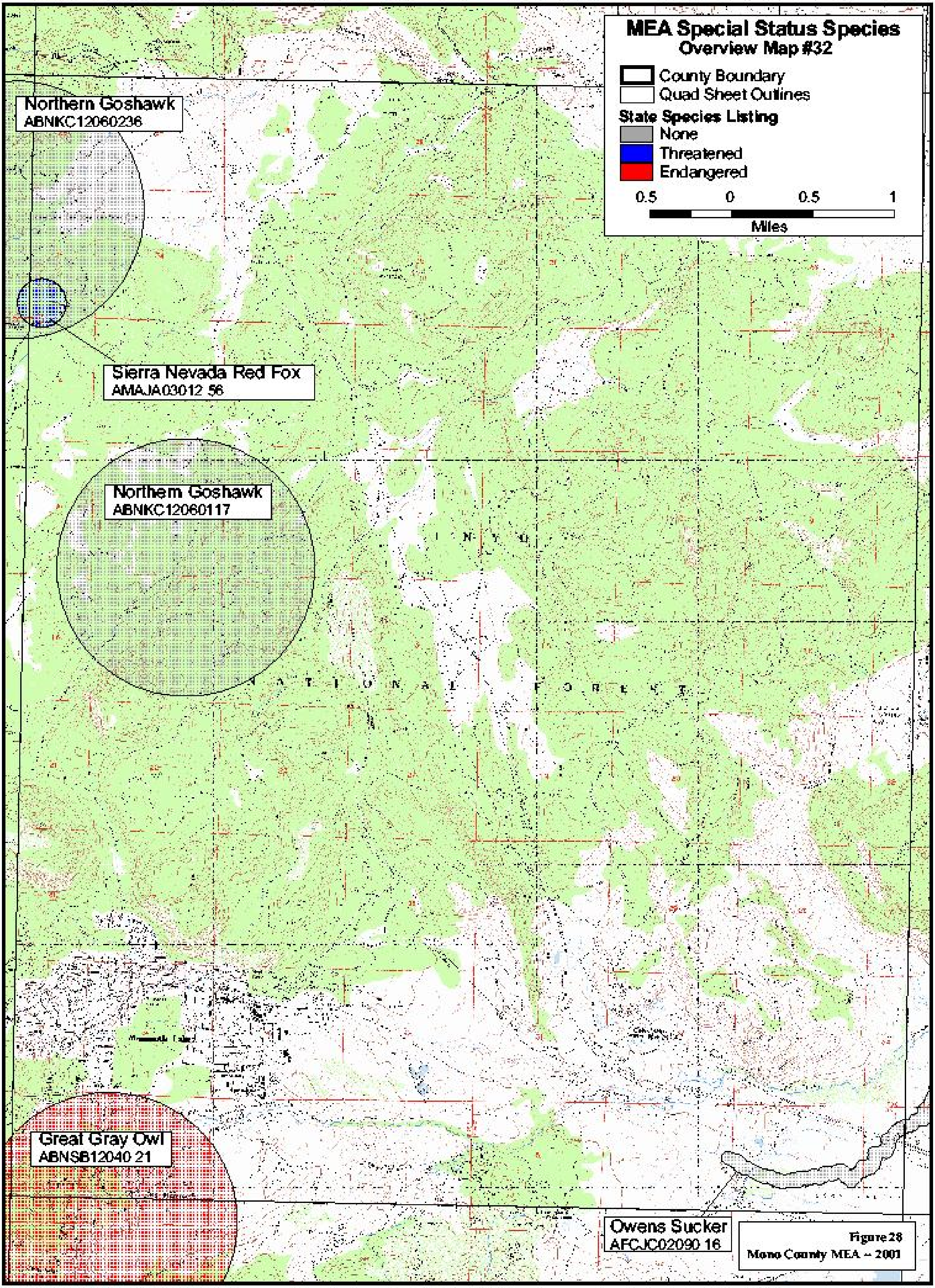
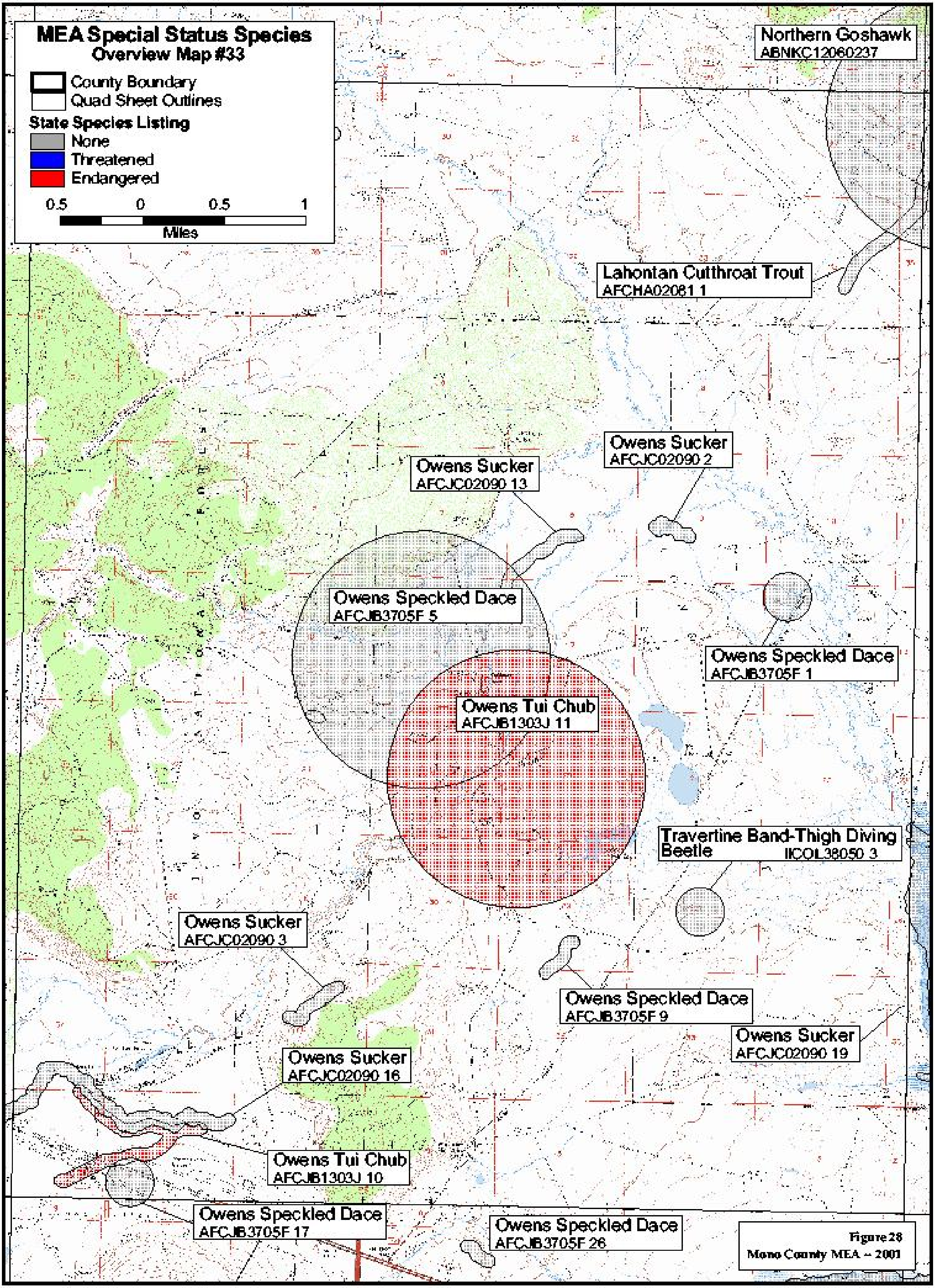


Figure 28
Mono County MEA – 2001


MEA Special Status Species
Overview Map #33
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Northern Goshawk
ABNKC12060237
Lahontan Cutthroat Trout
AFCHA02081 1
Owens Sucker
AFCJC02090 2
Owens Sucker
AFCJC02090 13
Owens Speckled Dace
AFCJB3705F 5
Owens Speckled Dace
AFCJB3705F 1
Owens Tui Chub
AFCJB1303J 11
Travertine Band-Thigh Diving Beetle
IICOL38050 3
Owens Sucker
AFCJC02090 3
Owens Speckled Dace
AFCJB3705F 9
Owens Sucker
AFCJC02090 19
Owens Sucker
AFCJC02090 16
Owens Tui Chub
AFCJB1303J 10
Owens Speckled Dace
AFCJB3705F 17
Owens Speckled Dace
AFCJB3705F 26
Figure 28
Mono County MEA ~ 2001

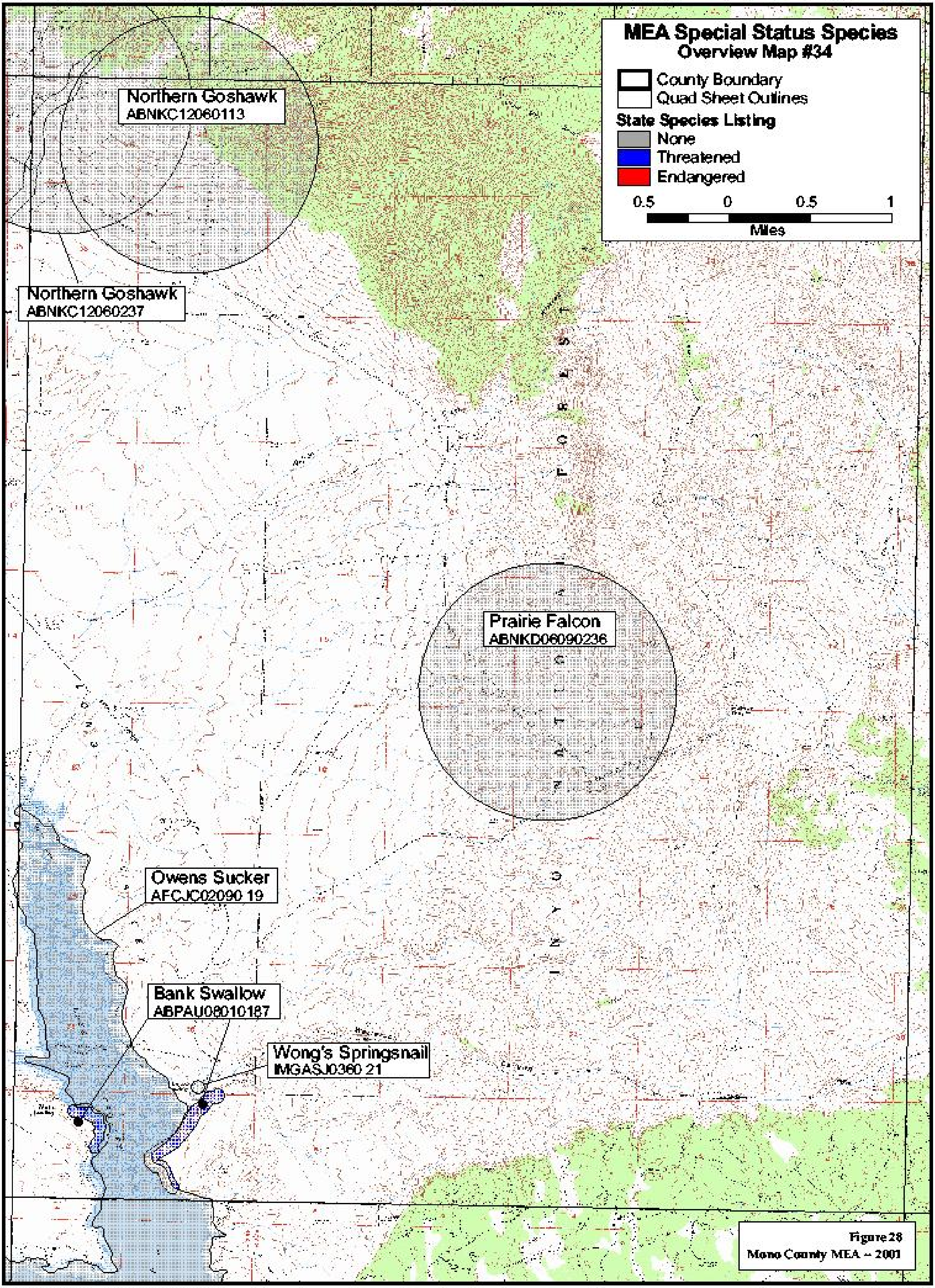
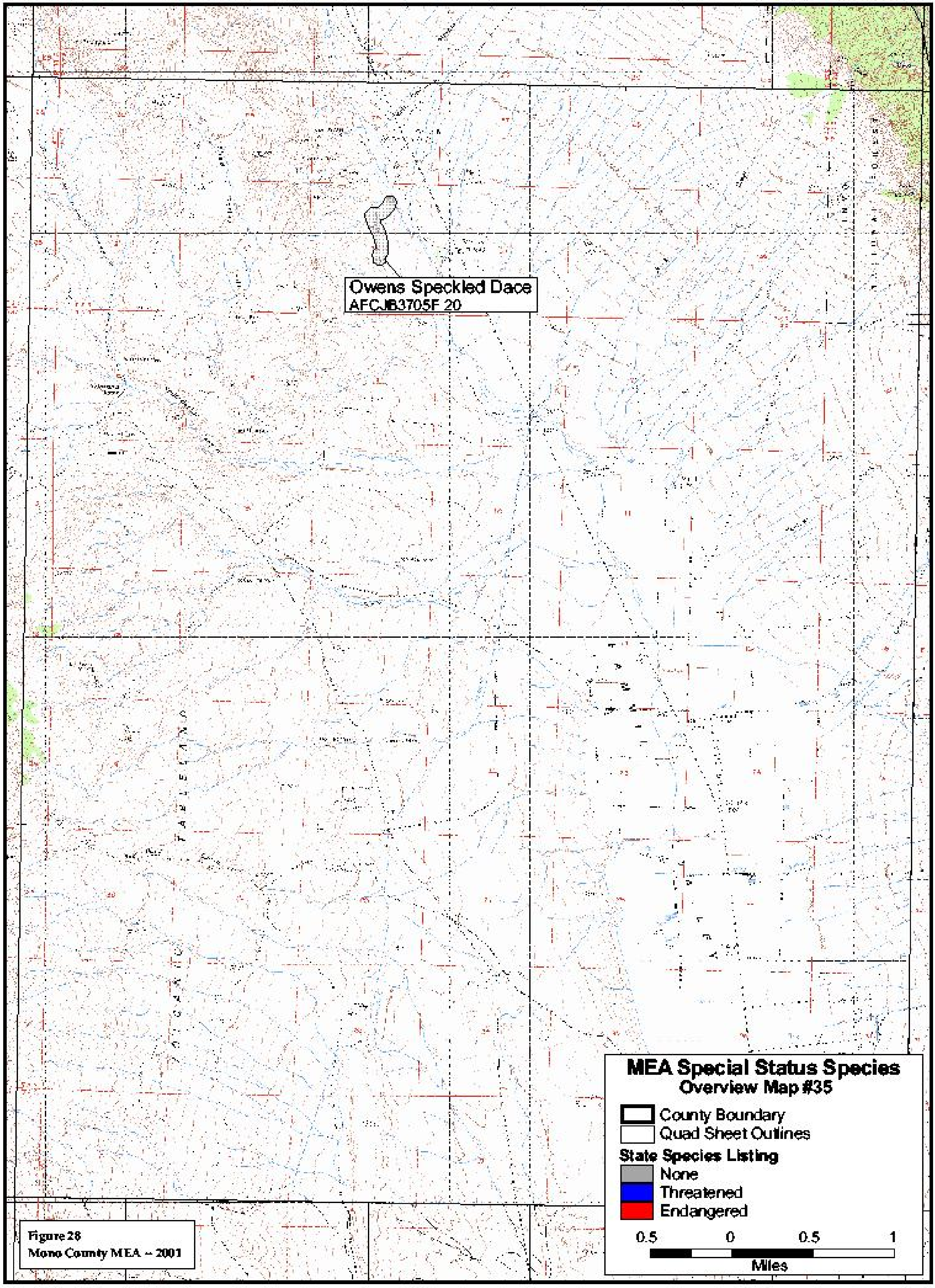
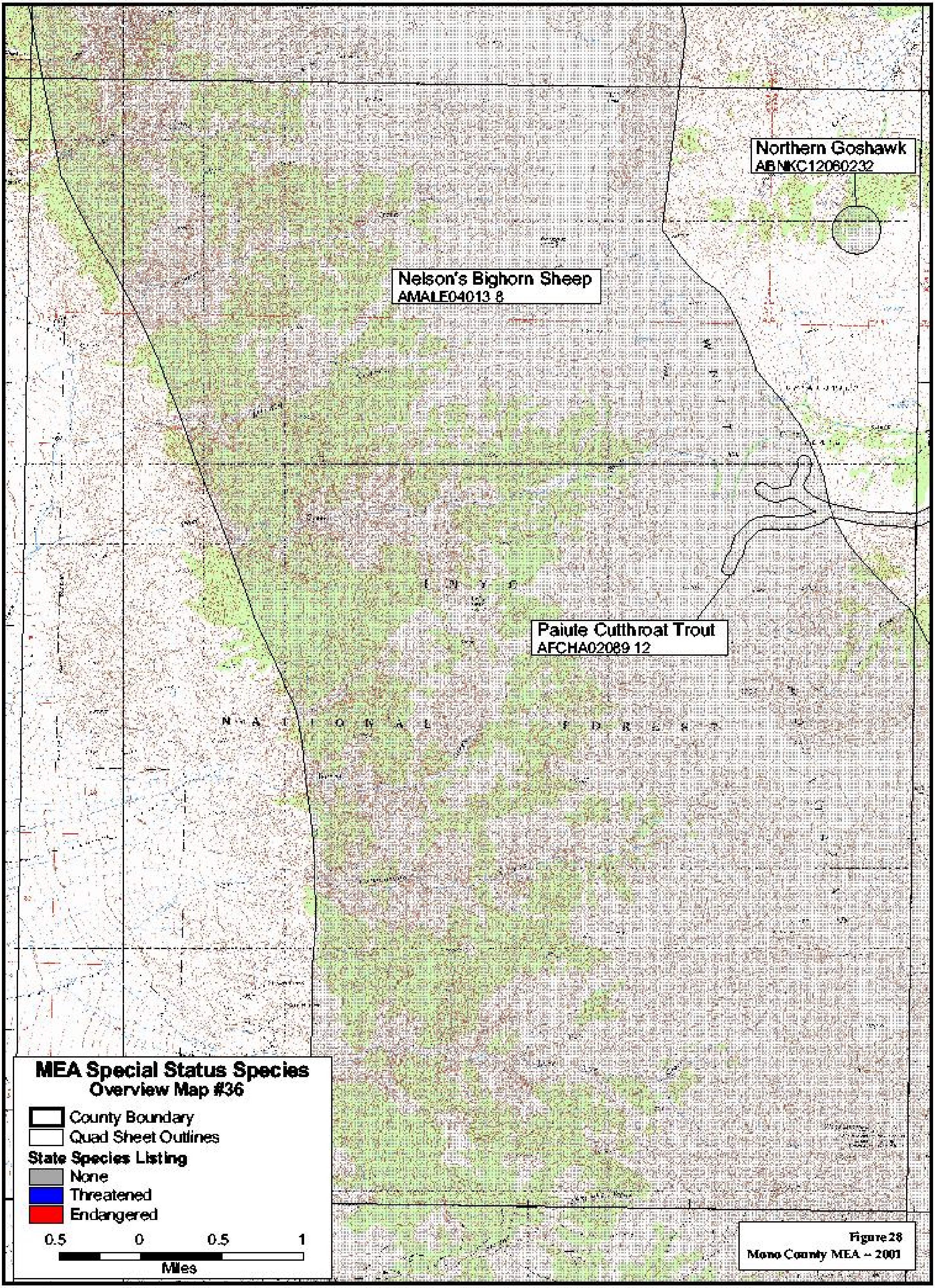


Figure 28
Mono County MEA -- 2001


Owens Speckled Dace
AFCJB3705F 20
MEA Special Status Species
Overview Map #35
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5
0
0.5
1
Miles
Figure 28
Mono County MEA ~ 2001


Northern Goshawk
ABNKC12060232
Nelson's Bighorn Sheep
AMALE04013 8
Paiute Cutthroat Trout
AFCHA02089 12
I N Y O
N A T I O N A L
F O R E S T
MEA Special Status Species
Overview Map #36
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Figure 28
Mono County MEA ~ 2001

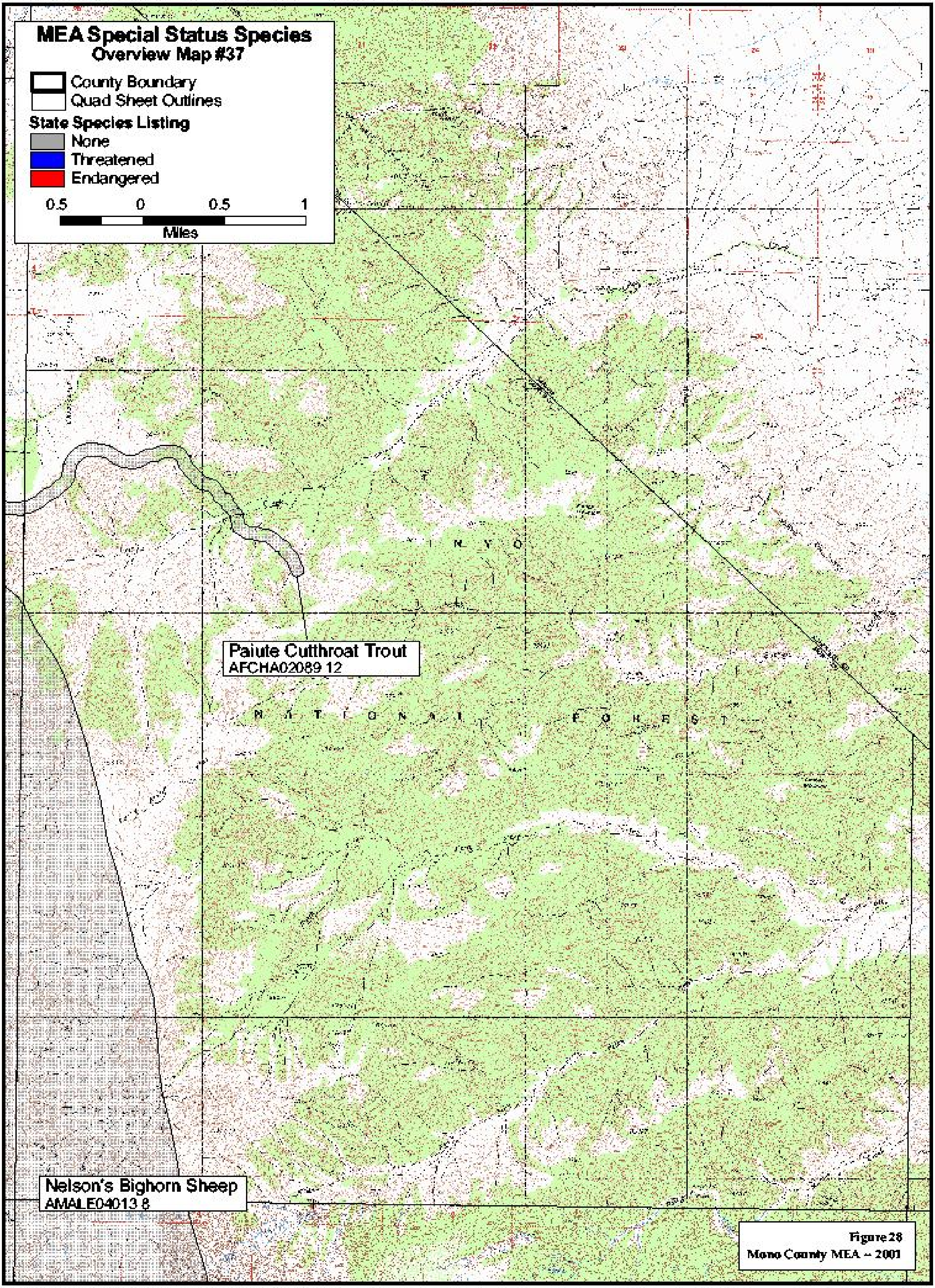
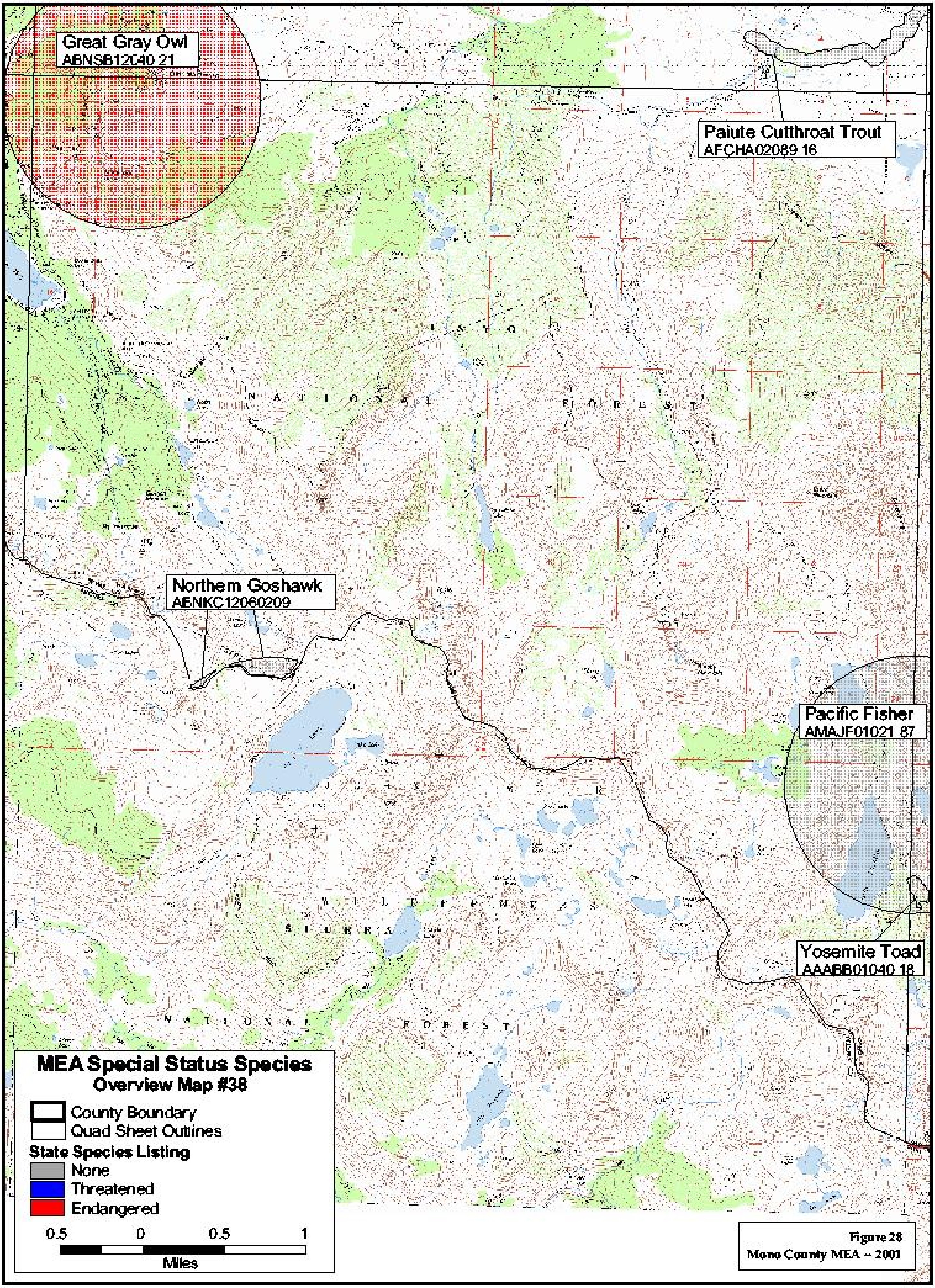


Figure 28
Mono County MEA -- 2001


Great Gray Owl
ABNSB12040 21
Paiute Cutthroat Trout
AFCHA02089 16
NATIONAL
FOREST
Northern Goshawk
ABNKC12060209
Pacific Fisher
AMAJF01021 87
WILDERNESS
SIERRA
Yosemite Toad
AAABB01040 18
NATIONAL
FOREST
MEA Special Status Species
Overview Map #38
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Figure 28
Mono County MEA ~ 2001

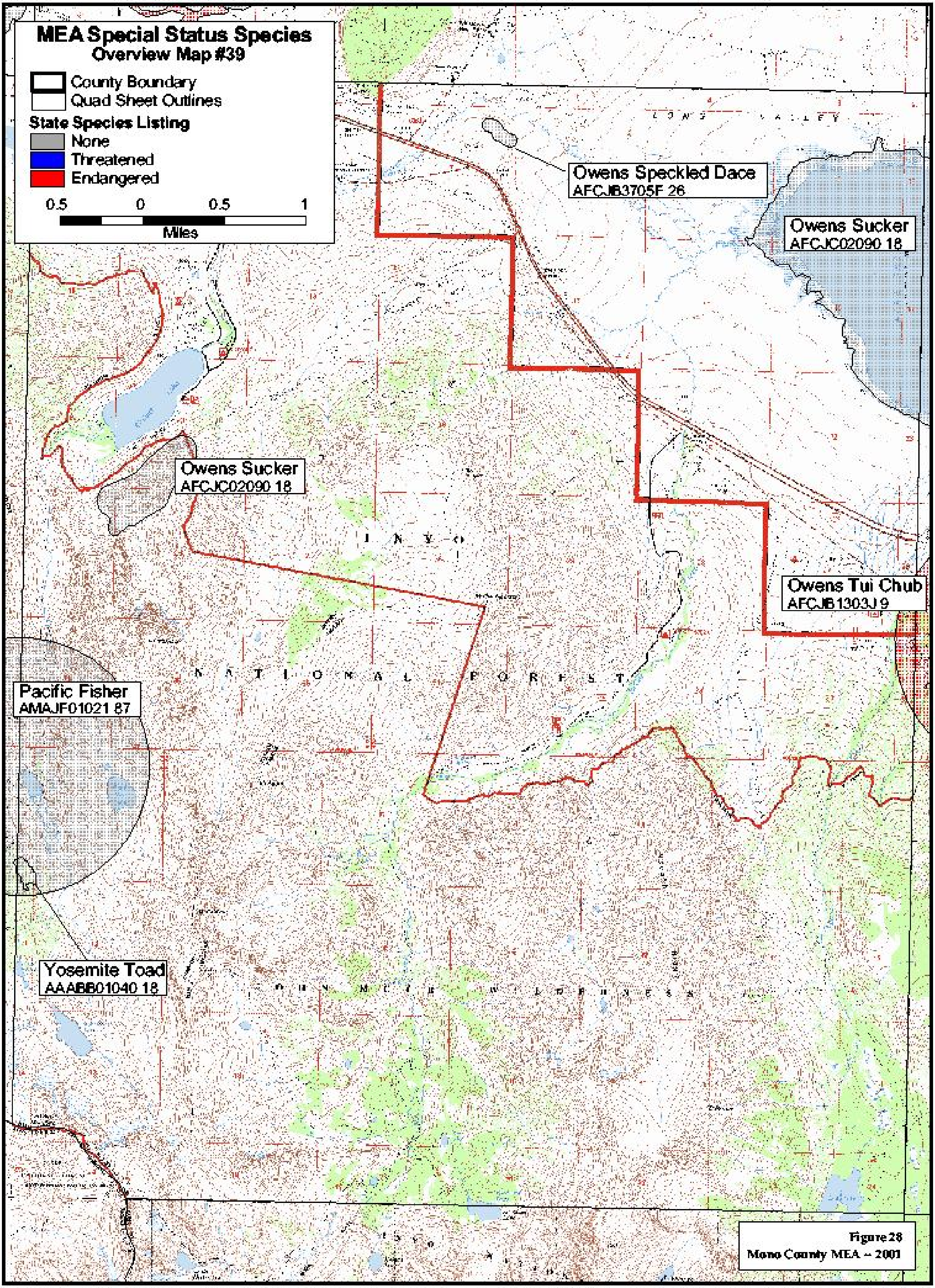


Figure 28
Mono County MEA – 2001

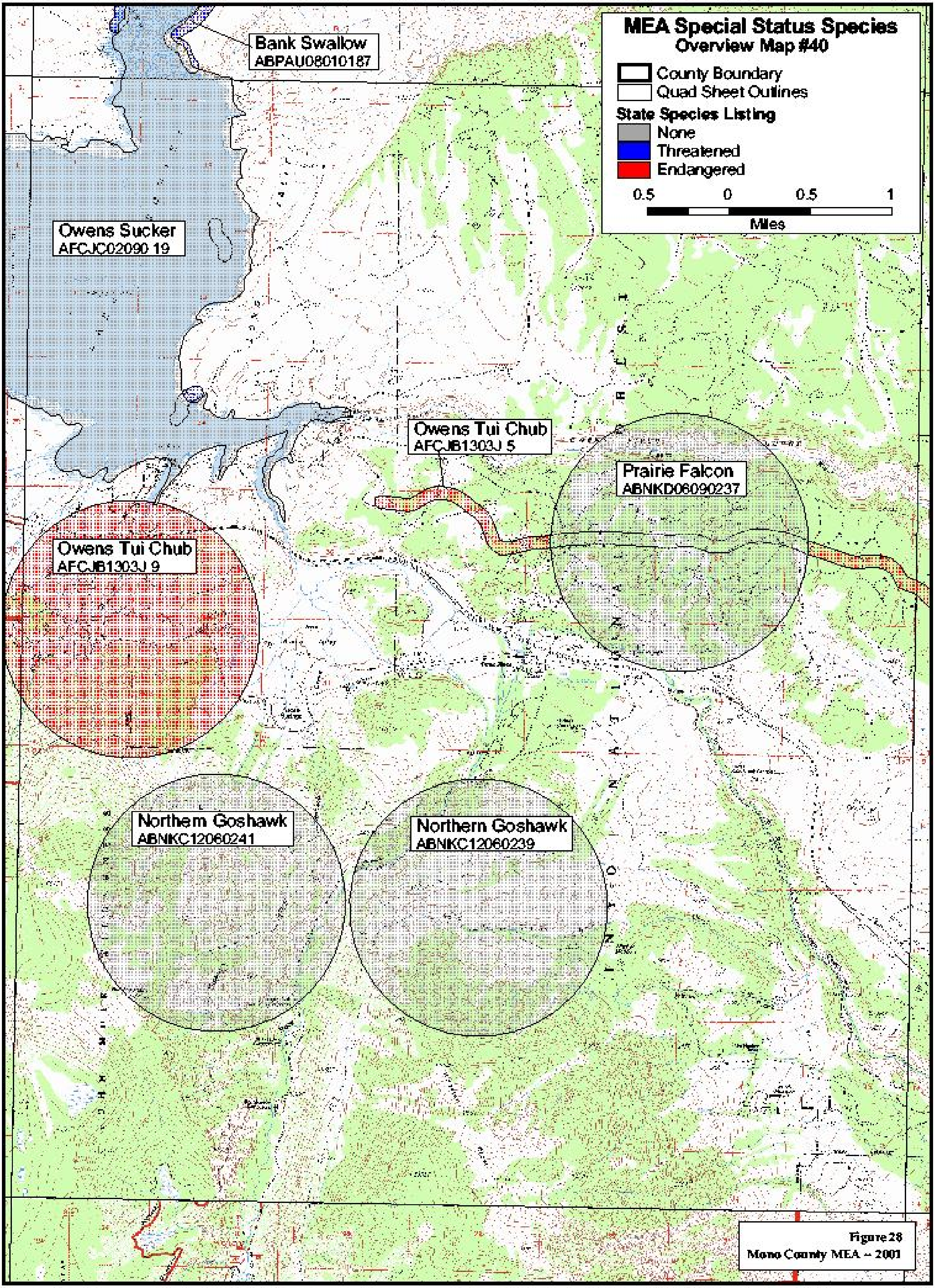
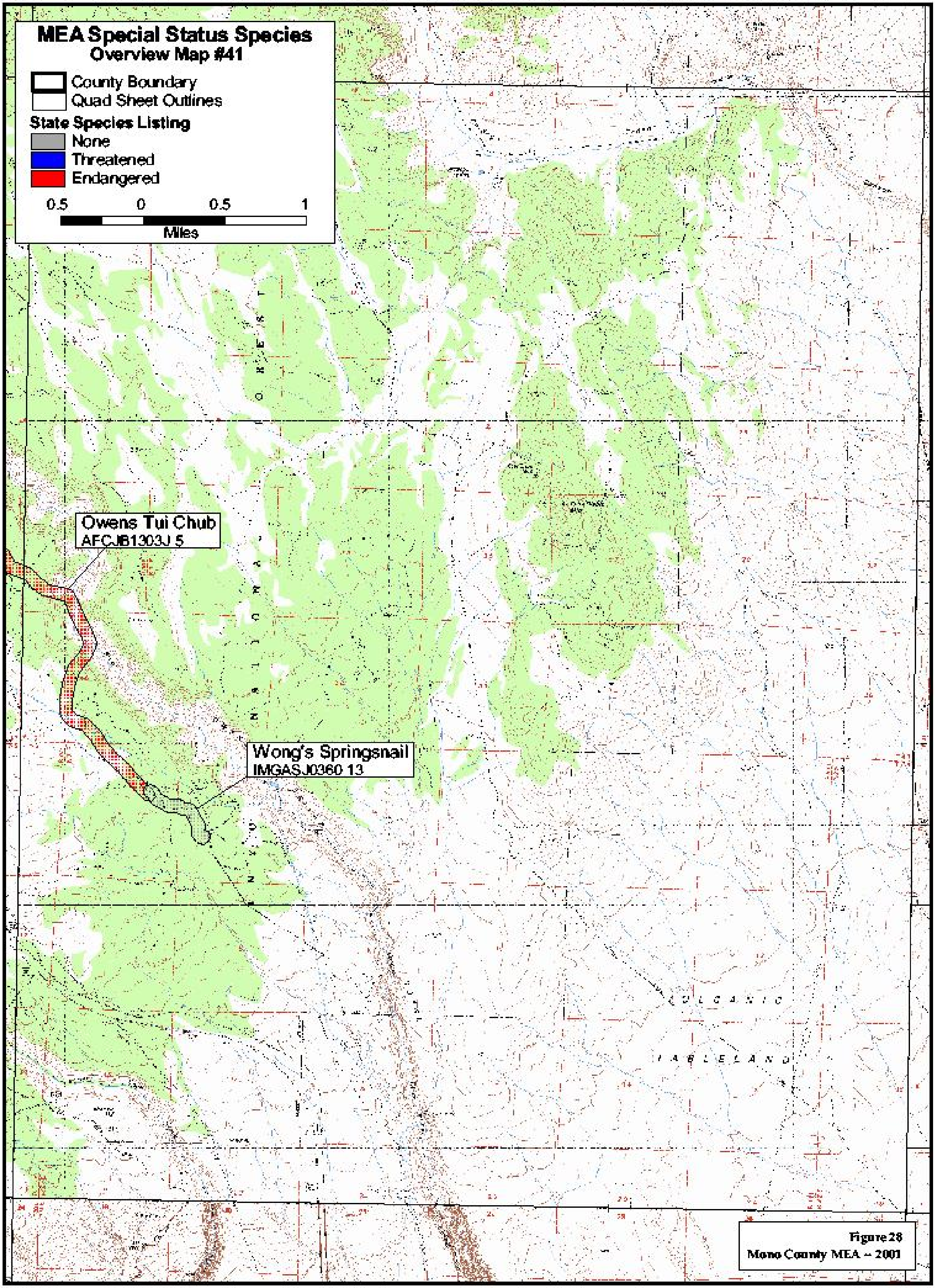


Figure 28
Mono County MEA – 2001


MEA Special Status Species
Overview Map #41
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Owens Tui Chub
AFCJB1303J 5
Wong's Springsnail
IMGASJ0360 13
VOLCANIC
TABLELAND
Figure 28
Mono County MEA – 2001

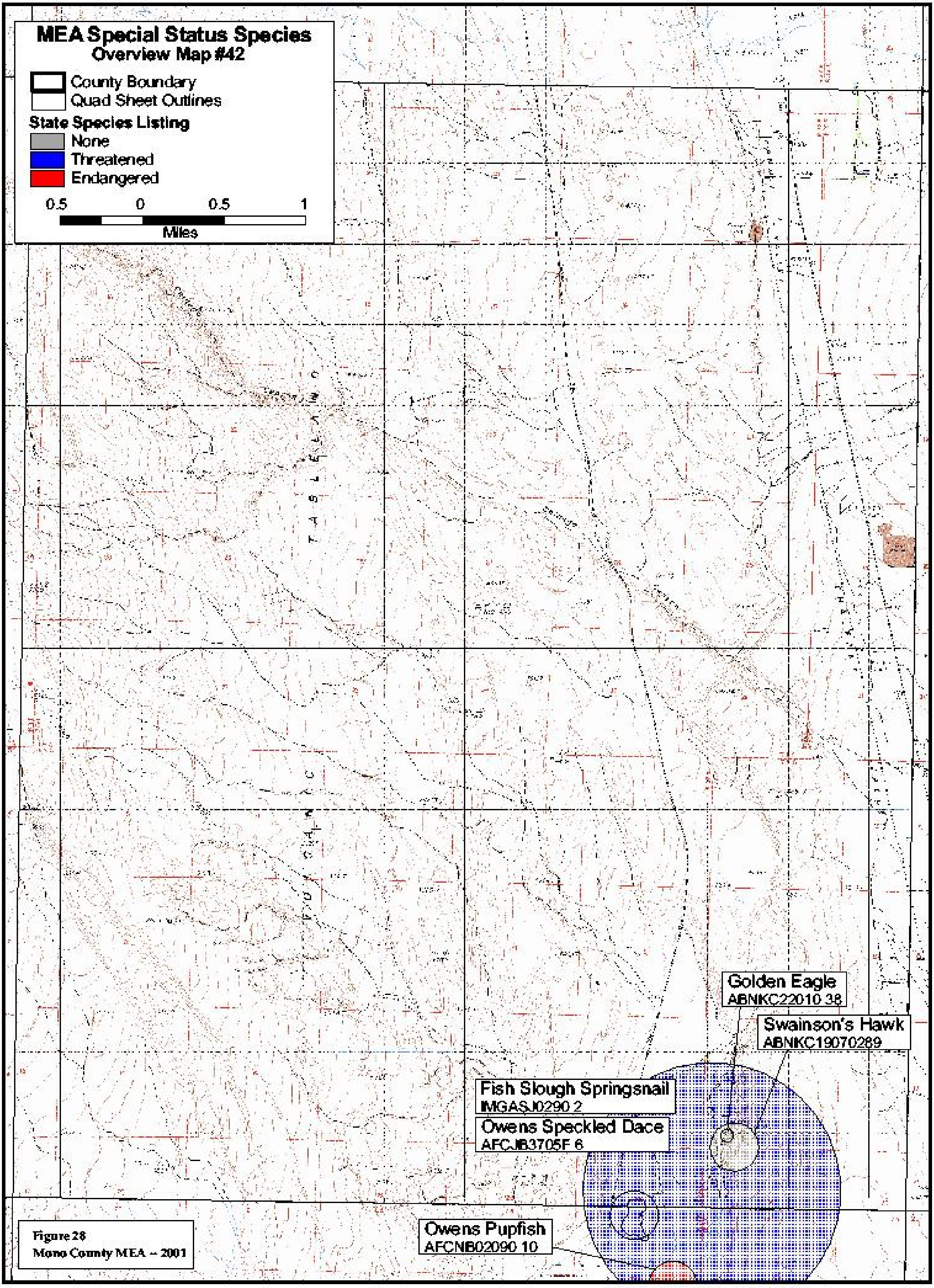
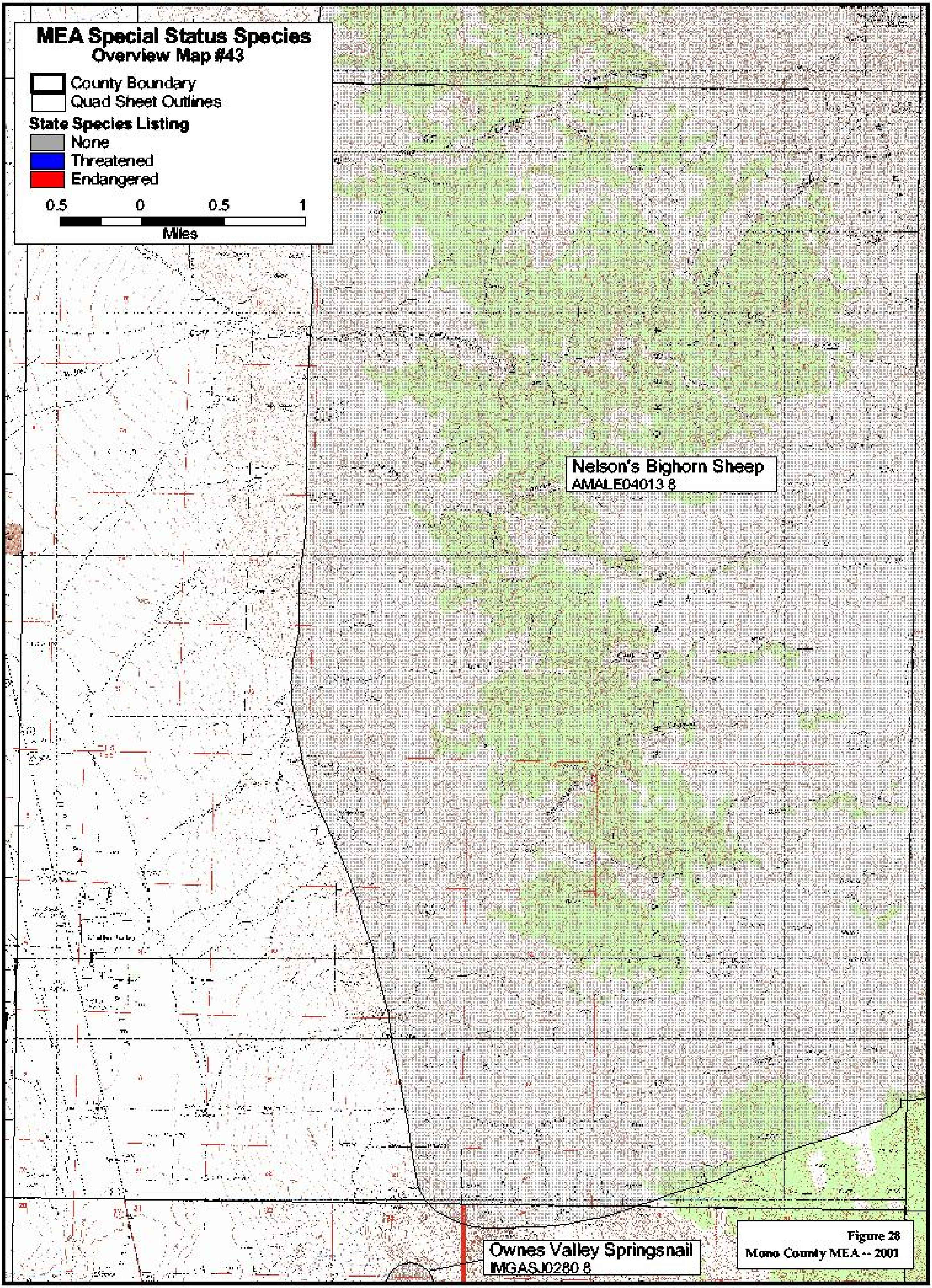
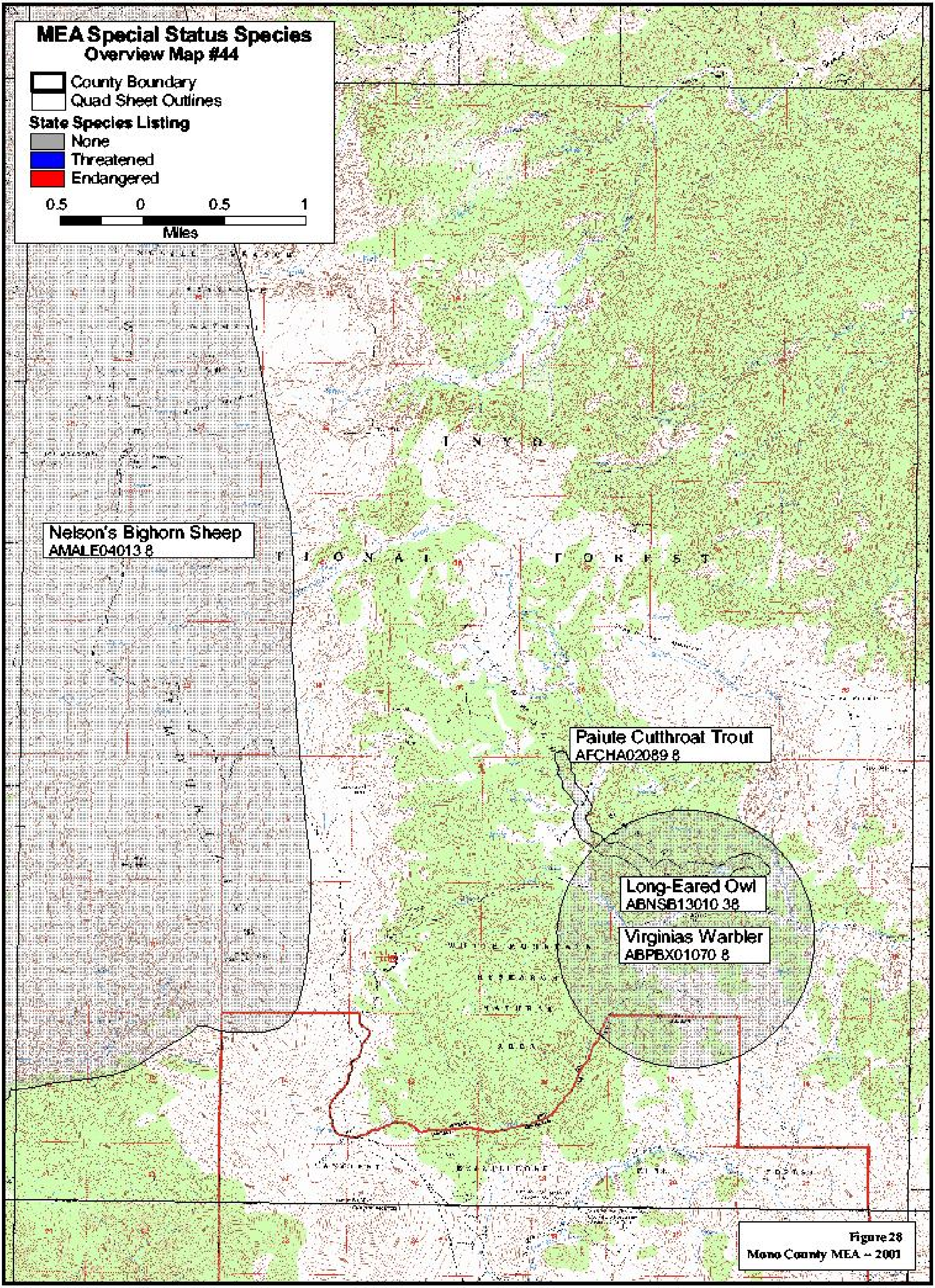


Figure 28
Mono County MEA – 2001


MEA Special Status Species
Overview Map #43
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Nelson's Bighorn Sheep
AMALE04013 8
Ownes Valley Springsnail
IMGASJ0280 8
Figure 28
Mono County MEA -- 2001


MEA Special Status Species
Overview Map #44
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5
0
0.5
1
Miles
Nelson's Bighorn Sheep
AMALE04013 8
Paiute Cutthroat Trout
AFCHA02089 8
Long-Eared Owl
ABNSB13010 38
Virginias Warbler
ABPBX01070 8
Figure 28
Mono County MEA -- 2001

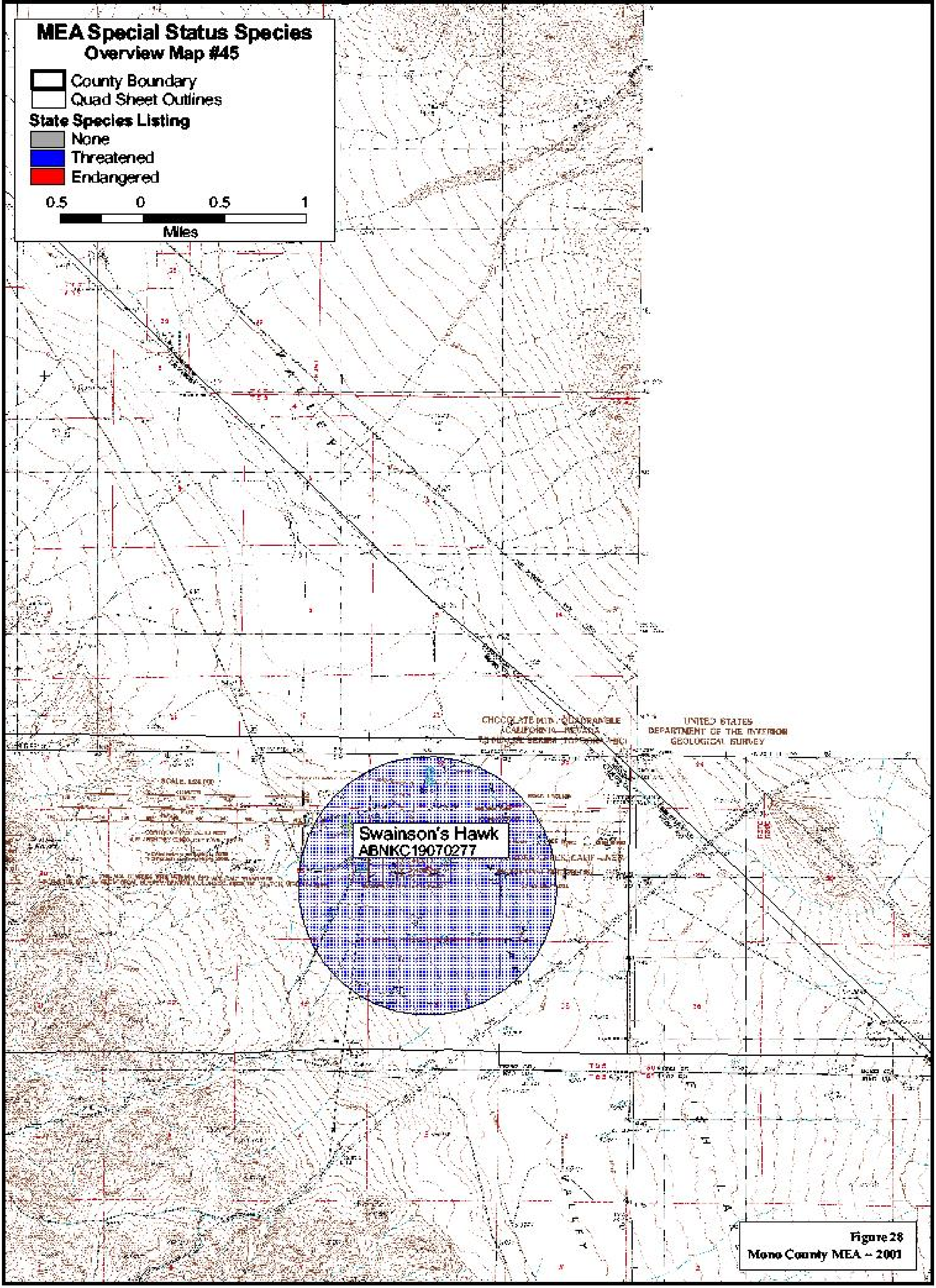
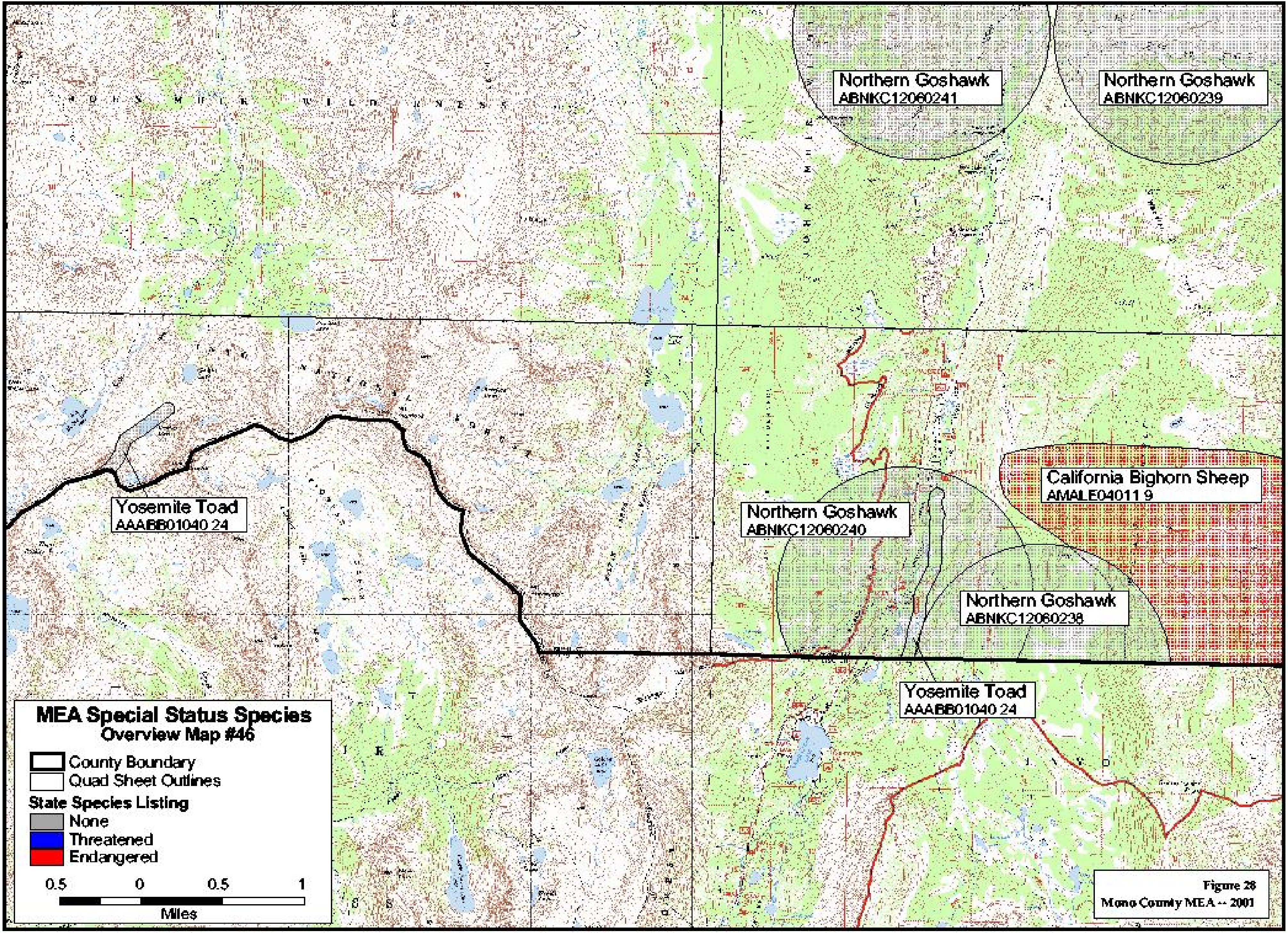


Figure 28
Mono County MEA ~ 2001



Northern Goshawk
ABNKC12060241
Northern Goshawk
ABNKC12060239
California Bighorn Sheep
AMALE04011 9
Yosemite Toad
AAABB01040 24
Northern Goshawk
ABNKC12060240
Northern Goshawk
ABNKC12060238
Yosemite Toad
AAABB01040 24
MEA Special Status Species
Overview Map #46
County Boundary
Quad Sheet Outlines
State Species Listing
None
Threatened
Endangered
0.5 0 0.5 1
Miles
Figure 28
Mono County MEA -- 2001

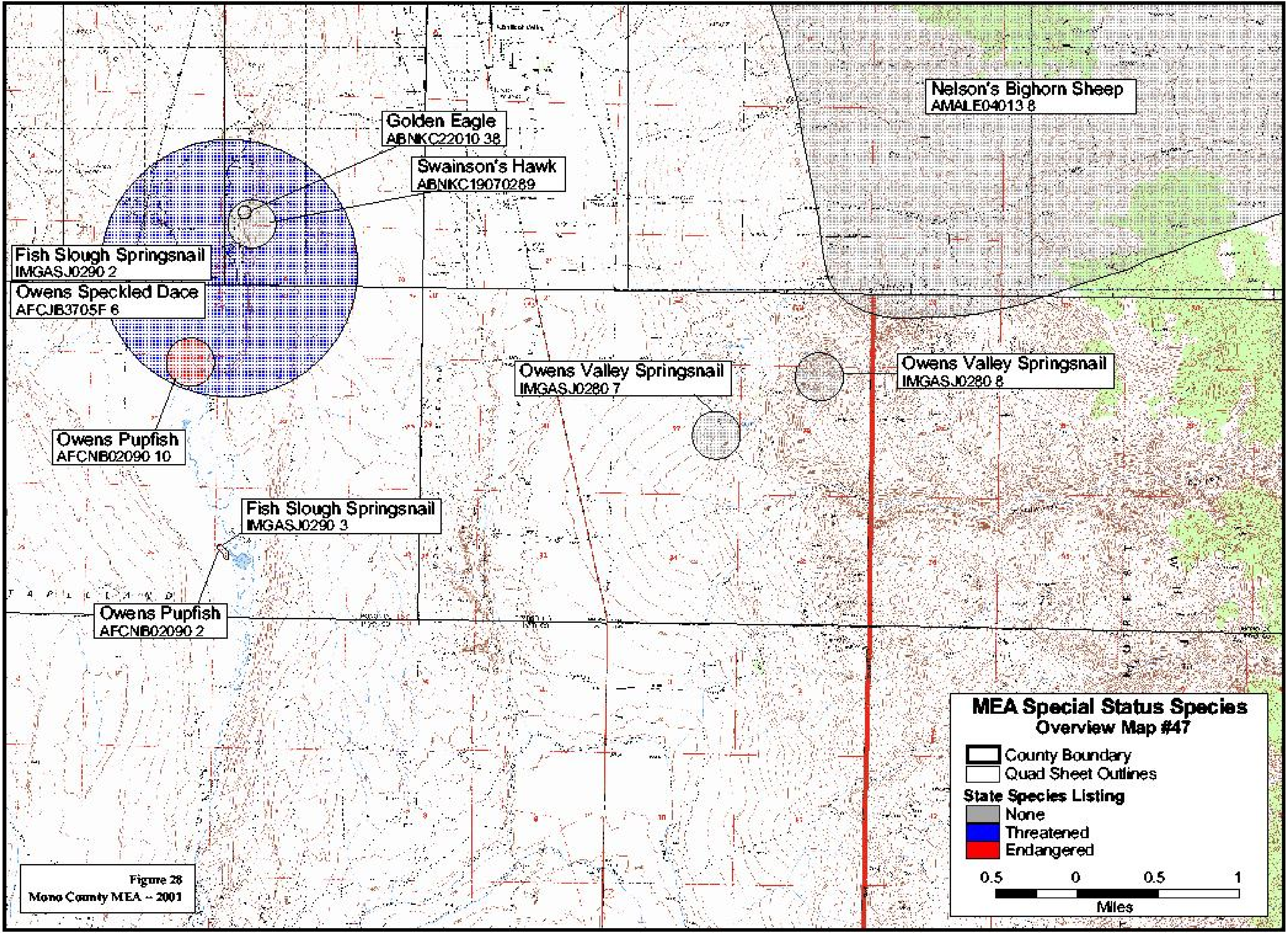
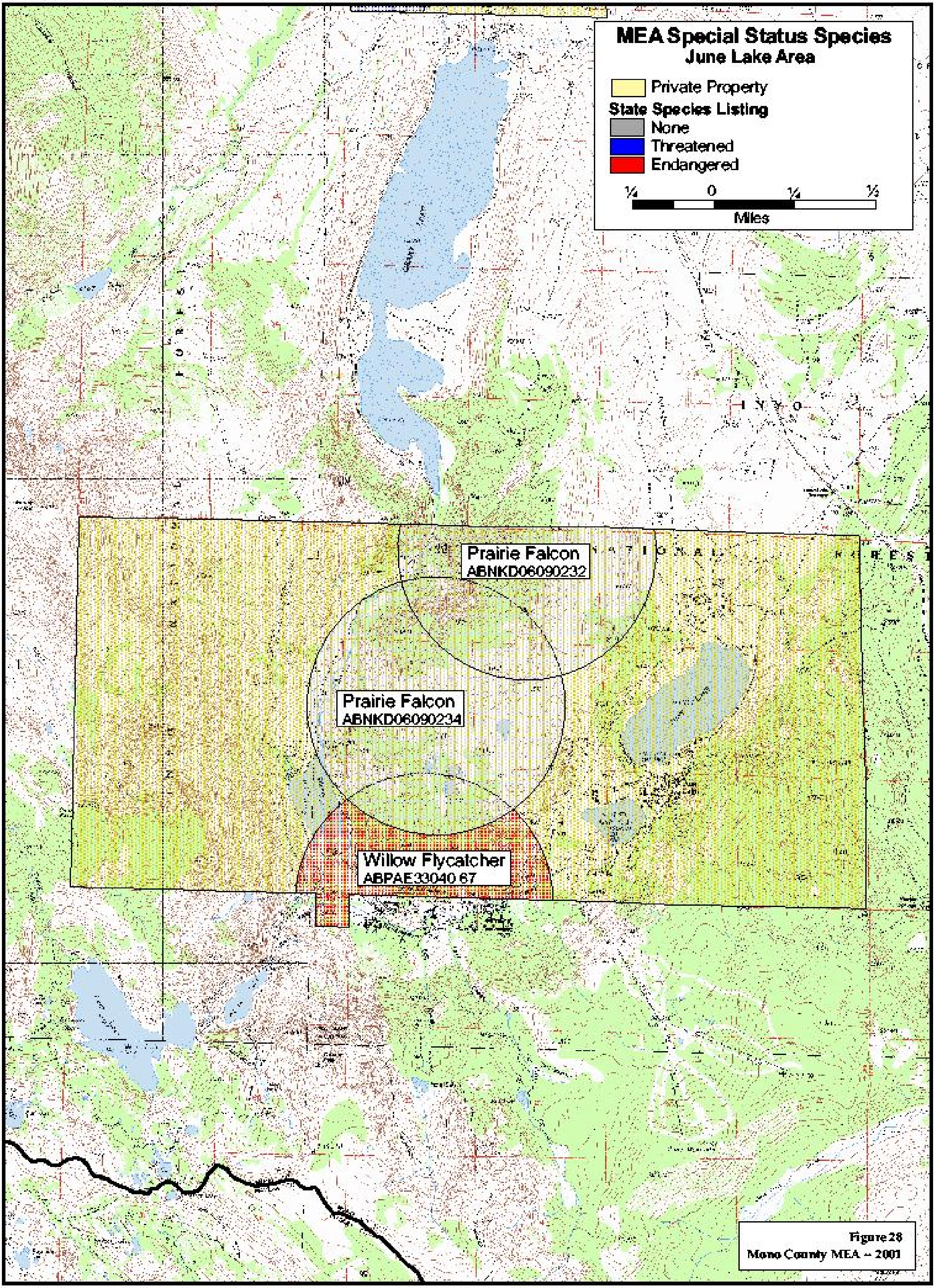


Figure 28
Mono County MEA -- 2001


MEA Special Status Species
June Lake Area
Private Property
State Species Listing
None
Threatened
Endangered
¼
0
¼
½
Miles
Prairie Falcon
ABNKD06090232
Prairie Falcon
ABNKD06090234
Willow Flycatcher
ABPAE33040 67
Figure 28
Mono County MEA ~ 2001

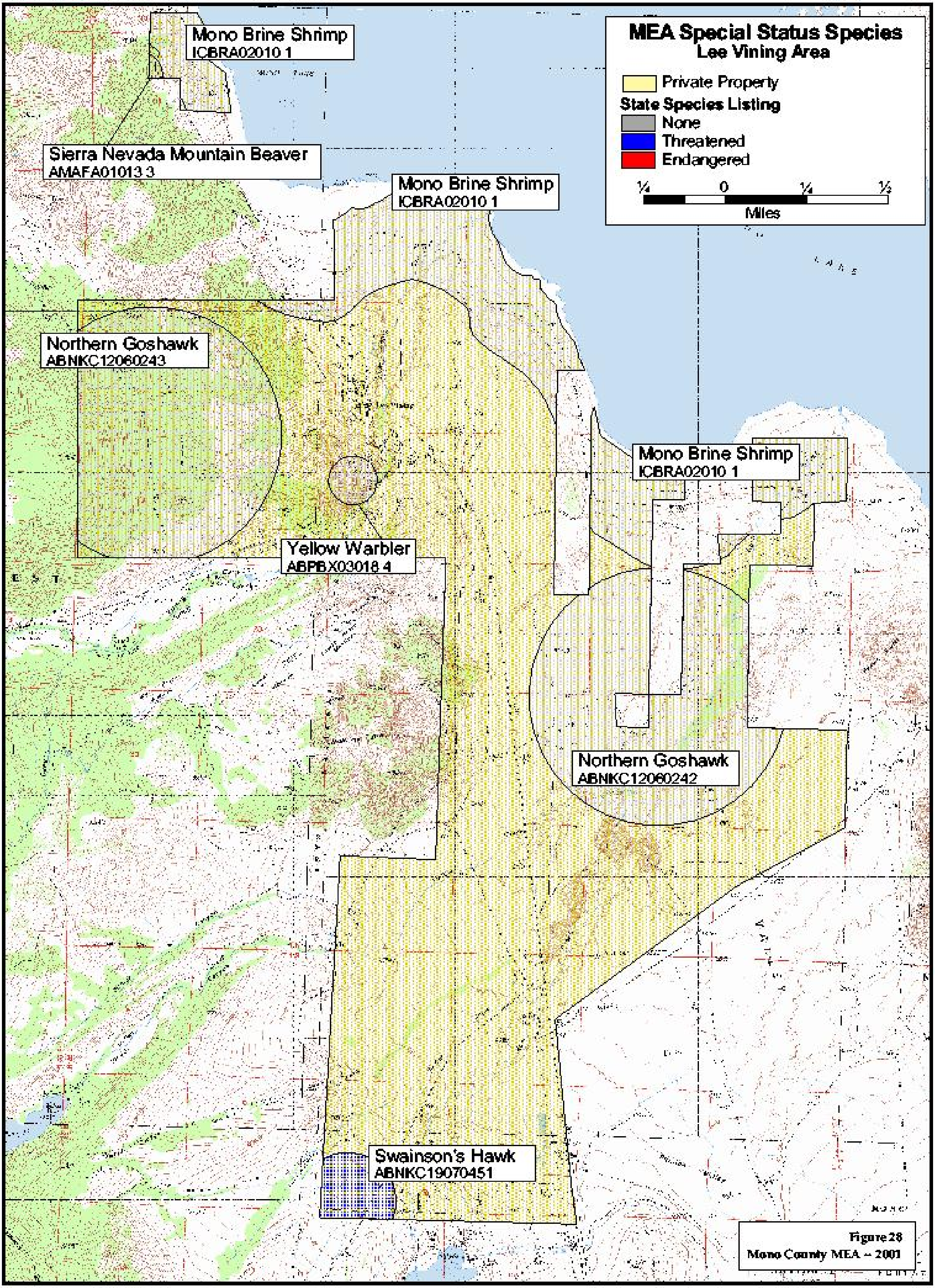


Figure 28
Mono County MEA – 2001

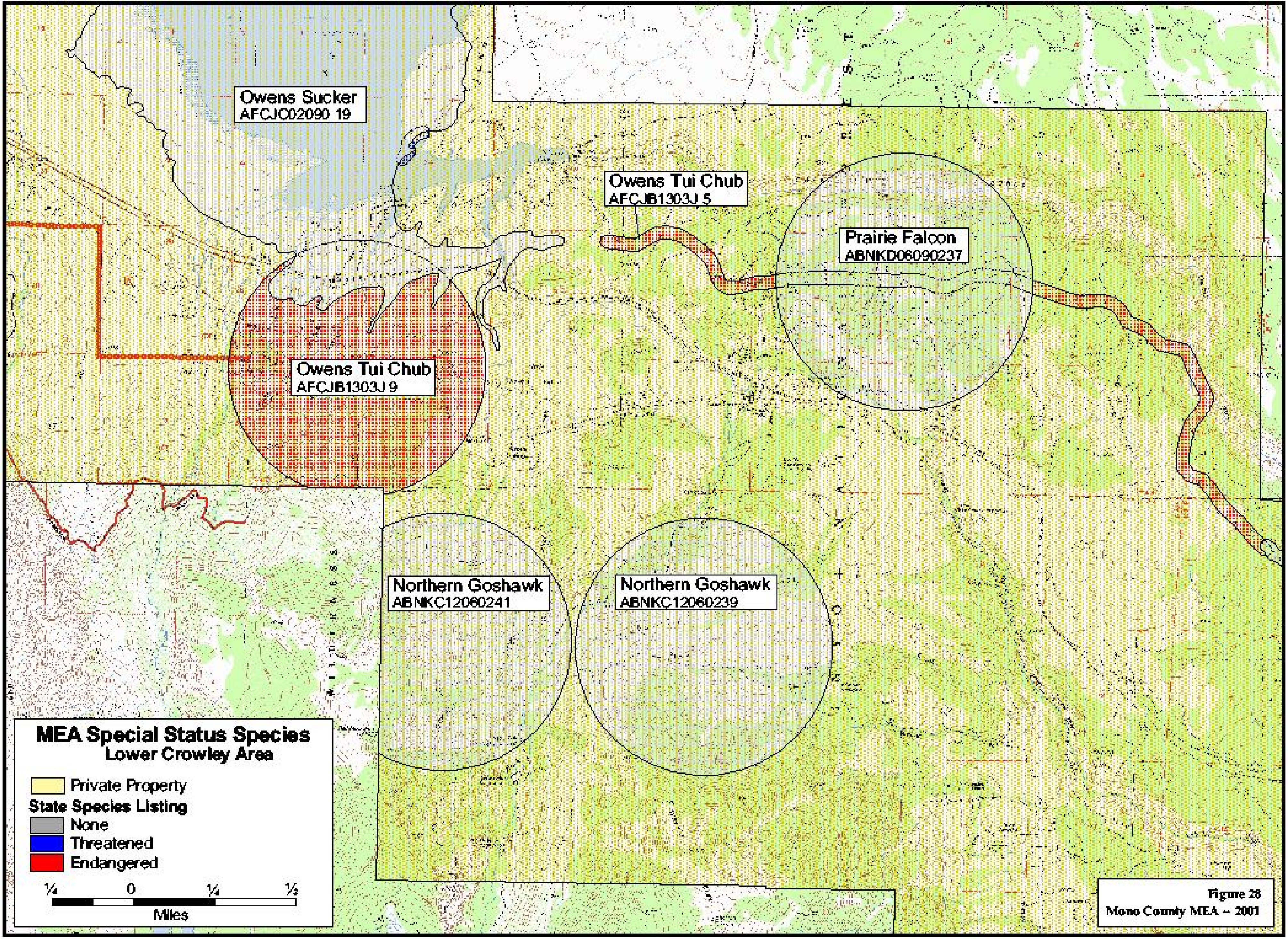


Figure 28
Mono County MEA -- 2001

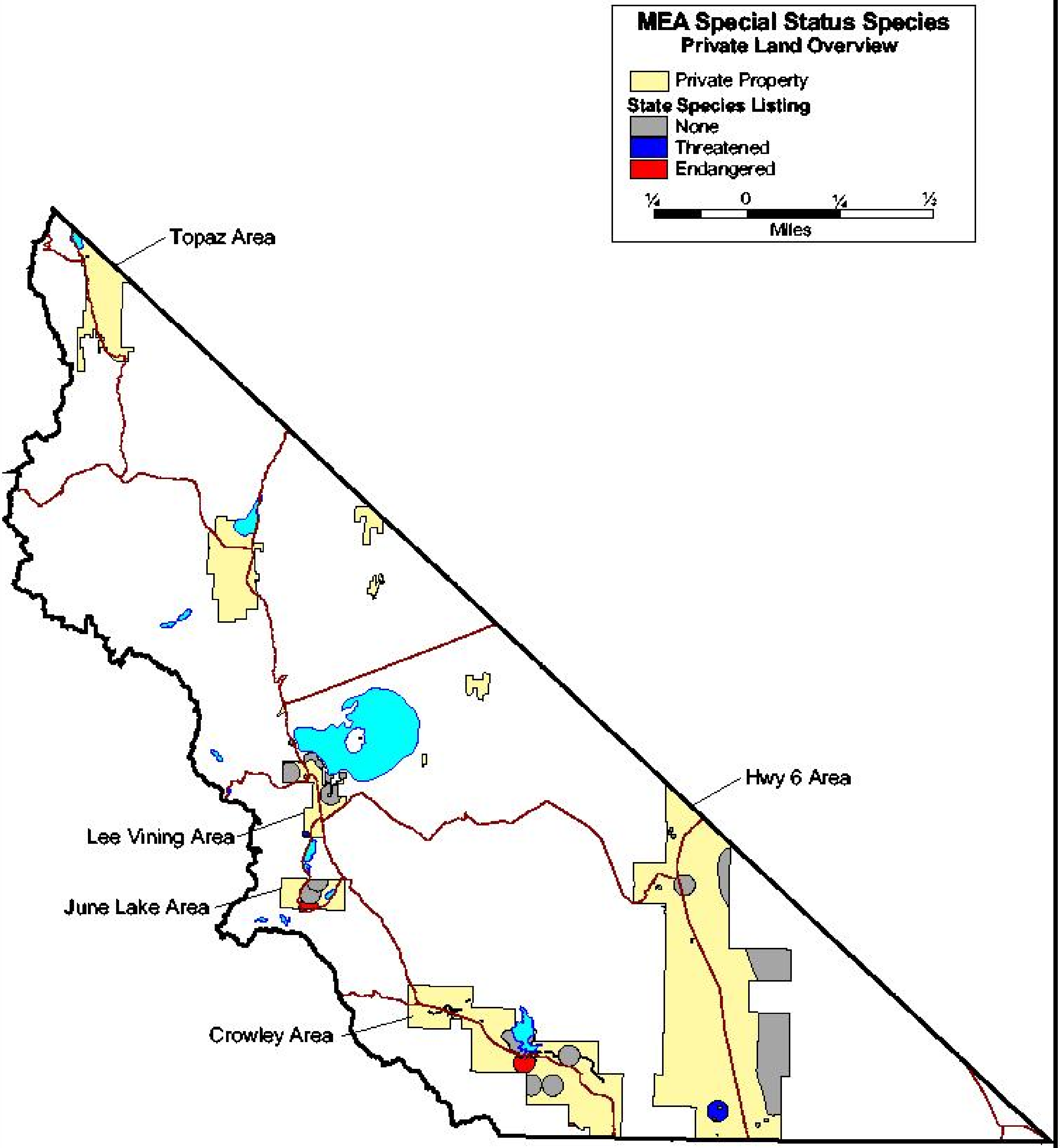
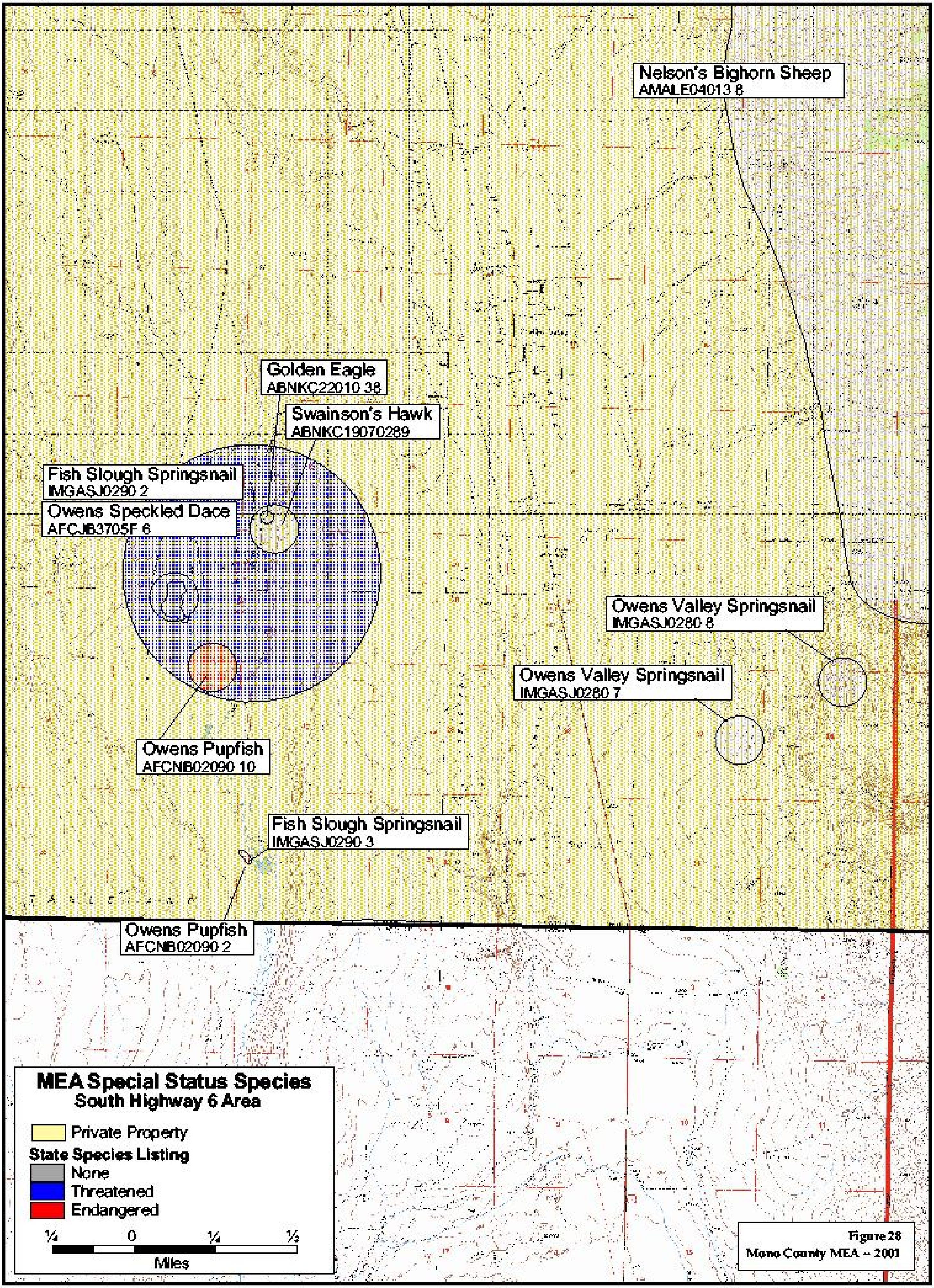
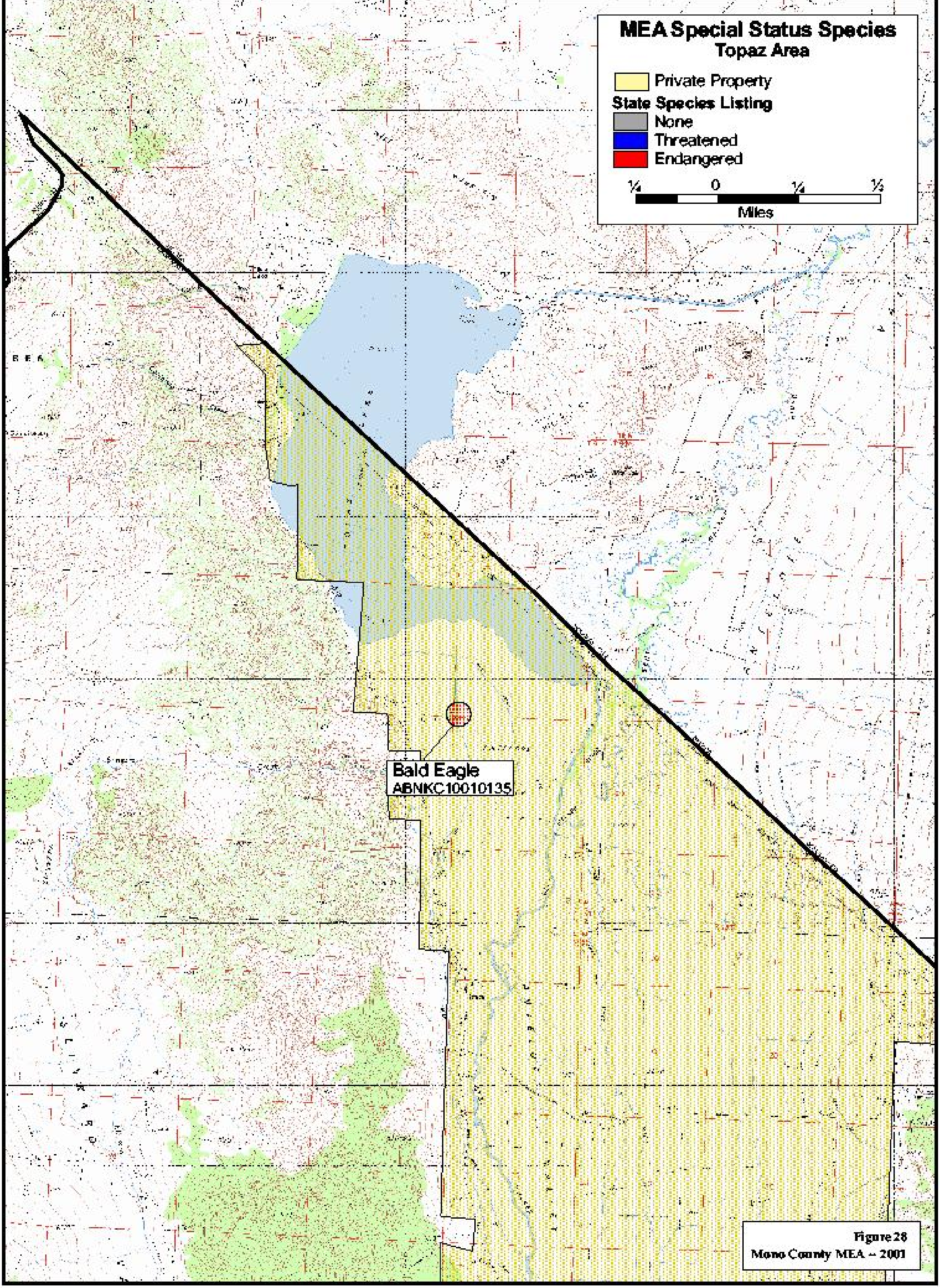


Figure 28
Mono County MEA -- 2001

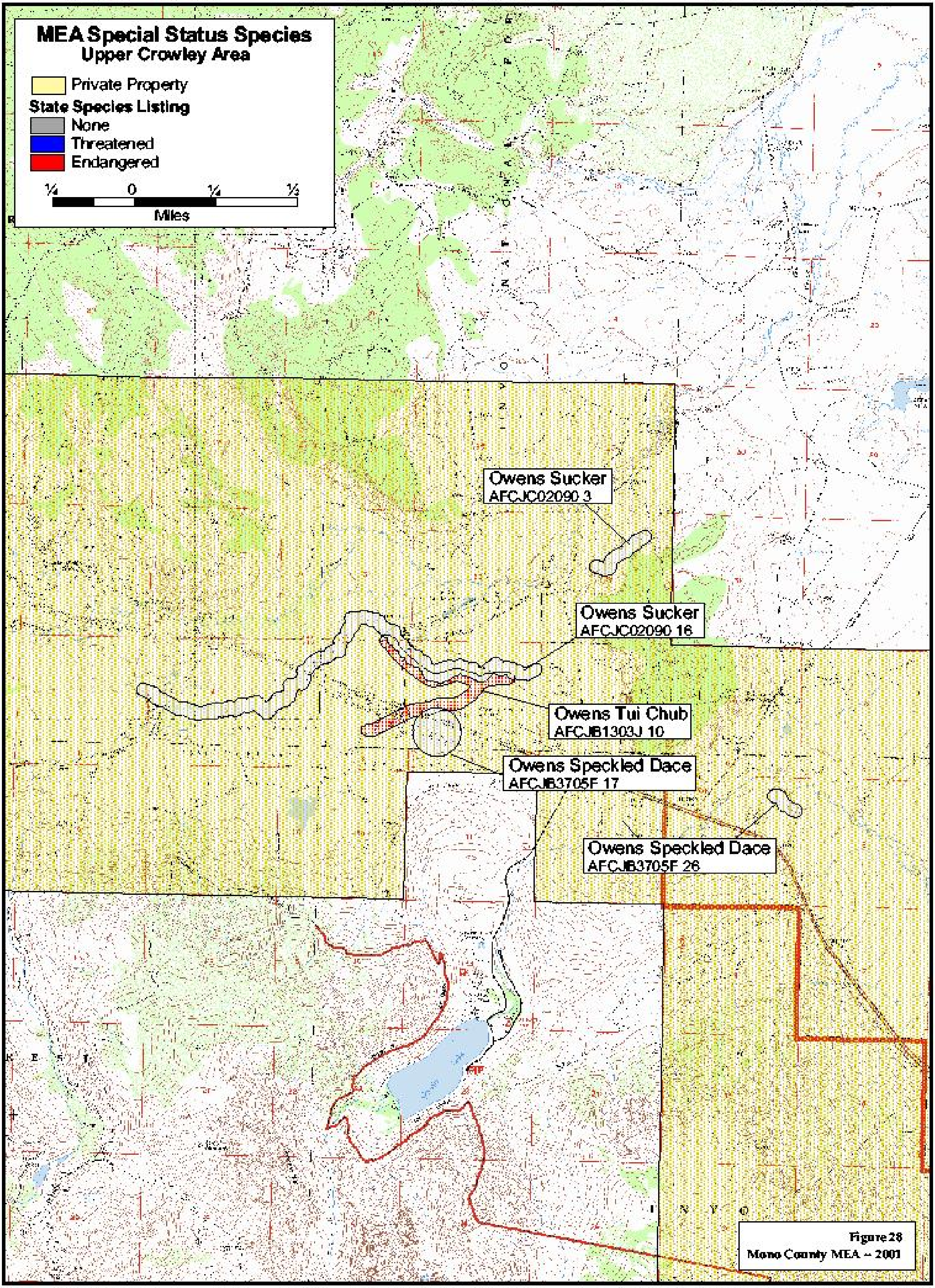
Note: Areas without names lack any Special Status Species occurence

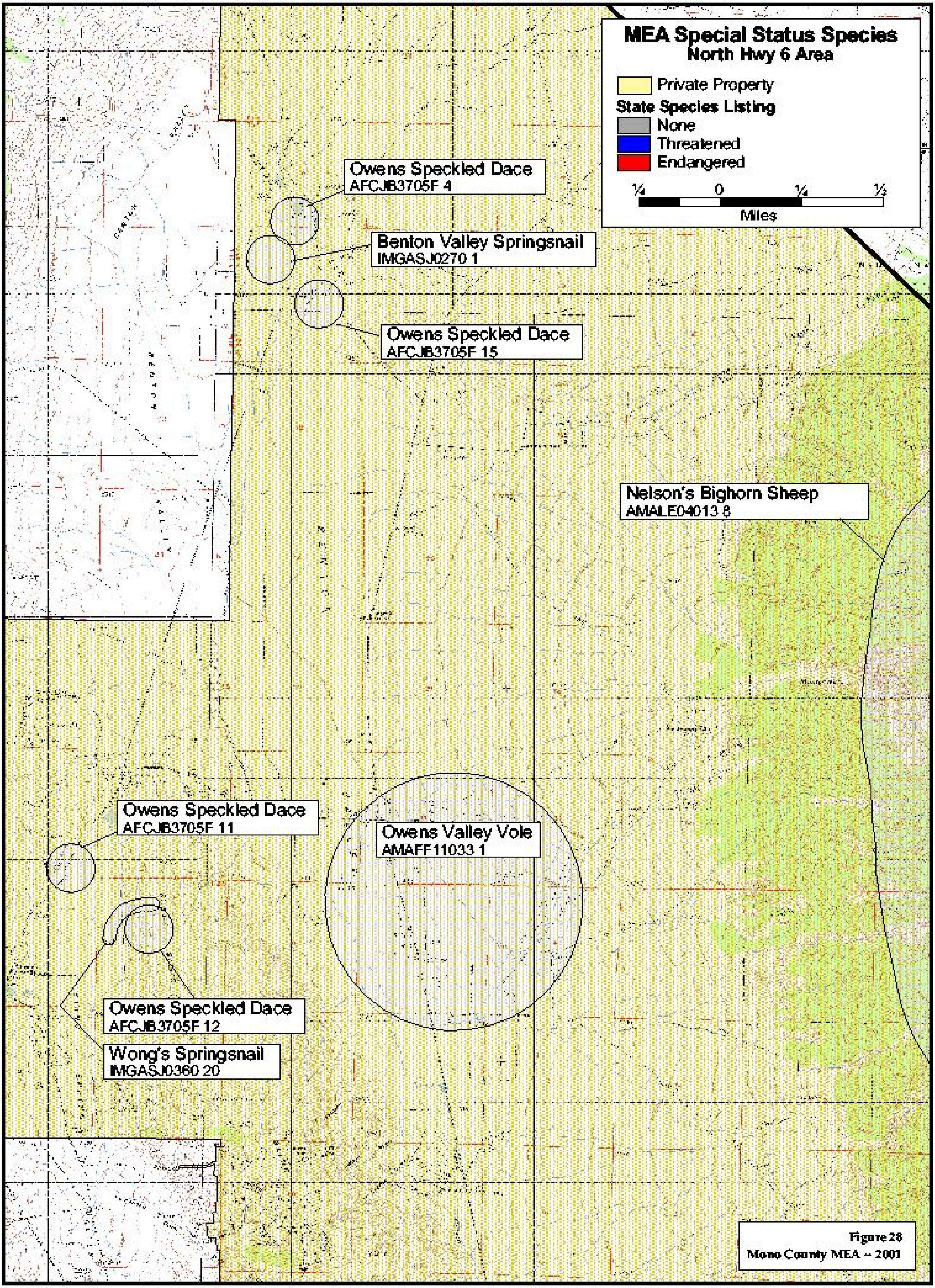


Nelson's Bighorn Sheep
AMALE04013 8
Golden Eagle
ABNKC22010 38
Swainson's Hawk
ABNKC19070289
Fish Slough Springsnail
IMGASJ0290 2
Owens Speckled Dace
AFCJB3705F 6
Owens Valley Springsnail
IMGASJ0280 8
Owens Valley Springsnail
IMGASJ0280 7
Owens Pupfish
AFCNB02090 10
Fish Slough Springsnail
IMGASJ0290 3
Owens Pupfish
AFCNB02090 2
MEA Special Status Species
South Highway 6 Area
Private Property
State Species Listing
None
Threatened
Endangered
¼ 0 ¼ ½
Miles
Figure 28
Mono County MEA – 2001

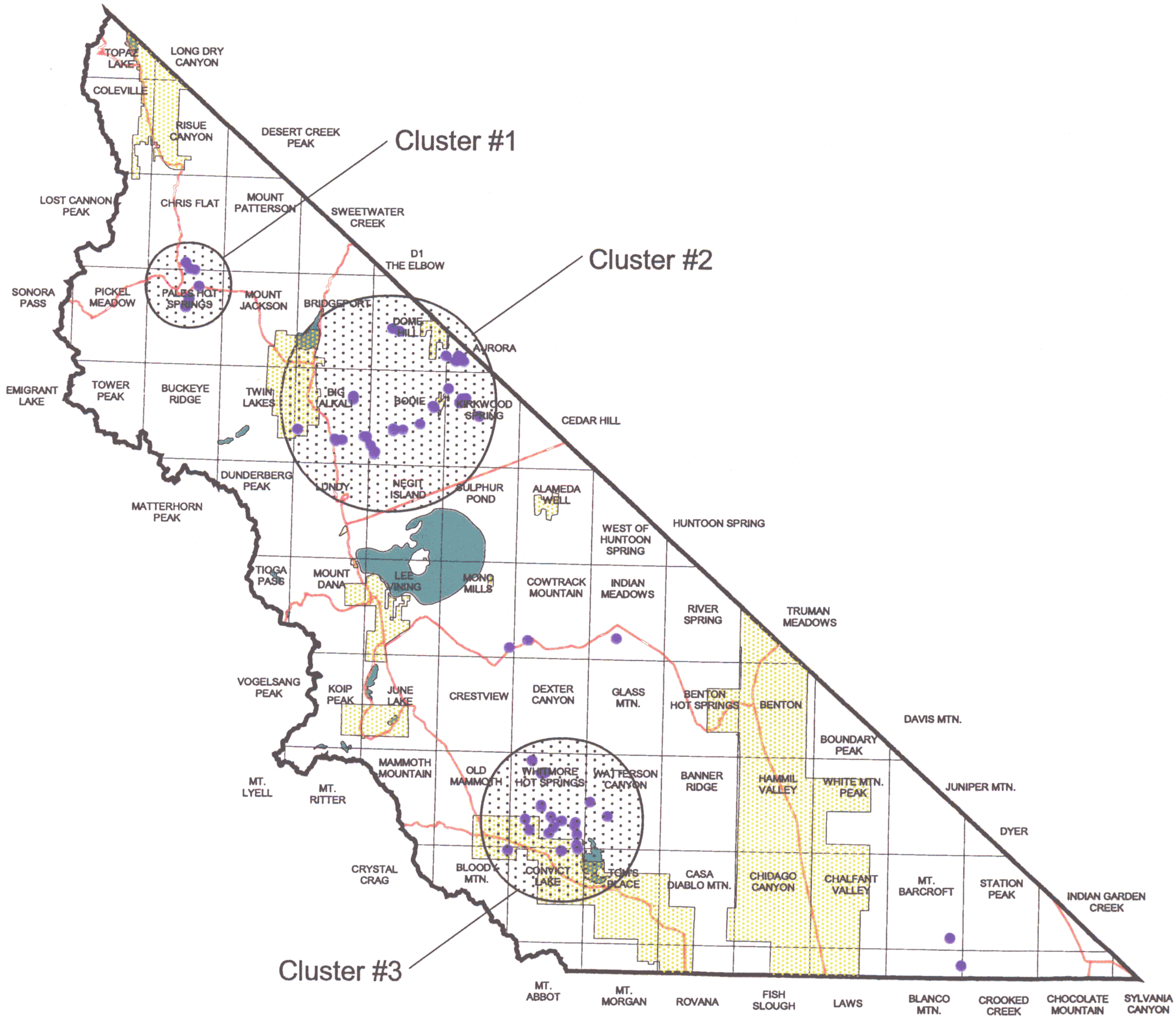


MEA Special Status Species
Topaz Area
Private Property
State Species Listing
None
Threatened
Endangered
¼ 0 ¼ ½
Miles
Bald Eagle
ABNKC10010135
Figure 28
Mono County MEA -- 2001


MEA Special Status Species
Upper Crowley Area
Private Property
State Species Listing
None
Threatened
Endangered
¼
0
¼
½
Miles
Owens Sucker
AFCJC02090 3
Owens Sucker
AFCJC02090 16
Owens Tui Chub
AFCJB1303J 10
Owens Speckled Dace
AFCJB3705F 17
Owens Speckled Dace
AFCJB3705F 26
Figure 28
Mono County MEA ~ 2001


MEA Special Status Species
North Hwy 6 Area
Private Property
State Species Listing
None
Threatened
Endangered
¼ 0 ¼ ½
Miles
Owens Speckled Dace
AFCJB3705F 4
Benton Valley Springsnail
IMGASJ0270 1
Owens Speckled Dace
AFCJB3705F 15
Nelson's Bighorn Sheep
AMALE04013 8
Owens Speckled Dace
AFCJB3705F 11
Owens Valley Vole
AMAFF11033 1
Owens Speckled Dace
AFCJB3705F 12
Wong's Springsnail
IMGASJ0360 20
Figure 28
Mono County MEA ~ 2001

Identified Sage Grouse Leks
County Overview



●	Sage Grouse Leks
	Private Land

Note: This map is based on 2001 BLM data obtained through an intensive Sage Grouse Study project. The data is not static, and will be updated each year as new data becomes available.

Figure 28
Mono County MEA -- 2001

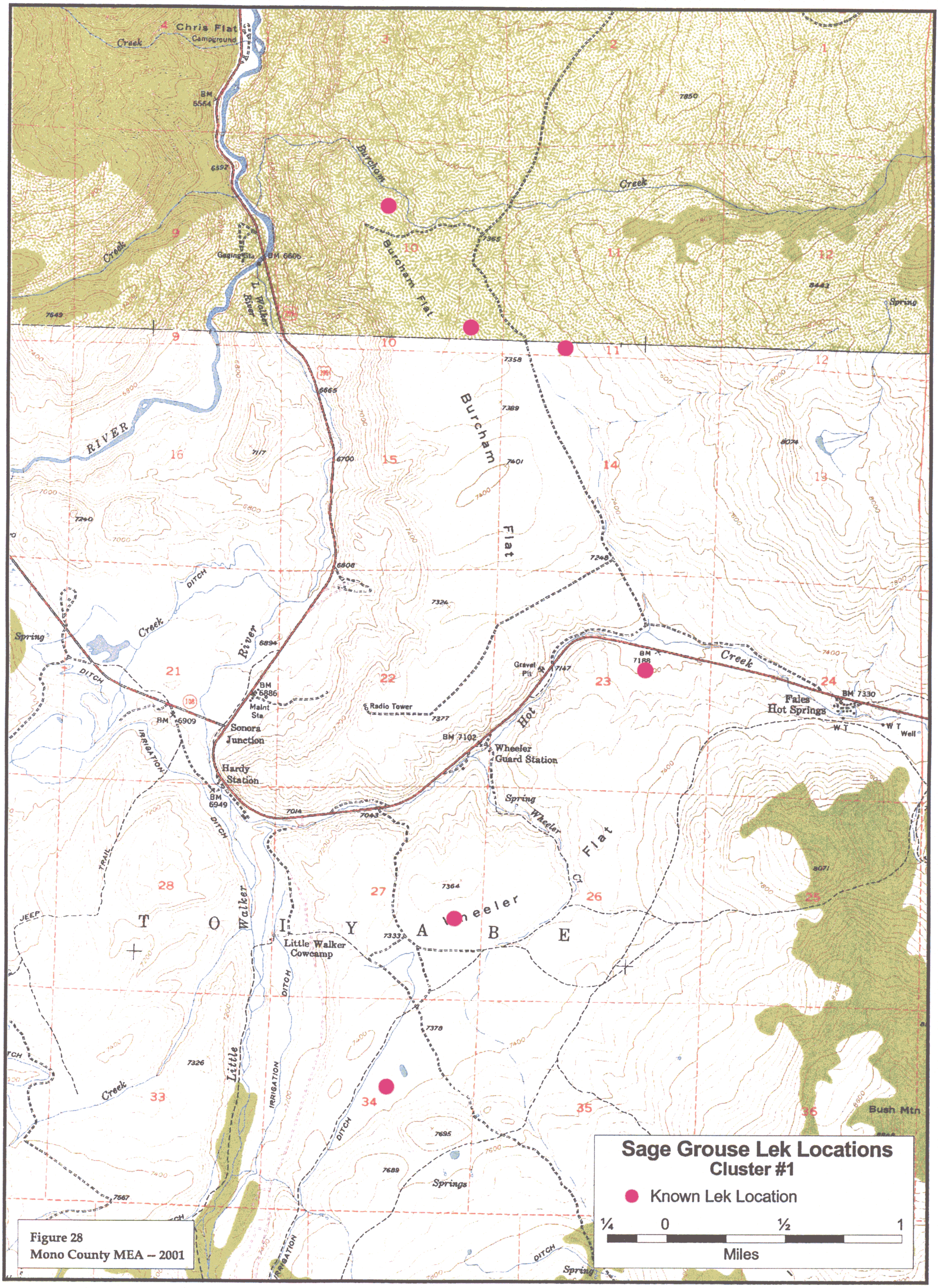


Figure 28
Mono County MEA -- 2001

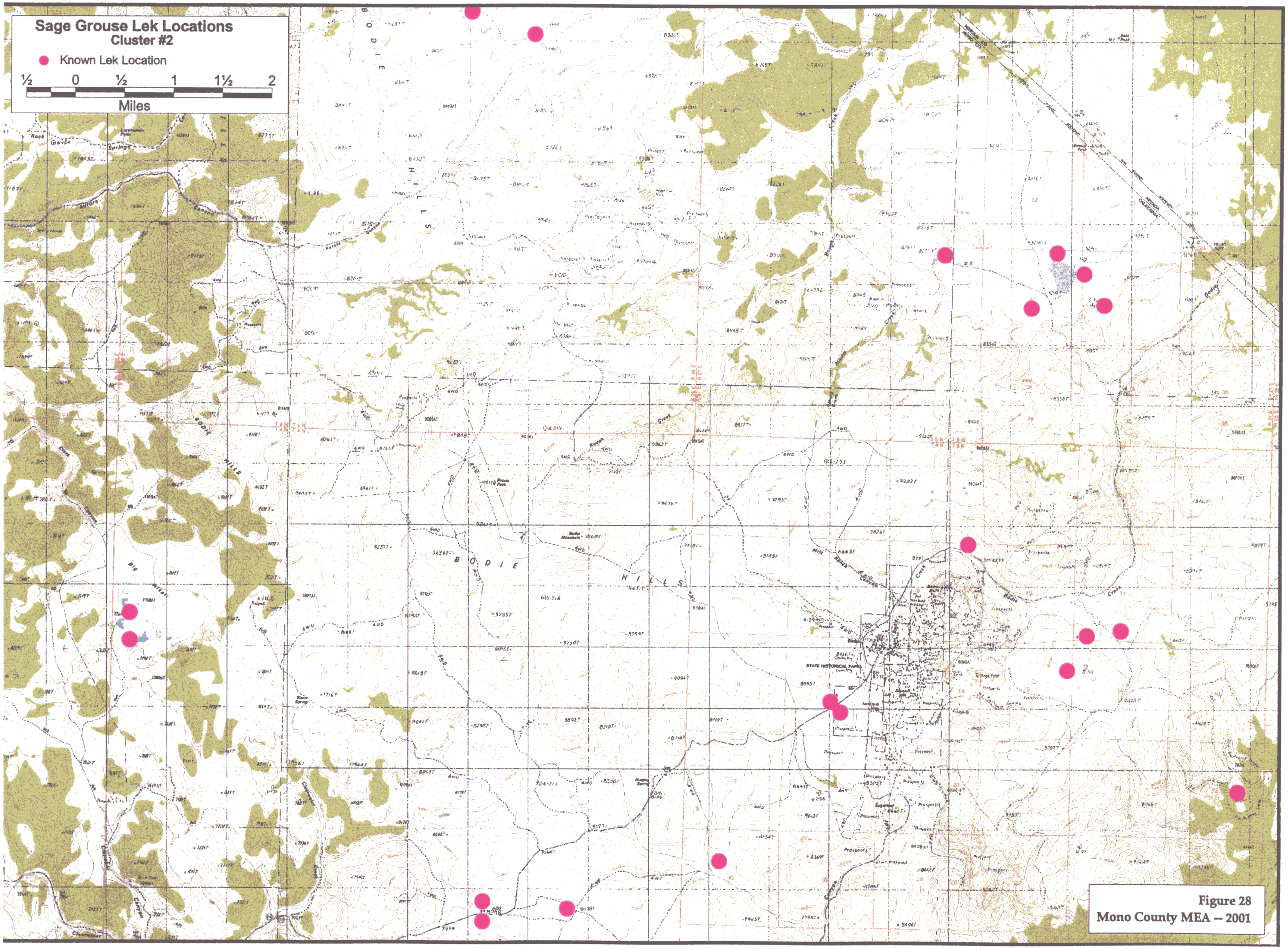


Figure 28
Mono County MEA -- 2001

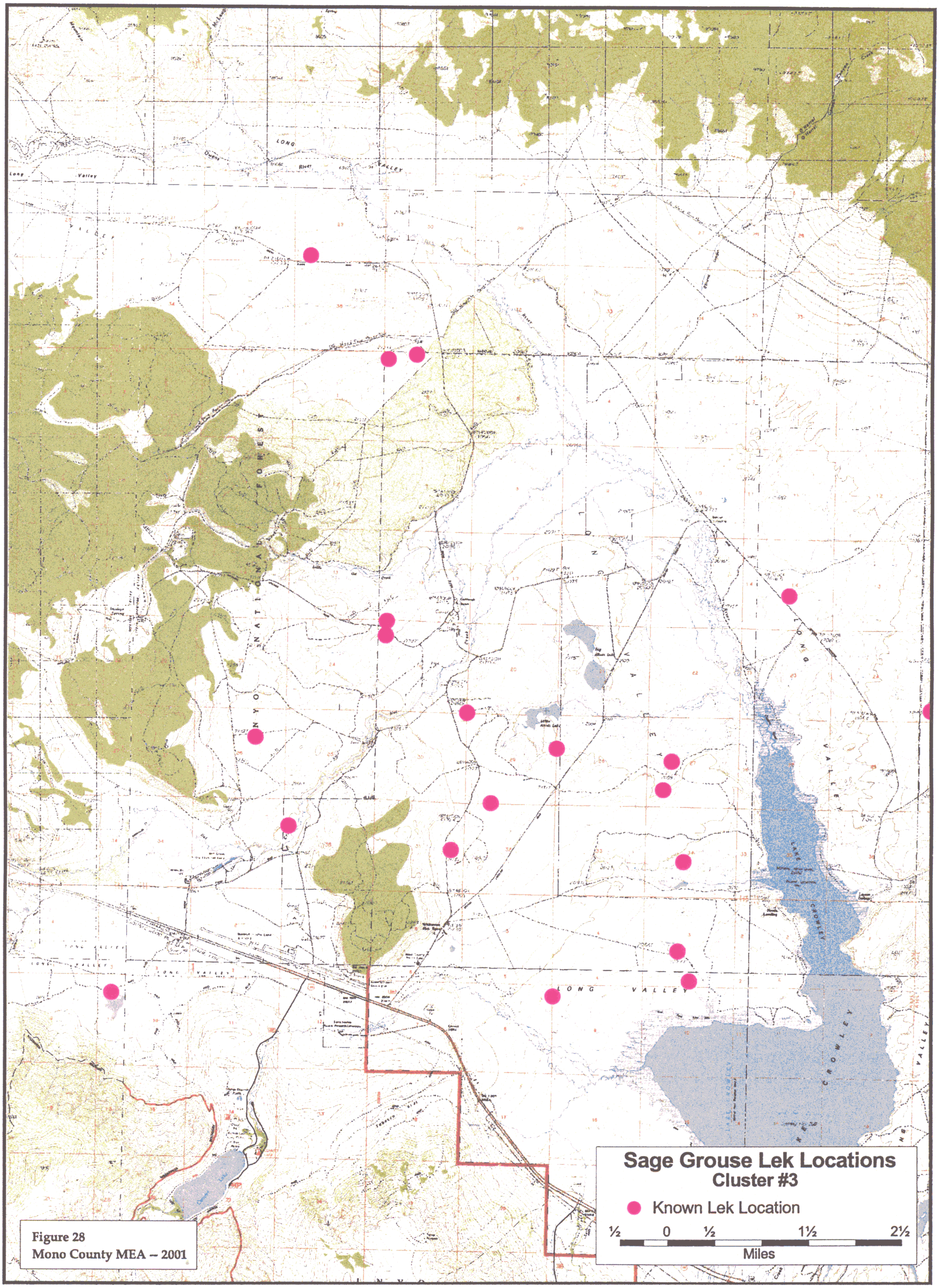


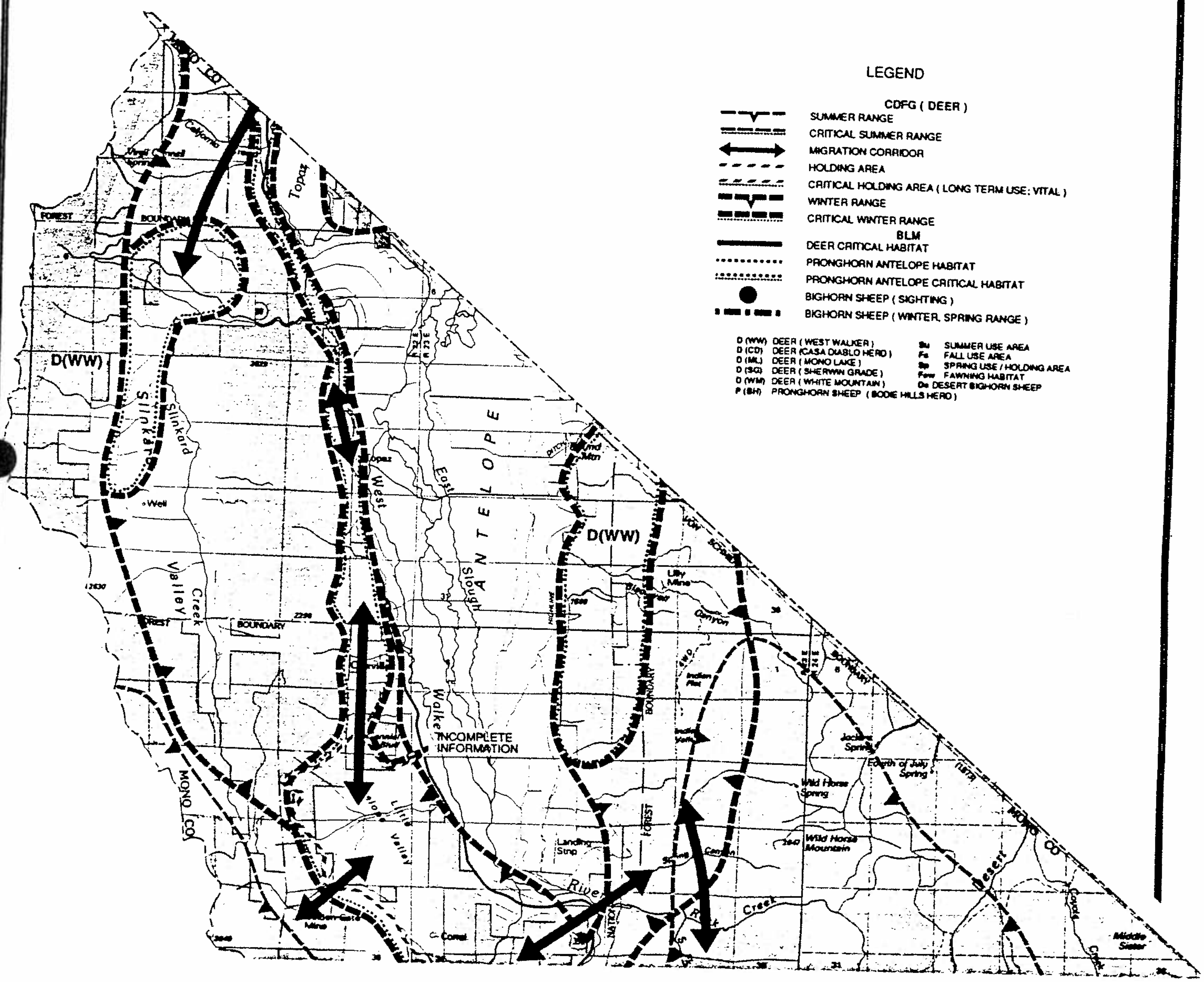
Figure 28
Mono County MEA – 2001

Figure 32

Wildlife Use Areas – Big Game

A. Antelope Valley
B. Devil's Gate
C. East Walker
D. Bridgeport
E. Bodie
F. Mono Lake
G. Cowtrack Mountain
I. June Lake
J. Long Valley
K. Hammil Valley
L. Wheeler / Paradise
M. Chalfant Valley

A. Antelope Valley



SOURCES: Calif.Dept of Fish and Game; BLM

FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

FIGURE 32 A
WILDLIFE USE AREAS - BIG GAME

B. Devil's Gate to Swauger Creek

LEGEND

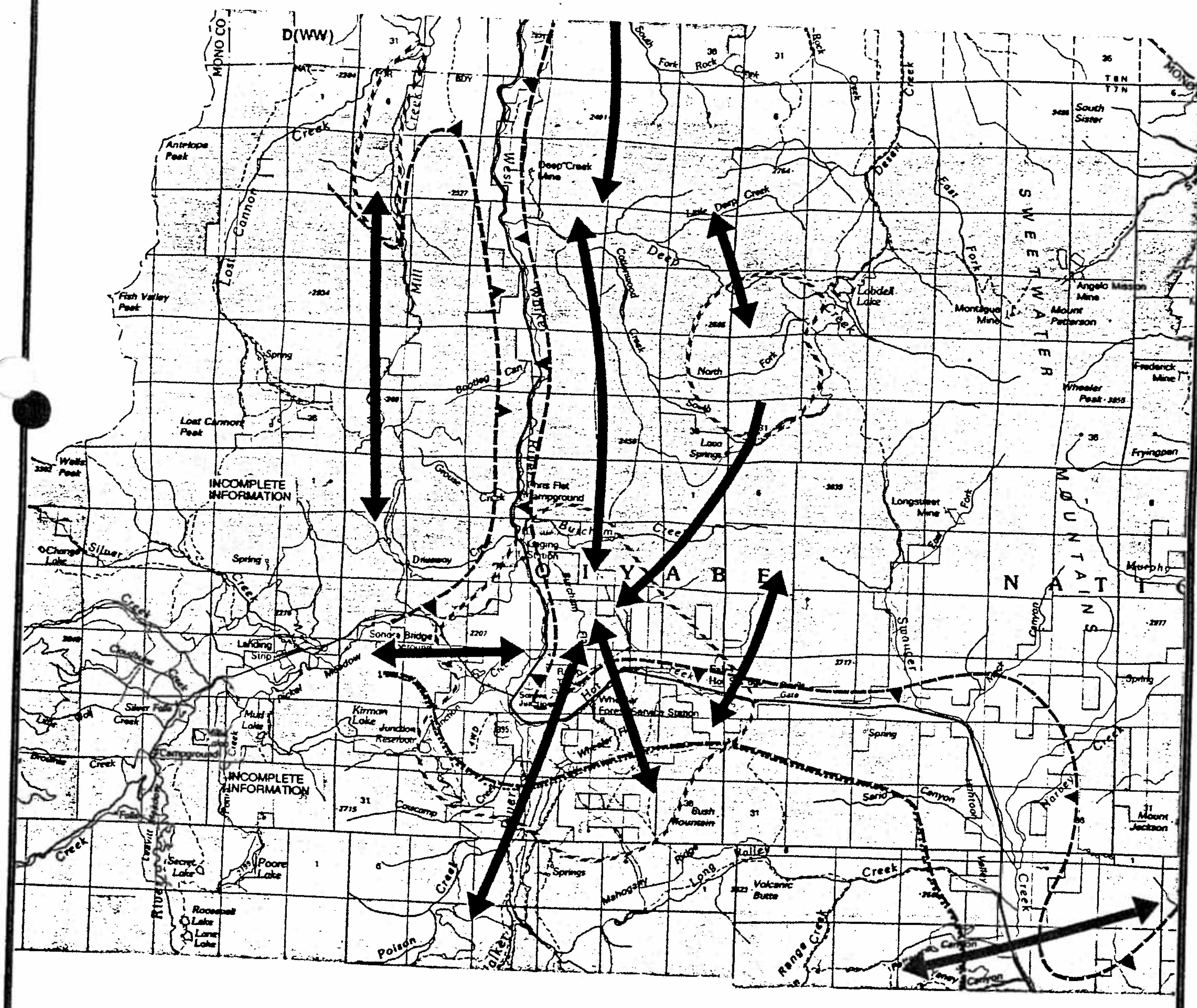
CDFG (DEER)

- SUMMER RANGE
- CRITICAL SUMMER RANGE
- MIGRATION CORRIDOR
- HOLDING AREA
- CRITICAL HOLDING AREA (LONG TERM USE; VITAL)
- WINTER RANGE
- CRITICAL WINTER RANGE

BLM

- DEER CRITICAL HABITAT
- PRONGHORN ANTELOPE HABITAT
- PRONGHORN ANTELOPE CRITICAL HABITAT
- BIGHORN SHEEP (SIGHTING)
- BIGHORN SHEEP (WINTER, SPRING RANGE)

D (WW)	DEER (WEST WALKER)	Su	SUMMER USE AREA
D (CD)	DEER (CASA DIABLO HERD)	Fe	FALL USE AREA
D (ML)	DEER (MONO LAKE)	Sp	SPRING USE / HOLDING AREA
D (SG)	DEER (SHERWIN GRADE)	Few	FAWNING HABITAT
D (WM)	DEER (WHITE MOUNTAIN)	De	DESERT BIGHORN SHEEP
P (BH)	PRONGHORN SHEEP (BODIE HILLS HERD)		



SOURCES: Calif.Dept of Fish and Game; BLM

FEDERALLY OWNED LANDS

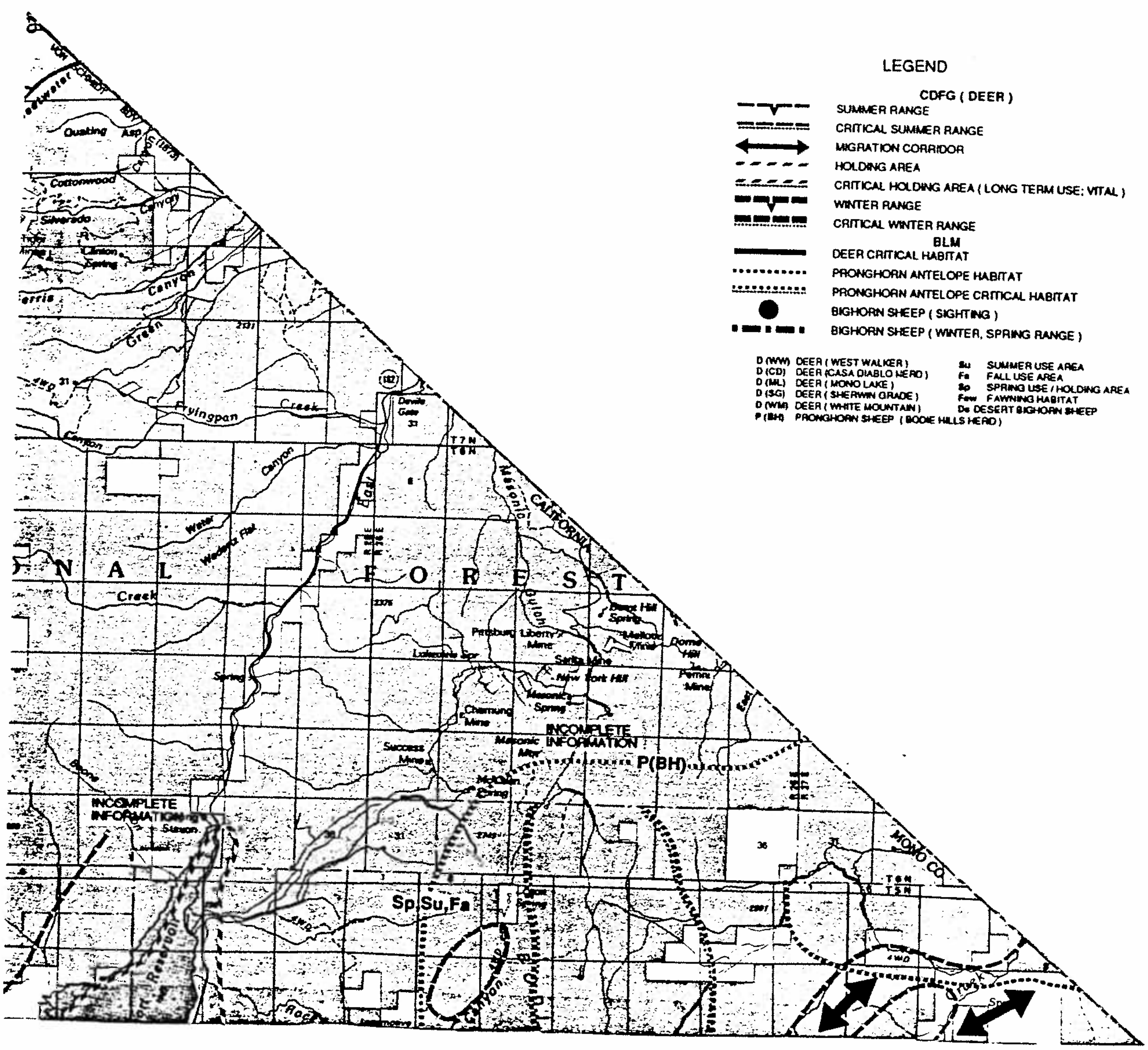
0 MILES 5

N

MONO COUNTY MEA

FIGURE 32 B
WILDLIFE USE AREAS - BIG GAME

C. East Walker



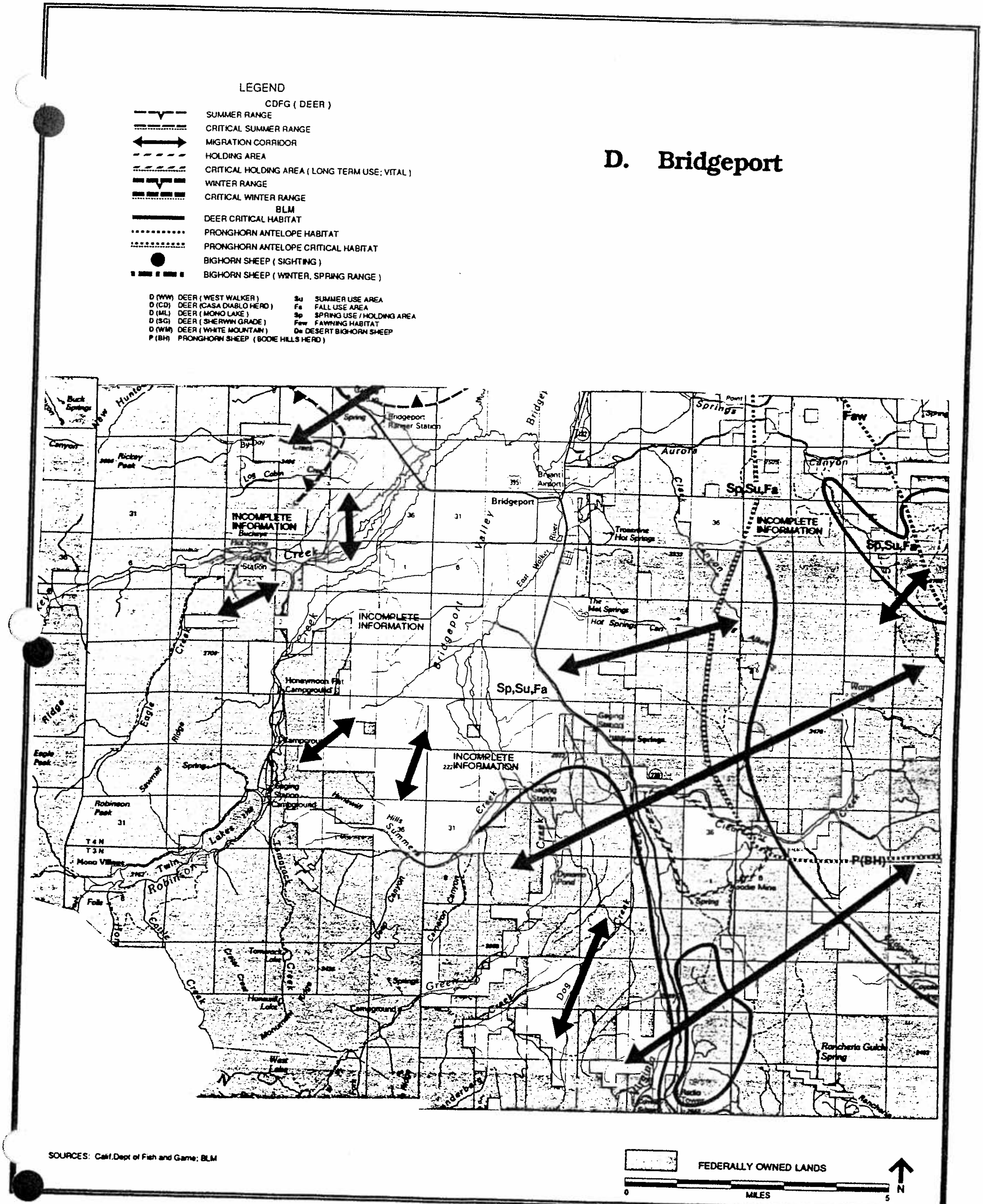
SOURCES: Calif.Dept of Fish and Game; BLM

FEDERALLY OWNED LANDS

0 MILES 5

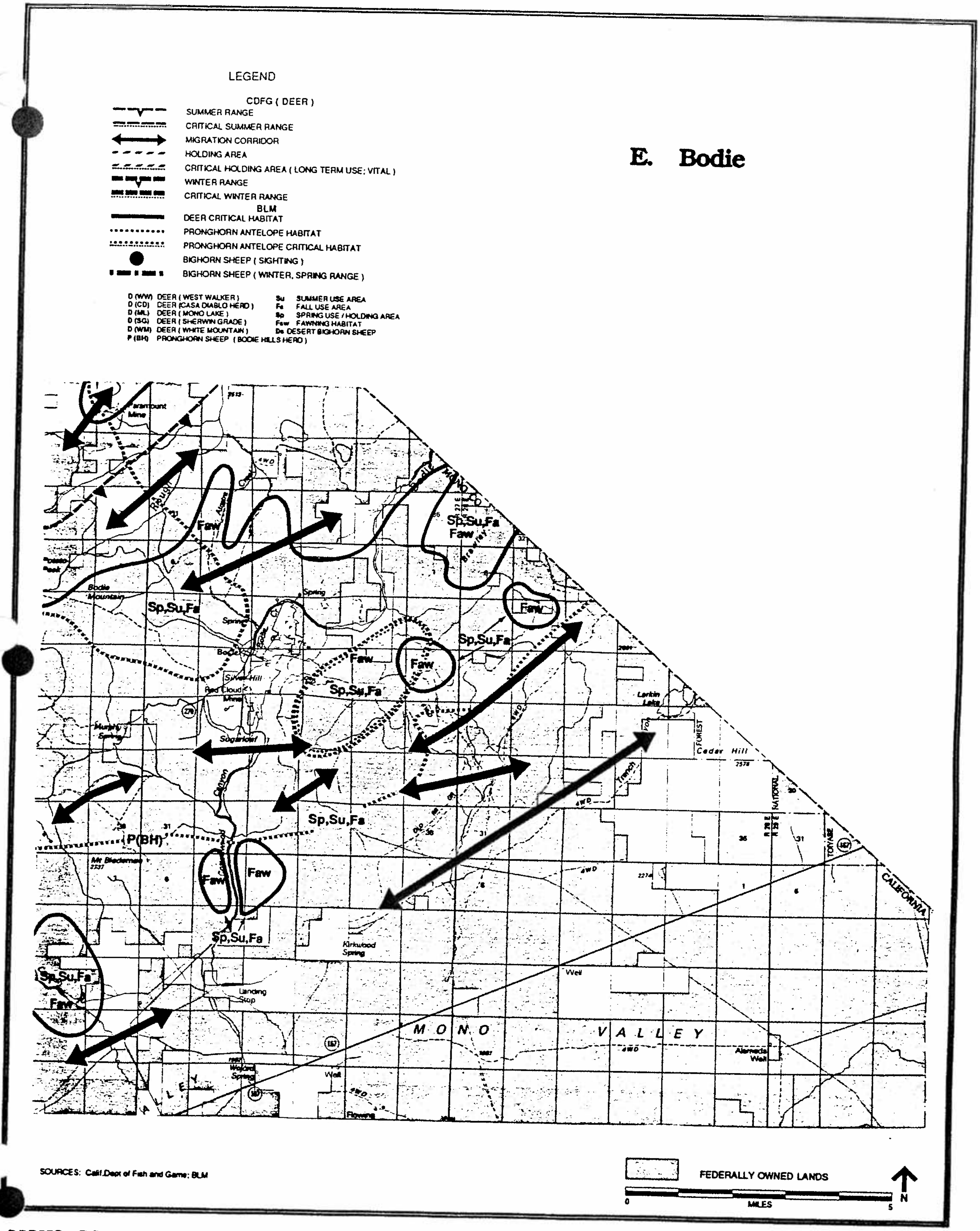
N

FIGURE 32 C
WILDLIFE USE AREAS - BIG GAME



MONO COUNTY MEA

FIGURE 32 D
WILDLIFE USE AREAS - BIG GAME



MONO COUNTY MEA

FIGURE 32 E
WILDLIFE USE AREAS - BIG GAME

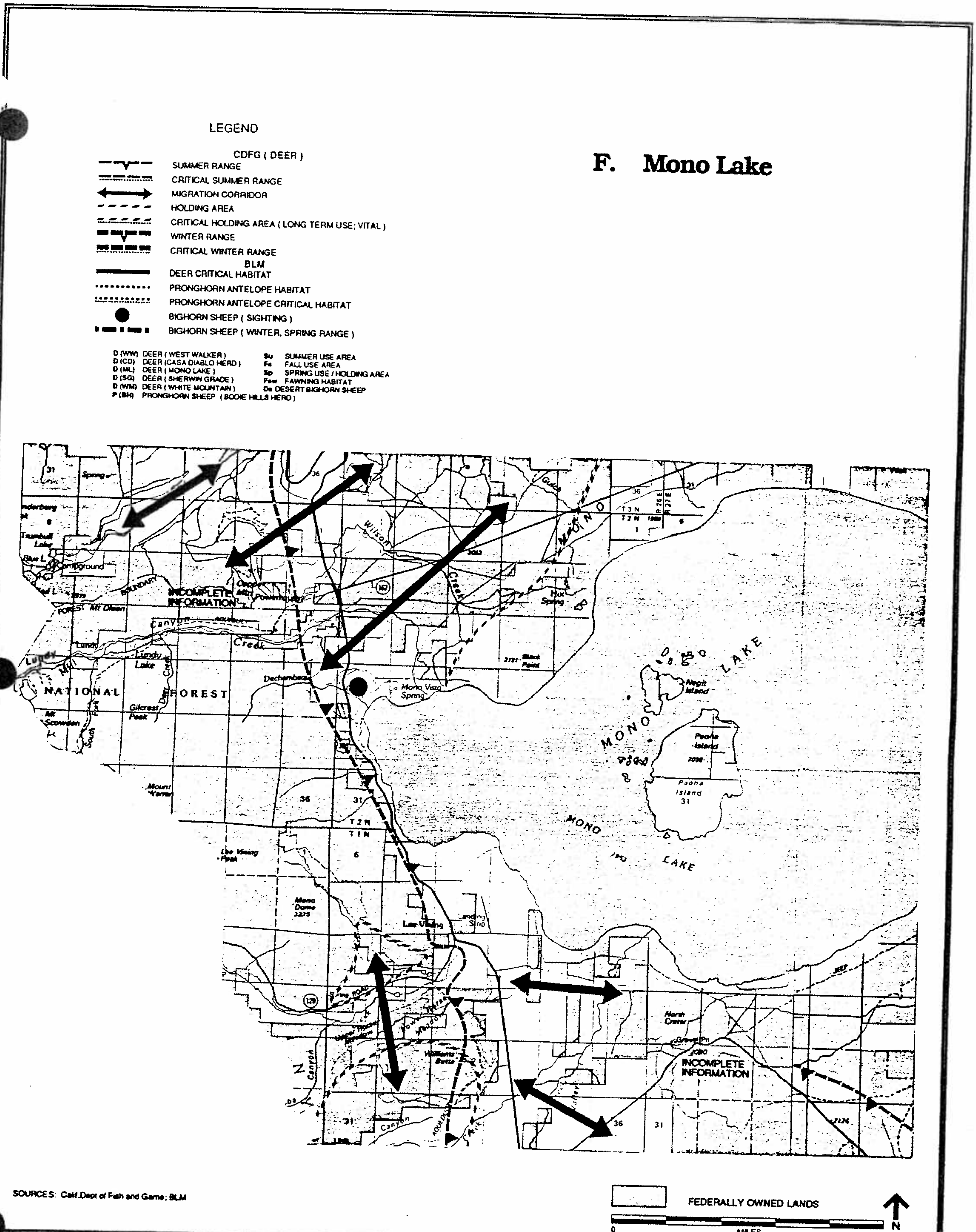
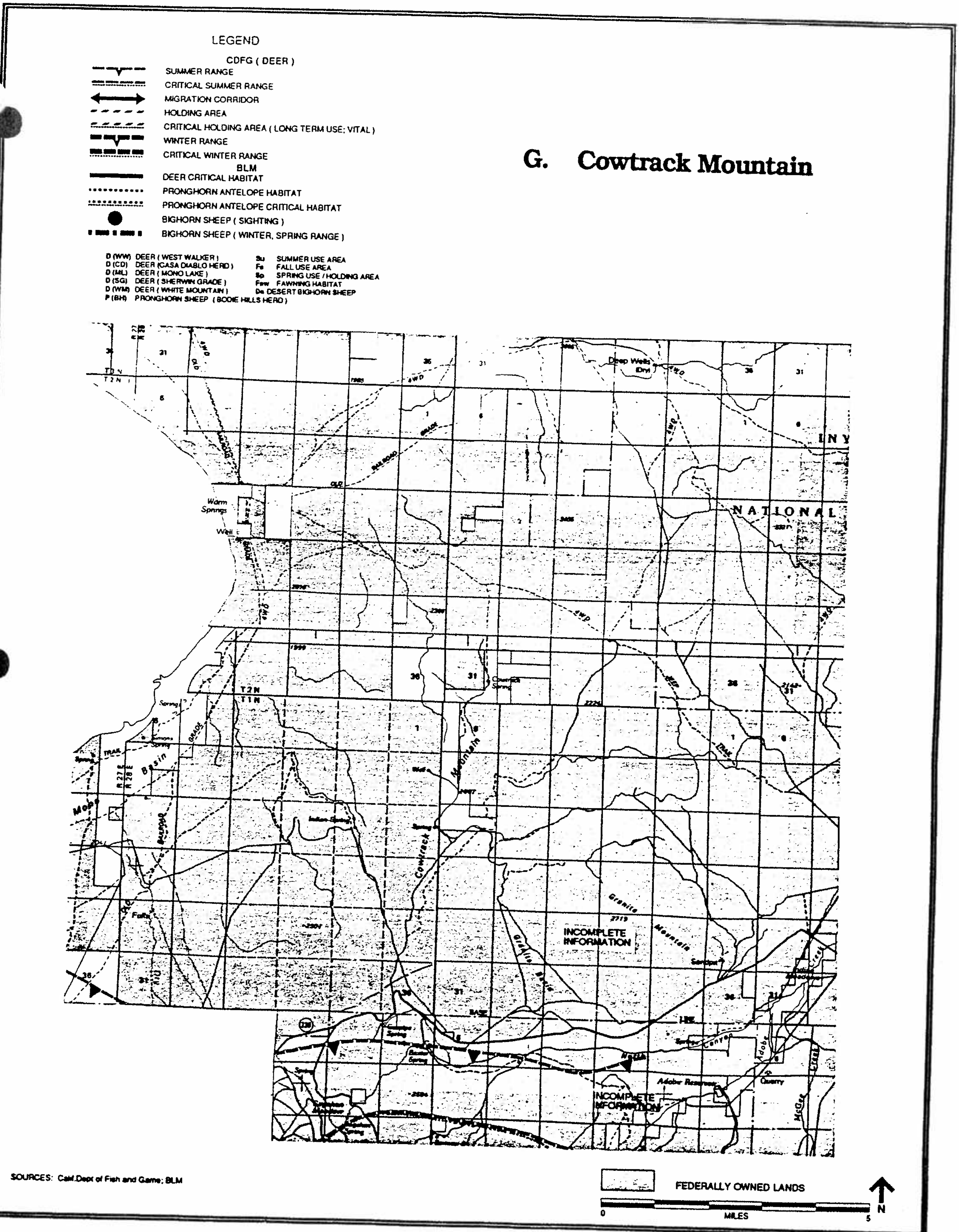


FIGURE 32 F
WILDLIFE USE AREAS - BIG GAME

G. Cowtrack Mountain



MONO COUNTY MEA

FIGURE 32 G
WILDLIFE USE AREAS - BIG GAME

LEGEND

CDFG (DEER)

SUMMER RANGE
CRITICAL SUMMER RANGE
MIGRATION CORRIDOR
HOLDING AREA
CRITICAL HOLDING AREA (LONG TERM USE; VITAL)
WINTER RANGE
CRITICAL WINTER RANGE

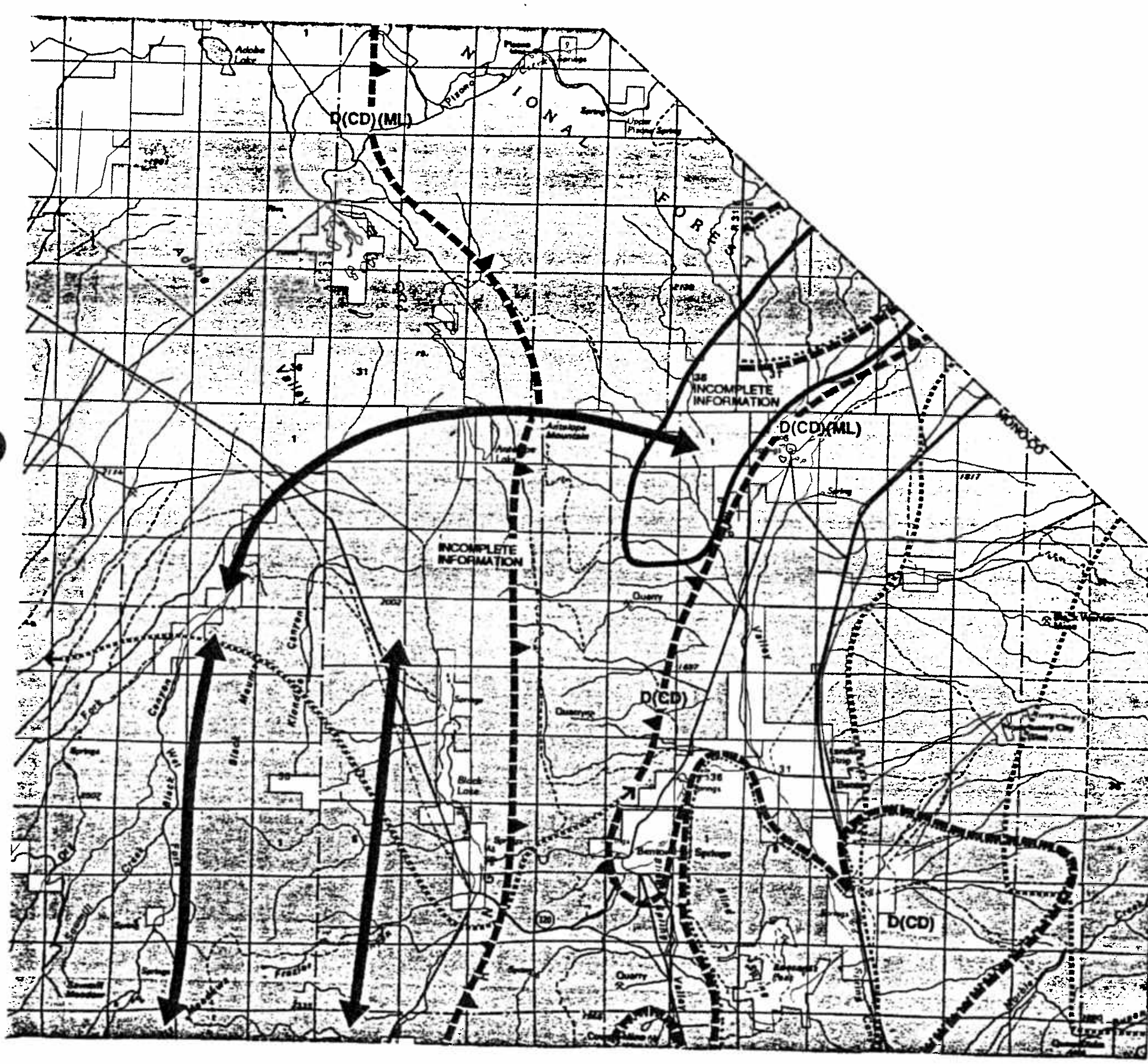
BLM

DEER CRITICAL HABITAT
PRONGHORN ANTELOPE HABITAT
PRONGHORN ANTELOPE CRITICAL HABITAT
BIGHORN SHEEP (SIGHTING)
BIGHORN SHEEP (WINTER, SPRING RANGE)

D (WW) DEER (WEST WALKER)
D (CD) DEER (CASA DIABLO HERD)
D (ML) DEER (MONO LAKE)
D (SG) DEER (SHERWIN GRADE)
D (WM) DEER (WHITE MOUNTAIN)
P (BH) PRONGHORN SHEEP (BODIE HILLS HERD)

Su SUMMER USE AREA
Fa FALL USE AREA
Sp SPRING USE / HOLDING AREA
Faw FAWNING HABITAT
Ds DESERT BIGHORN SHEEP

H. Adobe Valley / Benton



SOURCES: Calif.Dept of Fish and Game; BLM

FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

FIGURE 32 H
WILDLIFE USE AREAS - BIG GAME

LEGEND

CDFG (DEER)

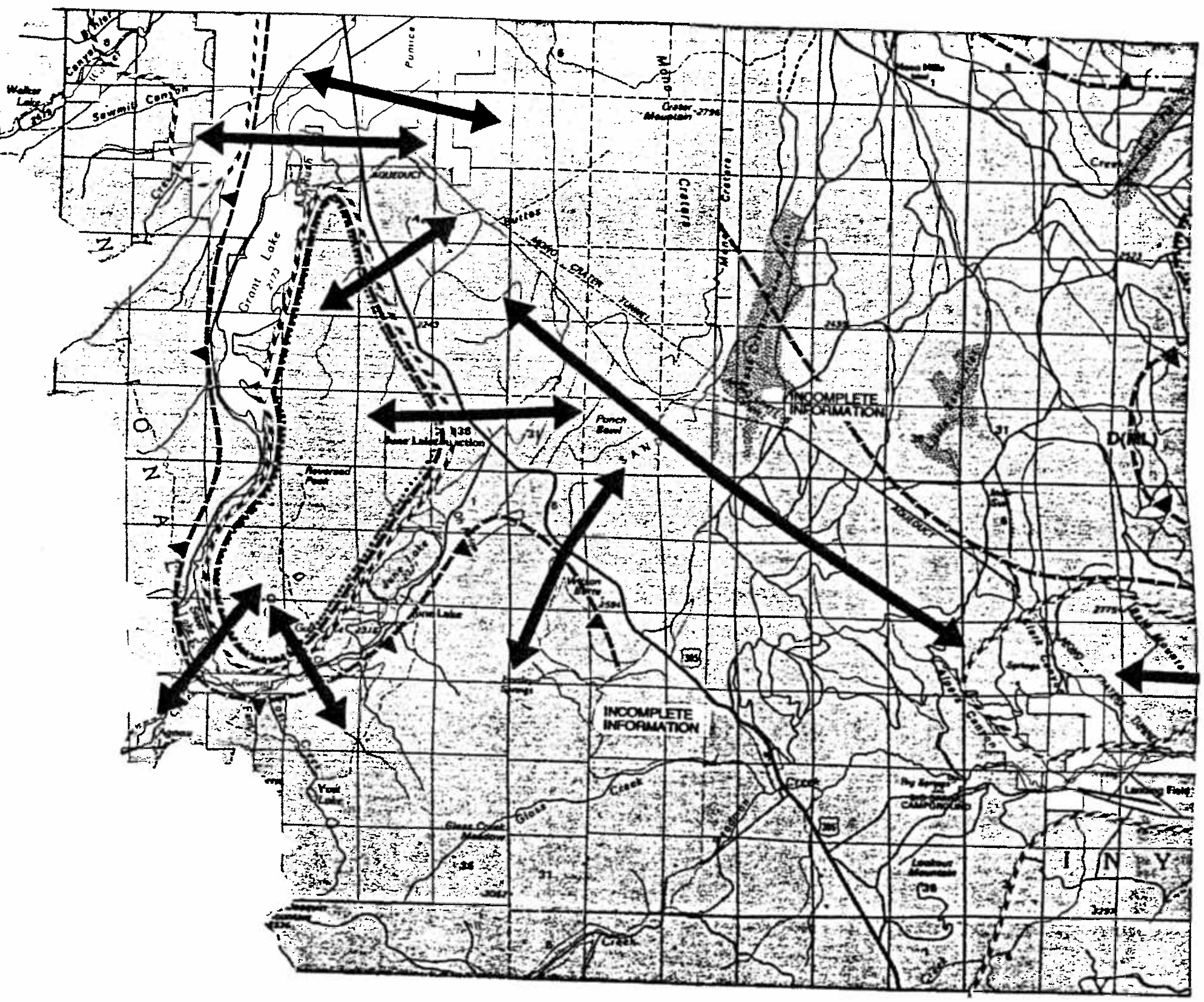
SUMMER RANGE
CRITICAL SUMMER RANGE
MIGRATION CORRIDOR
HOLDING AREA
CRITICAL HOLDING AREA (LONG TERM USE; VITAL)
WINTER RANGE
CRITICAL WINTER RANGE

BLM

DEER CRITICAL HABITAT
PRONGHORN ANTELOPE HABITAT
PRONGHORN ANTELOPE CRITICAL HABITAT
BIGHORN SHEEP (SIGHTING)
BIGHORN SHEEP (WINTER, SPRING RANGE)

D (WW)	DEER (WEST WALKER)	Su	SUMMER USE AREA
D (CD)	DEER (CASA DIABLO HERD)	Fa	FALL USE AREA
D (ML)	DEER (MONO LAKE)	Sp	SPRING USE / HOLDING AREA
D (SG)	DEER (SHERWIN GRADE)	Faw	FAWNING HABITAT
D (WM)	DEER (WHITE MOUNTAIN)	Ds	DESERT BIGHORN SHEEP
P (BH)	PRONGHORN SHEEP (BODIE HILLS HERD)		

I June Lake



SOURCES: Calif.Dept of Fish and Game; BLM

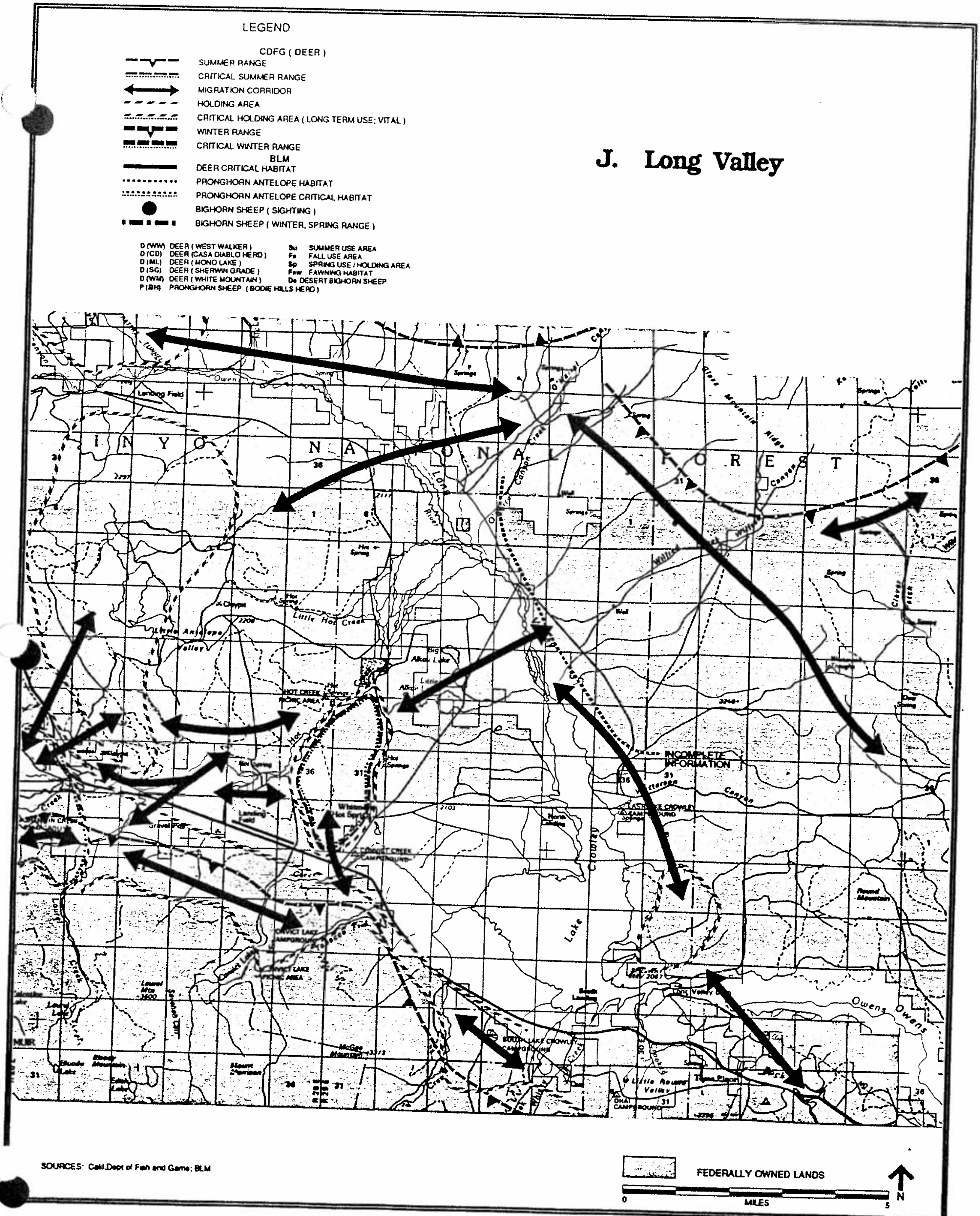
FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

FIGURE 32 I
WILDLIFE USE AREAS - BIG GAME



MONO COUNTY MEA

FIGURE 32 J
WILDLIFE USE AREAS - BIG GAME

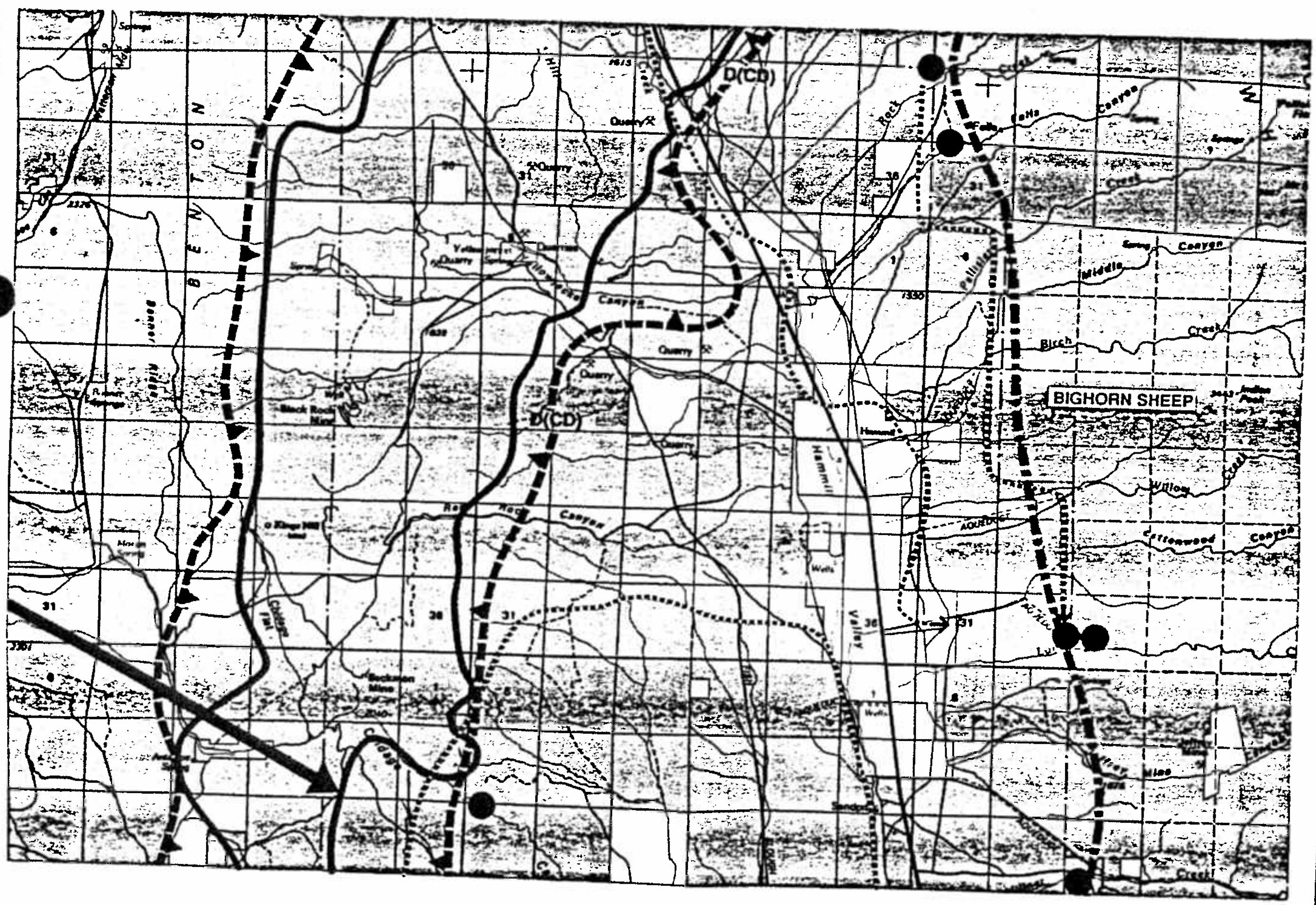
LEGEND

CDFG (DEER)
SUMMER RANGE
CRITICAL SUMMER RANGE
MIGRATION CORRIDOR
HOLDING AREA
CRITICAL HOLDING AREA (LONG TERM USE; VITAL)
WINTER RANGE
CRITICAL WINTER RANGE
BLM
DEER CRITICAL HABITAT
PRONGHORN ANTELOPE HABITAT
PRONGHORN ANTELOPE CRITICAL HABITAT
BIGHORN SHEEP (SIGHTING)
BIGHORN SHEEP (WINTER, SPRING RANGE)

D (WW) DEER (WEST WALKER)
D (CD) DEER (CASA DIABLO HERD)
D (ML) DEER (MONO LAKE)
D (SG) DEER (SHERWIN GRADE)
D (WM) DEER (WHITE MOUNTAIN)
P (BH) PRONGHORN SHEEP (BODIE HILLS HERD)

Su SUMMER USE AREA
Fa FALL USE AREA
Sp SPRING USE / HOLDING AREA
Faw FAWNING HABITAT
Ds DESERT BIGHORN SHEEP

K. Hammil Valley



SOURCES: Calif.Dept of Fish and Game; BLM

FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

FIGURE 32 K
WILDLIFE USE AREAS - BIG GAME

L. Wheeler / Paradise
M. Chalfant Valley

LEGEND

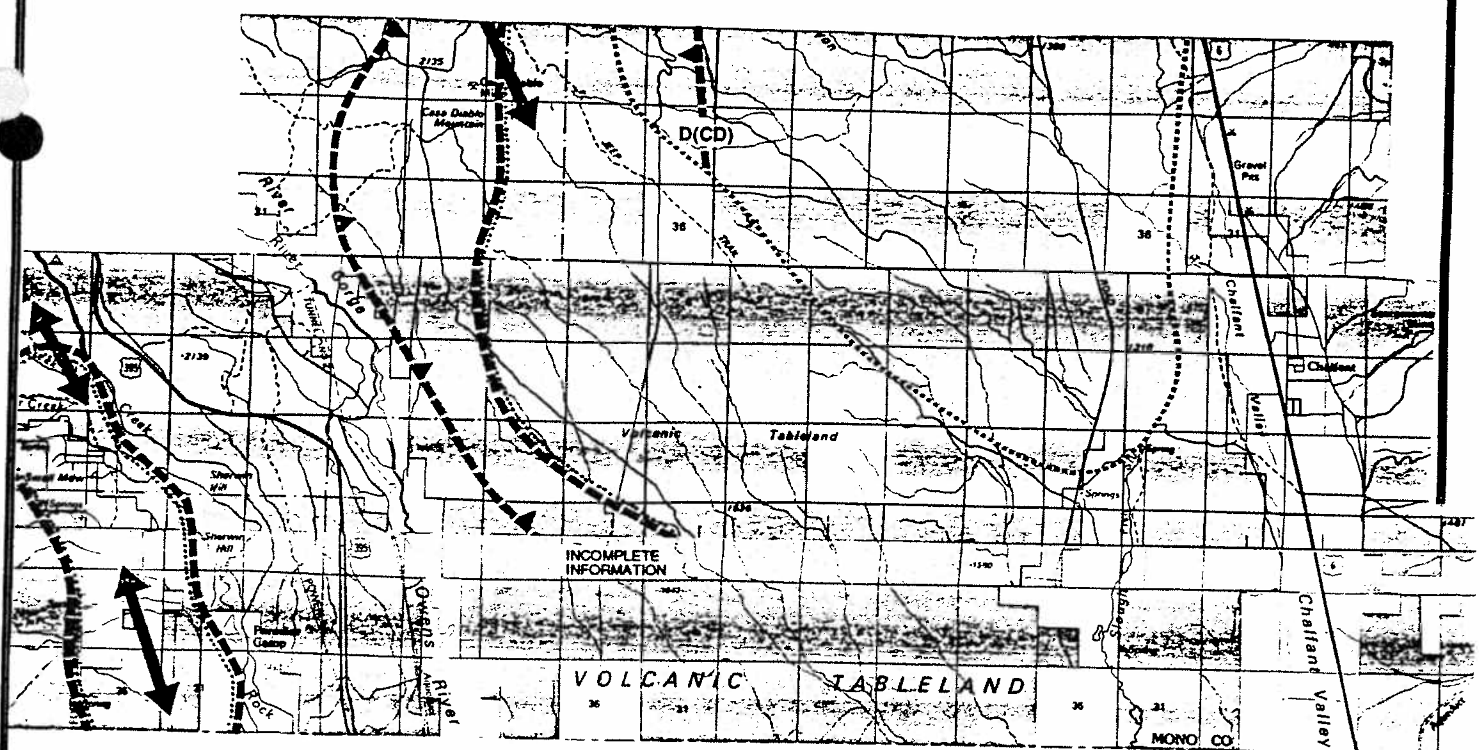
CDFG (DEER)

- SUMMER RANGE
- CRITICAL SUMMER RANGE
- MIGRATION CORRIDOR
- HOLDING AREA
- CRITICAL HOLDING AREA (LONG TERM USE; VITAL)
- WINTER RANGE
- CRITICAL WINTER RANGE

BLM

- DEER CRITICAL HABITAT
- PRONGHORN ANTELOPE HABITAT
- PRONGHORN ANTELOPE CRITICAL HABITAT
- BIGHORN SHEEP (SIGHTING)
- BIGHORN SHEEP (WINTER, SPRING RANGE)

D (WW)	DEER (WEST WALKER)	Su	SUMMER USE AREA
D (CD)	DEER (CASA DIABLO HERD)	Fa	FALL USE AREA
D (ML)	DEER (MONO LAKE)	Sp	SPRING USE / HOLDING AREA
D (SG)	DEER (SHERWIN GRADE)	Faw	FAWNING HABITAT
D (WM)	DEER (WHITE MOUNTAIN)	De	DESERT BIGHORN SHEEP
P (BH)	PRONGHORN SHEEP (BODIE HILLS HERD)		



SOURCES: Calif.Dept of Fish and Game; BLM

FEDERALLY OWNED LANDS

0 MILES 5

N

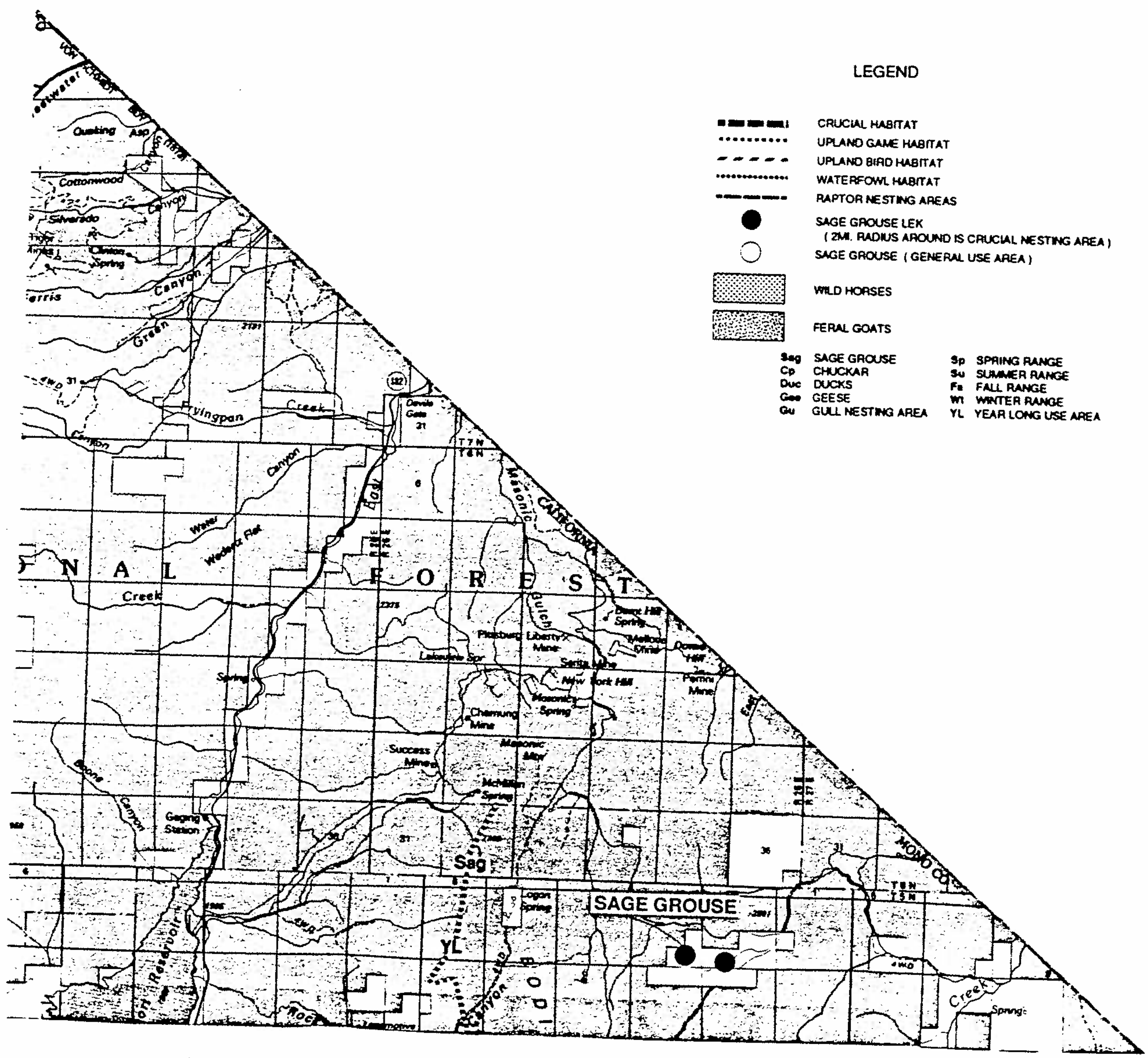
FIGURE 32 L & M
WILDLIFE USE AREAS - BIG GAME

Figure 33

Wildlife Use Areas – Other Wildlife

C. East Walker
D. Bridgeport
E. Bodie
F. Mono Lake
G. Cowtrack Mountain
H. Adobe Valley / Benton
J. Long Valley
K. Hammil Valley
L. Wheeler / Paradise
M. Chalfant Valley

C. East Walker



SOURCES: BLM; Calif. Dept of Fish and Game

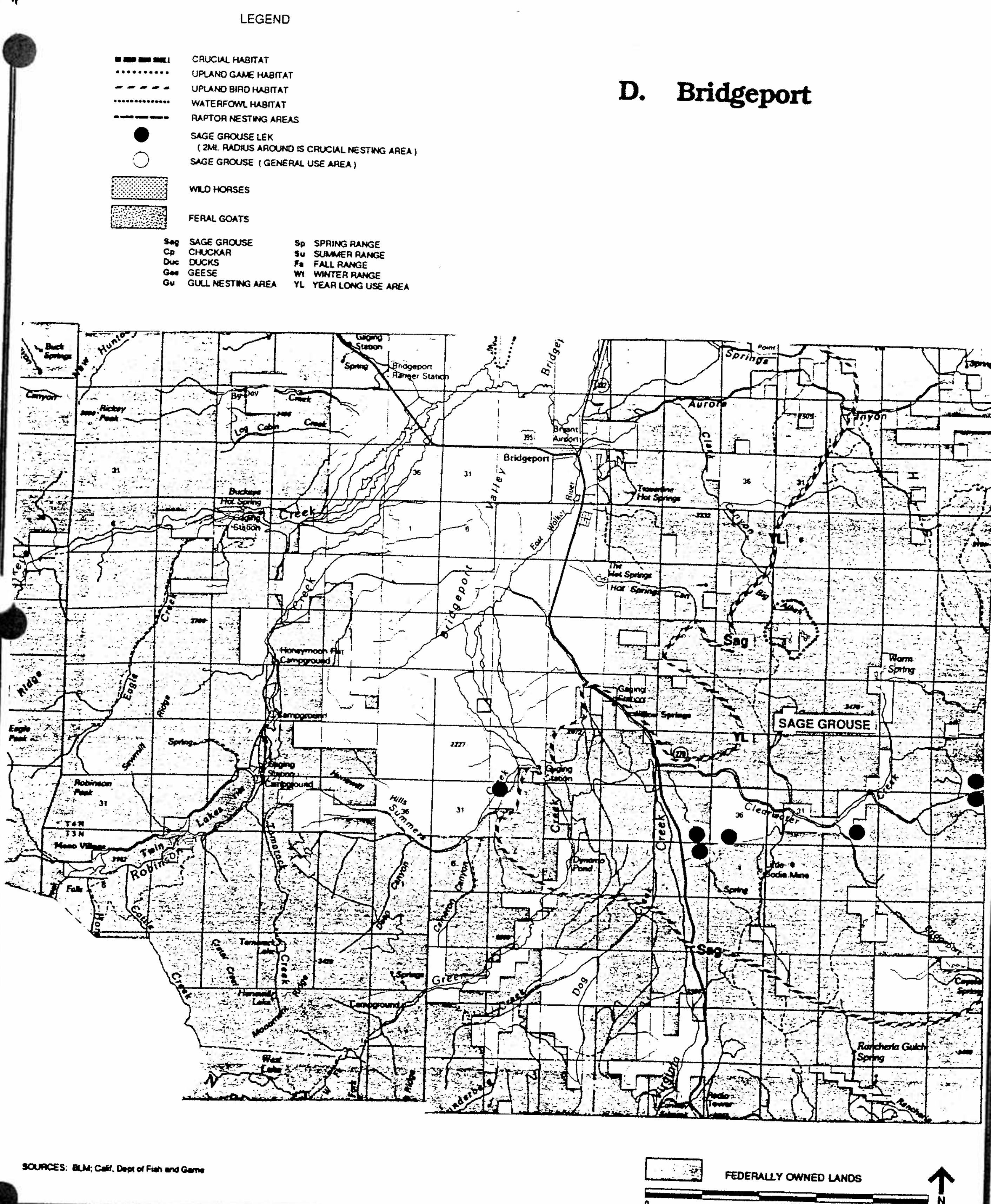
FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

FIGURE 33 C
WILDLIFE USE AREAS - OTHER WILDLIFE



MONO COUNTY MEA

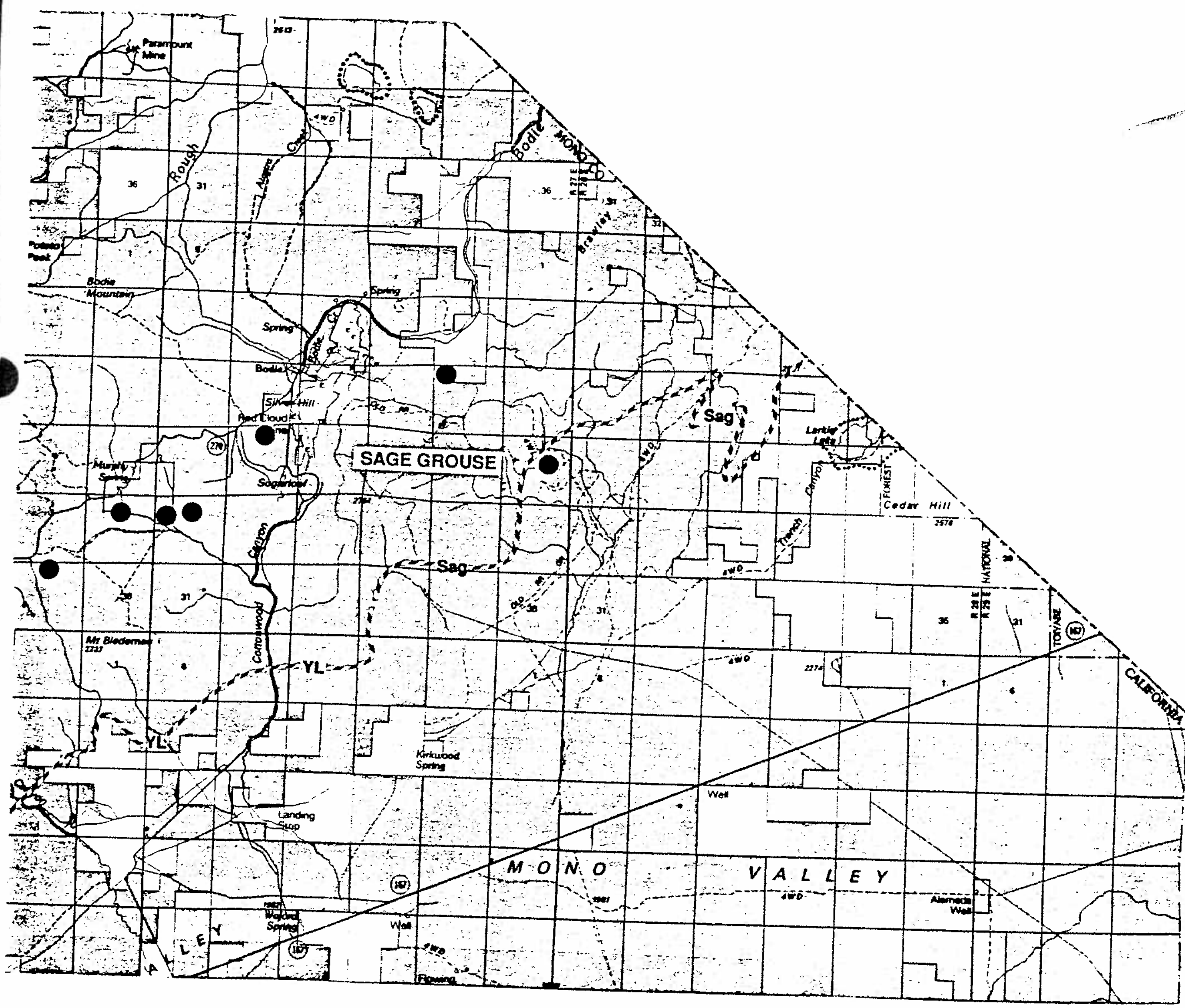
FIGURE 33 D
WILDLIFE USE AREAS - OTHER WILDLIFE

LEGEND

CRUCIAL HABITAT
UPLAND GAME HABITAT
UPLAND BIRD HABITAT
WATERFOWL HABITAT
RAPTOR NESTING AREAS
SAGE GROUSE LEK
(2MI. RADIUS AROUND IS CRUCIAL NESTING AREA)
SAGE GROUSE (GENERAL USE AREA)
WILD HORSES
FERAL GOATS

Sag	SAGE GROUSE	Sp	SPRING RANGE
Cp	CHUCKAR	Su	SUMMER RANGE
Duc	DUCKS	Fa	FALL RANGE
Gee	GEESE	Wt	WINTER RANGE
Gu	GULL NESTING AREA	YL	YEAR LONG USE AREA

E. Bodie



SOURCES: BLM; Calif. Dept of Fish and Game

FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

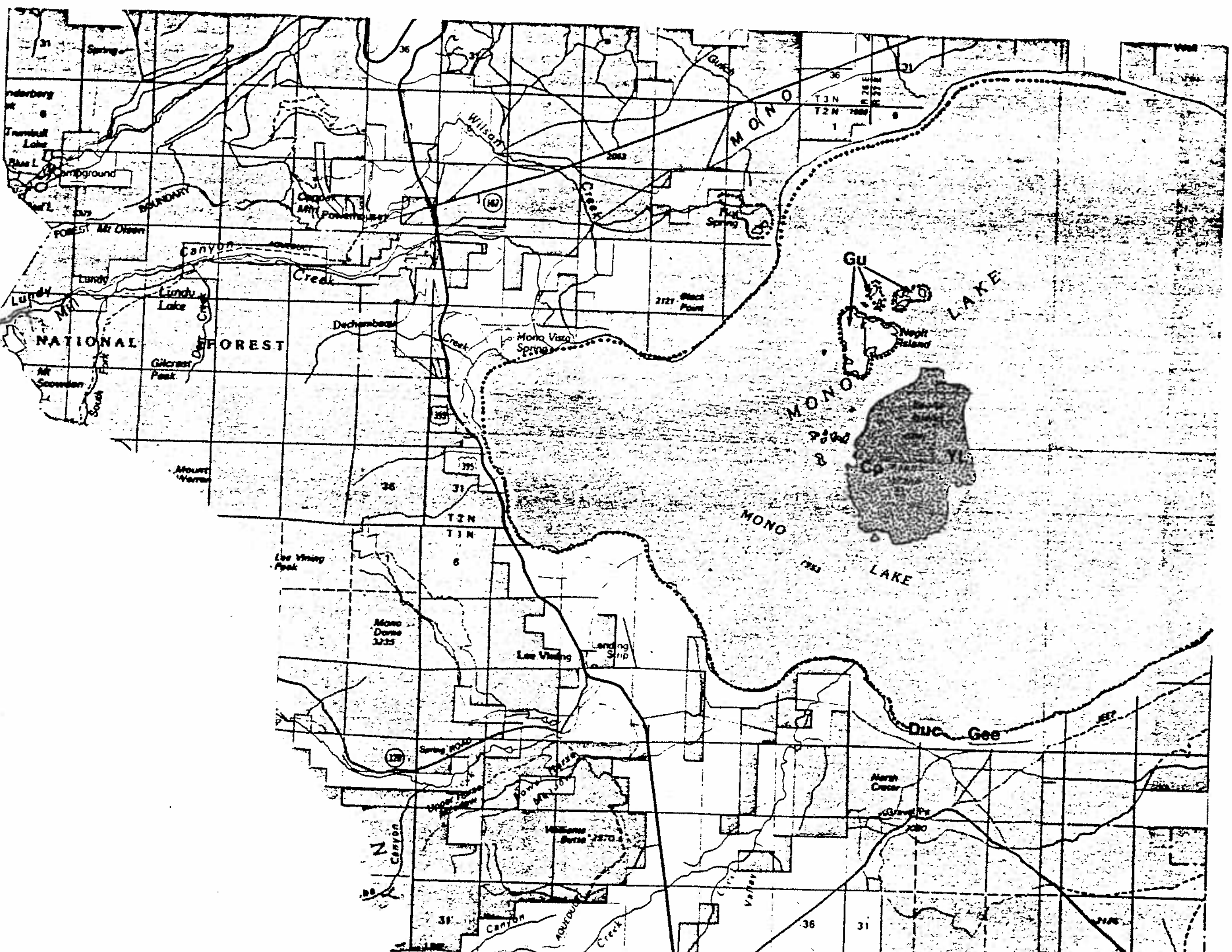
FIGURE 33 E
WILDLIFE USE AREAS - OTHER WILDLIFE

LEGEND

CRUCIAL HABITAT
UPLAND GAME HABITAT
UPLAND BIRD HABITAT
WATERFOWL HABITAT
RAPTOR NESTING AREAS
SAGE GROUSE LEK
(2MI. RADIUS AROUND IS CRUCIAL NESTING AREA)
SAGE GROUSE (GENERAL USE AREA)
WILD HORSES
FERAL GOATS

Sag	SAGE GROUSE	Sp	SPRING RANGE
Cp	CHUCKAR	Su	SUMMER RANGE
Duc	DUCKS	Fa	FALL RANGE
Gee	GEESE	Wt	WINTER RANGE
Gu	GULL NESTING AREA	YL	YEAR LONG USE AREA

F. Mono Lake



SOURCES: BLM; Calif. Dept of Fish and Game

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 33 F
WILDLIFE USE AREAS - OTHER WILDLIFE

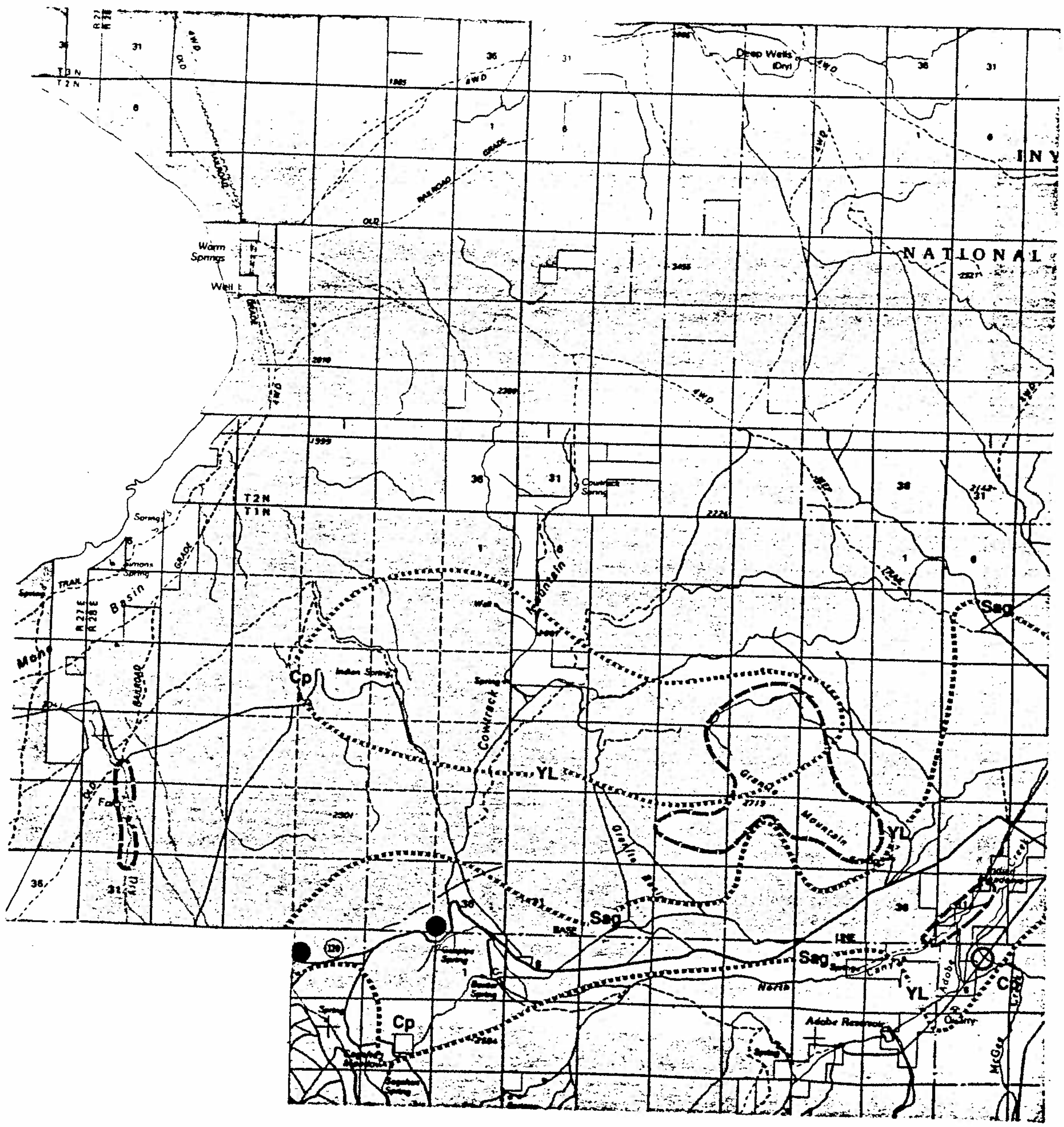
LEGEND

CRUCIAL HABITAT
UPLAND GAME HABITAT
UPLAND BIRD HABITAT
WATERFOWL HABITAT
RAPTOR NESTING AREAS
SAGE GROUSE LEK
(2MI. RADIUS AROUND IS CRUCIAL NESTING AREA)
SAGE GROUSE (GENERAL USE AREA)
WILD HORSES
FERAL GOATS

Sag SAGE GROUSE
Cp CHUCKAR
Duc DUCKS
Gee GEESE
Gu GULL NESTING AREA

Sp SPRING RANGE
Su SUMMER RANGE
Fa FALL RANGE
Wt WINTER RANGE
YL YEAR LONG USE AREA

G. Cowtrack Mountain



SOURCES: BLM; Calif. Dept of Fish and Game

FEDERALLY OWNED LANDS

0 MILES 5

N

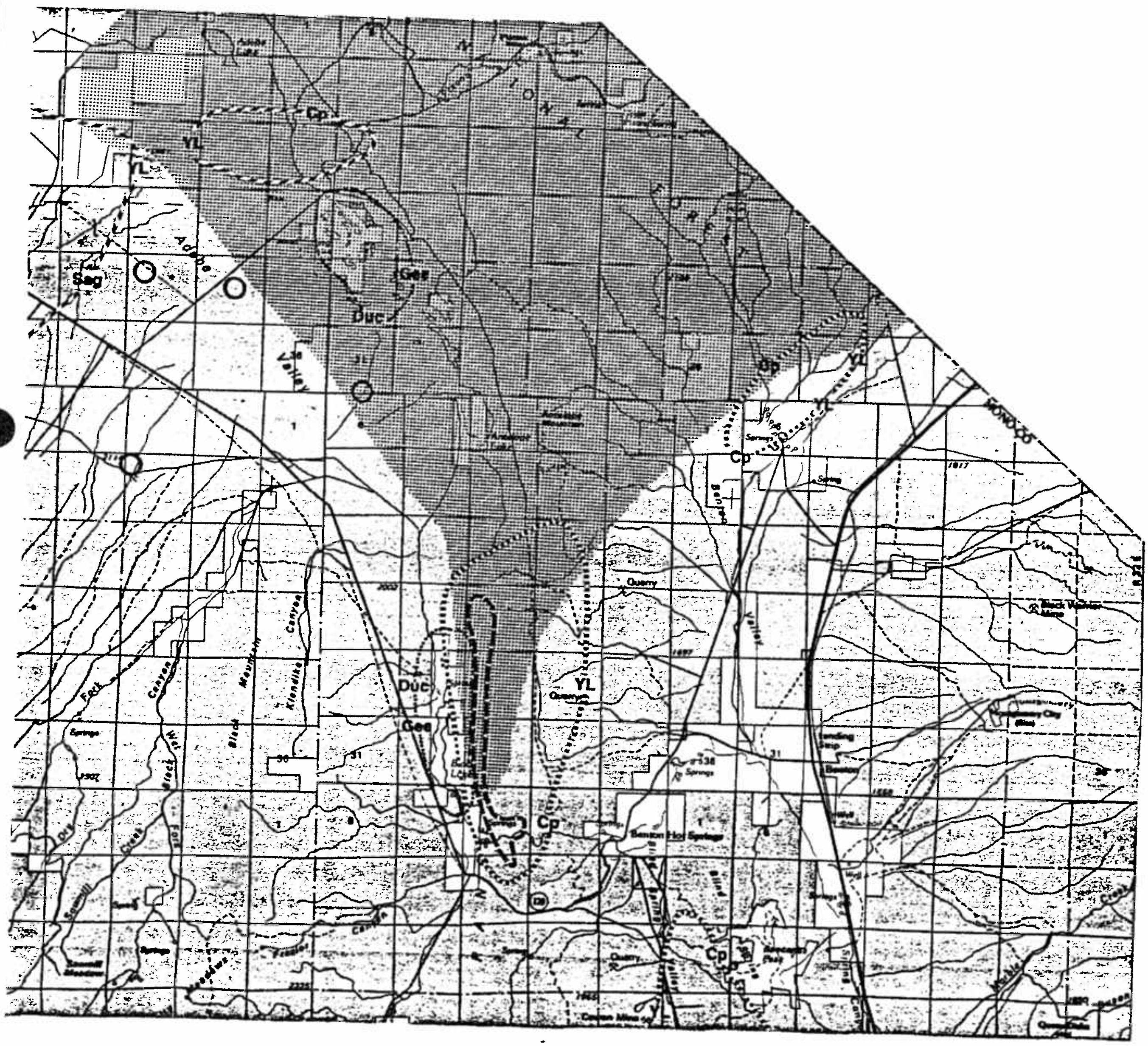
FIGURE 33 G
WILDLIFE USE AREAS - OTHER WILDLIFE

LEGEND

CRUCIAL HABITAT
UPLAND GAME HABITAT
UPLAND BIRD HABITAT
WATERFOWL HABITAT
RAPTOR NESTING AREAS
SAGE GROUSE LEK
(2MI. RADIUS AROUND IS CRUCIAL NESTING AREA)
SAGE GROUSE (GENERAL USE AREA)
WILD HORSES
FERAL GOATS

Sag	SAGE GROUSE	Sp	SPRING RANGE
Cp	CHUCKAR	Su	SUMMER RANGE
Duc	DUCKS	Fa	FALL RANGE
Gee	GEESE	Wi	WINTER RANGE
Gu	GULL NESTING AREA	YL	YEAR LONG USE AREA

H. Adobe Valley / Benton



SOURCES: BLM; Calif. Dept of Fish and Game

FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

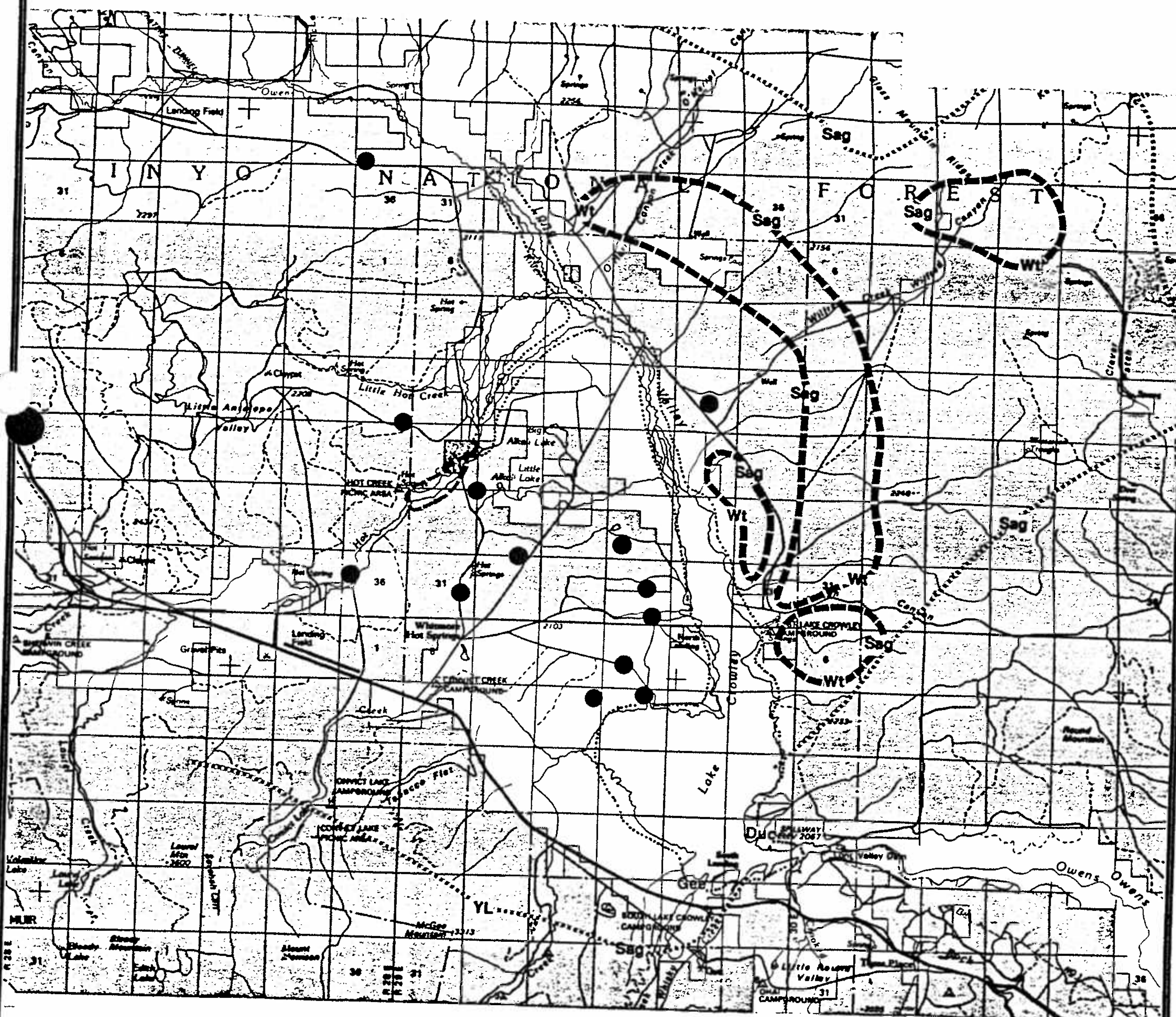
FIGURE 33 H
WILDLIFE USE AREAS - OTHER WILDLIFE

LEGEND

- CRUCIAL HABITAT
- UPLAND GAME HABITAT
- UPLAND BIRD HABITAT
- WATERFOWL HABITAT
- RAPTOR NESTING AREAS
- SAGE GROUSE LEK (2MI. RADIUS AROUND IS CRUCIAL NESTING AREA)
- SAGE GROUSE (GENERAL USE AREA)
- WILD HORSES
- FERAL GOATS

Sag	SAGE GROUSE	Sp	SPRING RANGE
Cp	CHUCKAR	Su	SUMMER RANGE
Duc	DUCKS	Fa	FALL RANGE
Gee	GEESE	Wt	WINTER RANGE
Gu	GULL NESTING AREA	YL	YEAR LONG USE AREA

J. Long Valley



SOURCES: BLM; Calif. Dept of Fish and Game

FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

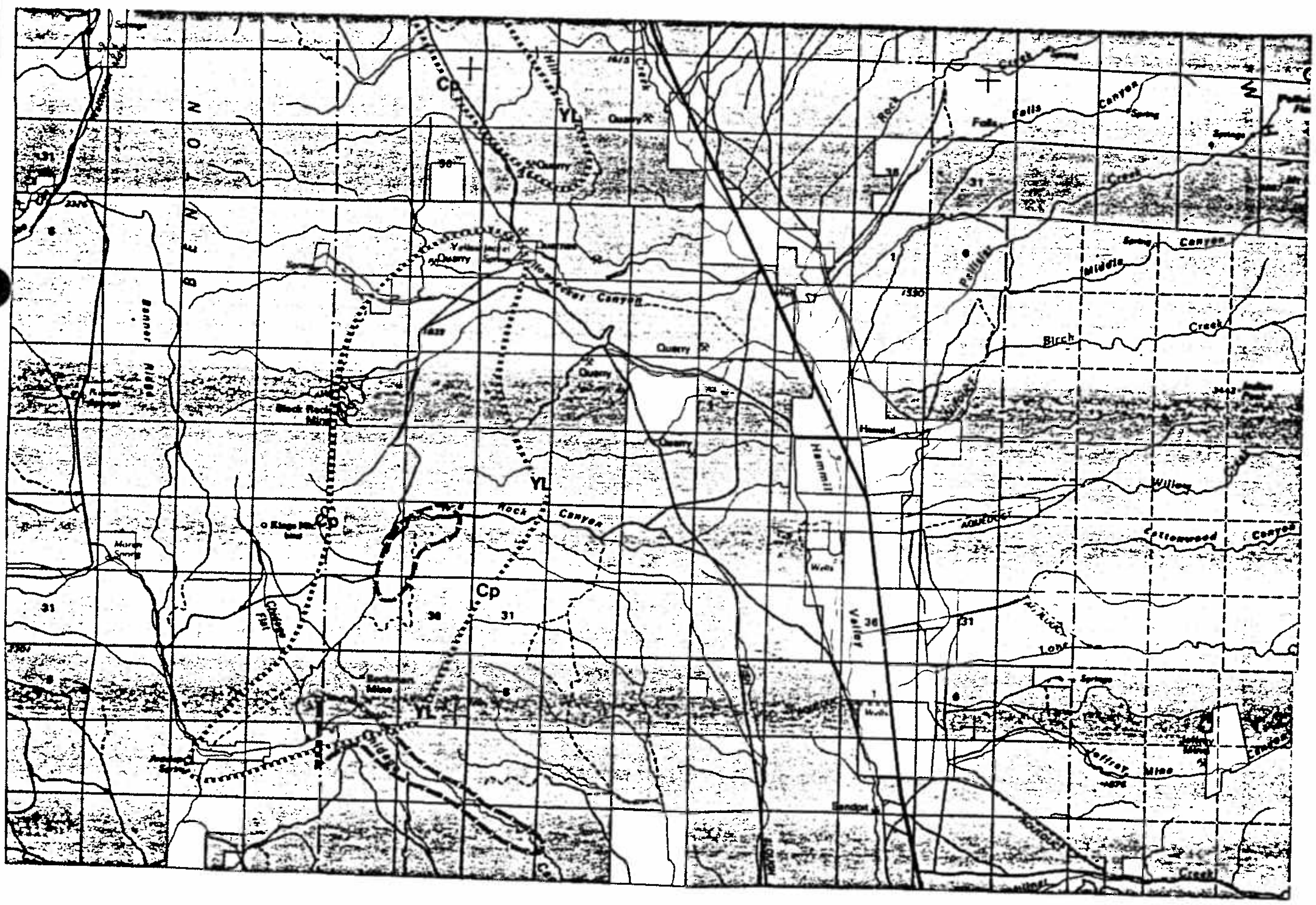
FIGURE 33 J
WILDLIFE USE AREAS - OTHER WILDLIFE

K. Hammil Valley

LEGEND

- CRUCIAL HABITAT
- UPLAND GAME HABITAT
- UPLAND BIRD HABITAT
- WATERFOWL HABITAT
- RAPTOR NESTING AREAS
- SAGE GROUSE LEK (2MI. RADIUS AROUND IS CRUCIAL NESTING AREA)
- SAGE GROUSE (GENERAL USE AREA)
- WILD HORSES
- FERAL GOATS

Sag	SAGE GROUSE	Sp	SPRING RANGE
Cp	CHUCKAR	Su	SUMMER RANGE
Duc	DUCKS	Fa	FALL RANGE
Gee	GEESE	Wt	WINTER RANGE
Gu	GULL NESTING AREA	YL	YEAR LONG USE AREA



SOURCES: BLM; Calif. Dept of Fish and Game

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 33 K
WILDLIFE USE AREAS - OTHER WILDLIFE

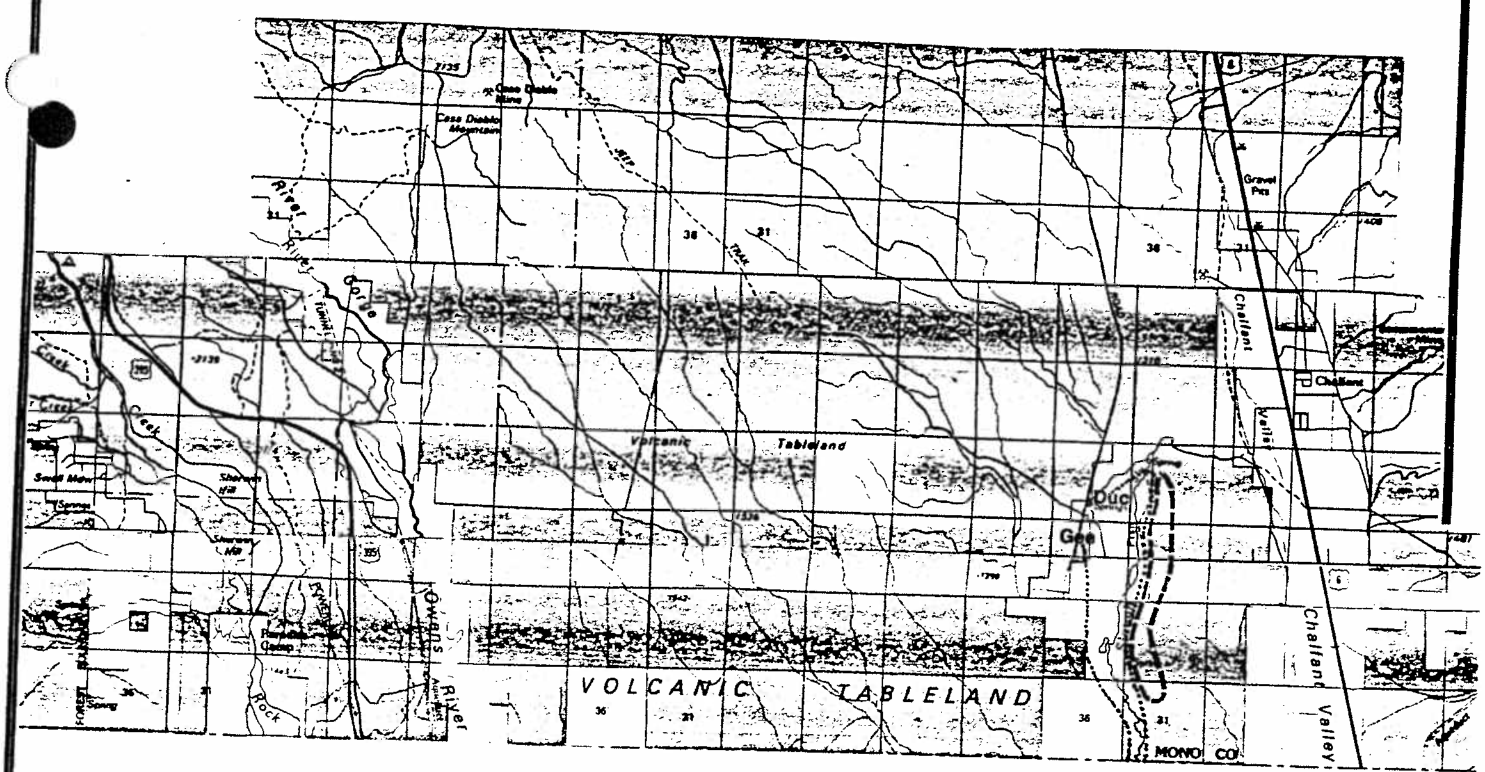
L. Wheeler / Paradise
M. Chalfant Valley

LEGEND

CRUCIAL HABITAT
UPLAND GAME HABITAT
UPLAND BIRD HABITAT
WATERFOWL HABITAT
RAPTOR NESTING AREAS
SAGE GROUSE LEK
(2MI. RADIUS AROUND IS CRUCIAL NESTING AREA)
SAGE GROUSE (GENERAL USE AREA)
WILD HORSES
FERAL GOATS

Sag SAGE GROUSE
Cp CHUCKAR
Duc DUCKS
Gee GEESE
Gu GULL NESTING AREA

Sp SPRING RANGE
Su SUMMER RANGE
Fa FALL RANGE
Wt WINTER RANGE
YL YEAR LONG USE AREA



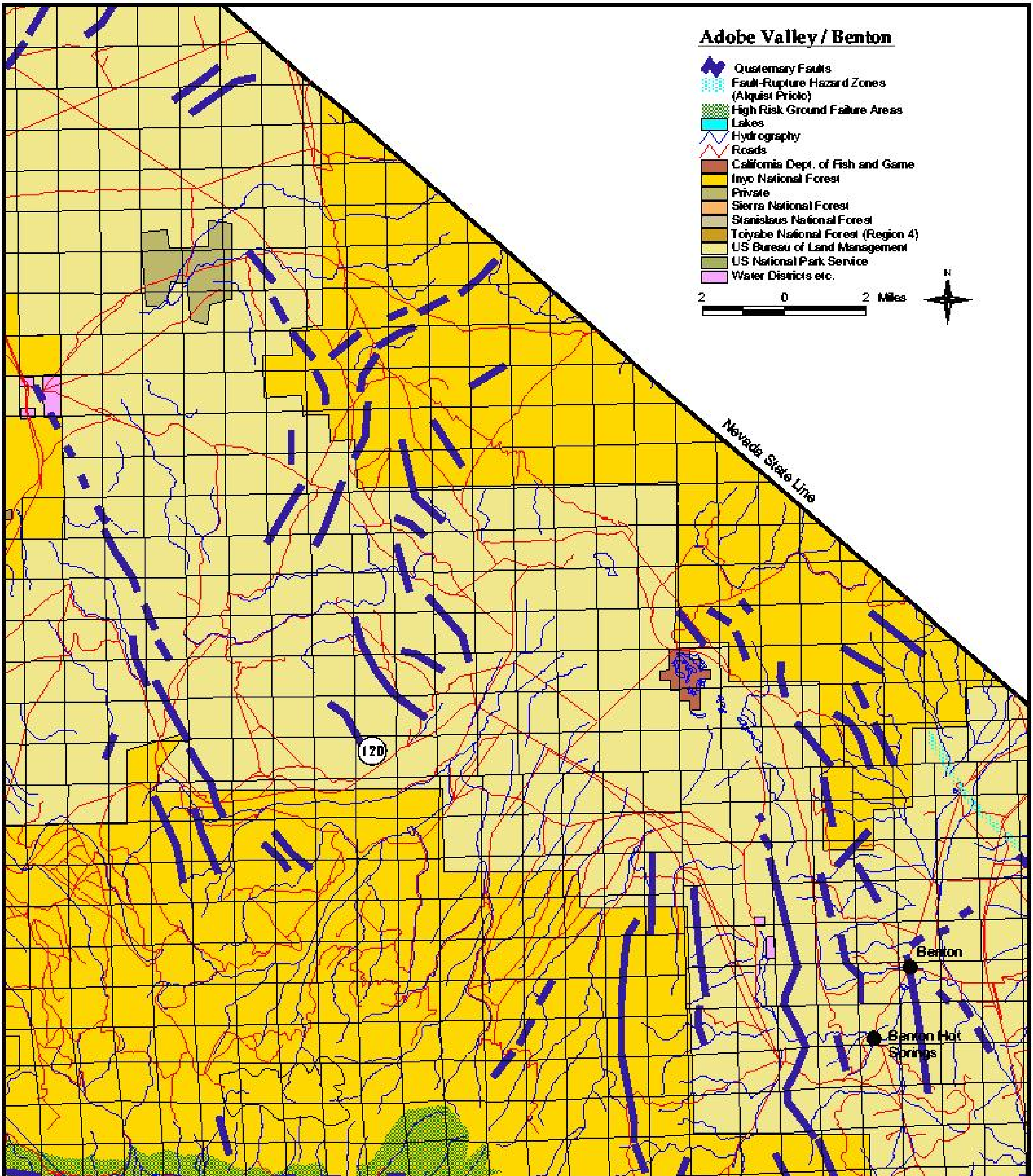
SOURCES: BLM; Calif. Dept of Fish and Game

FEDERALLY OWNED LANDS

0 MILES 5

N

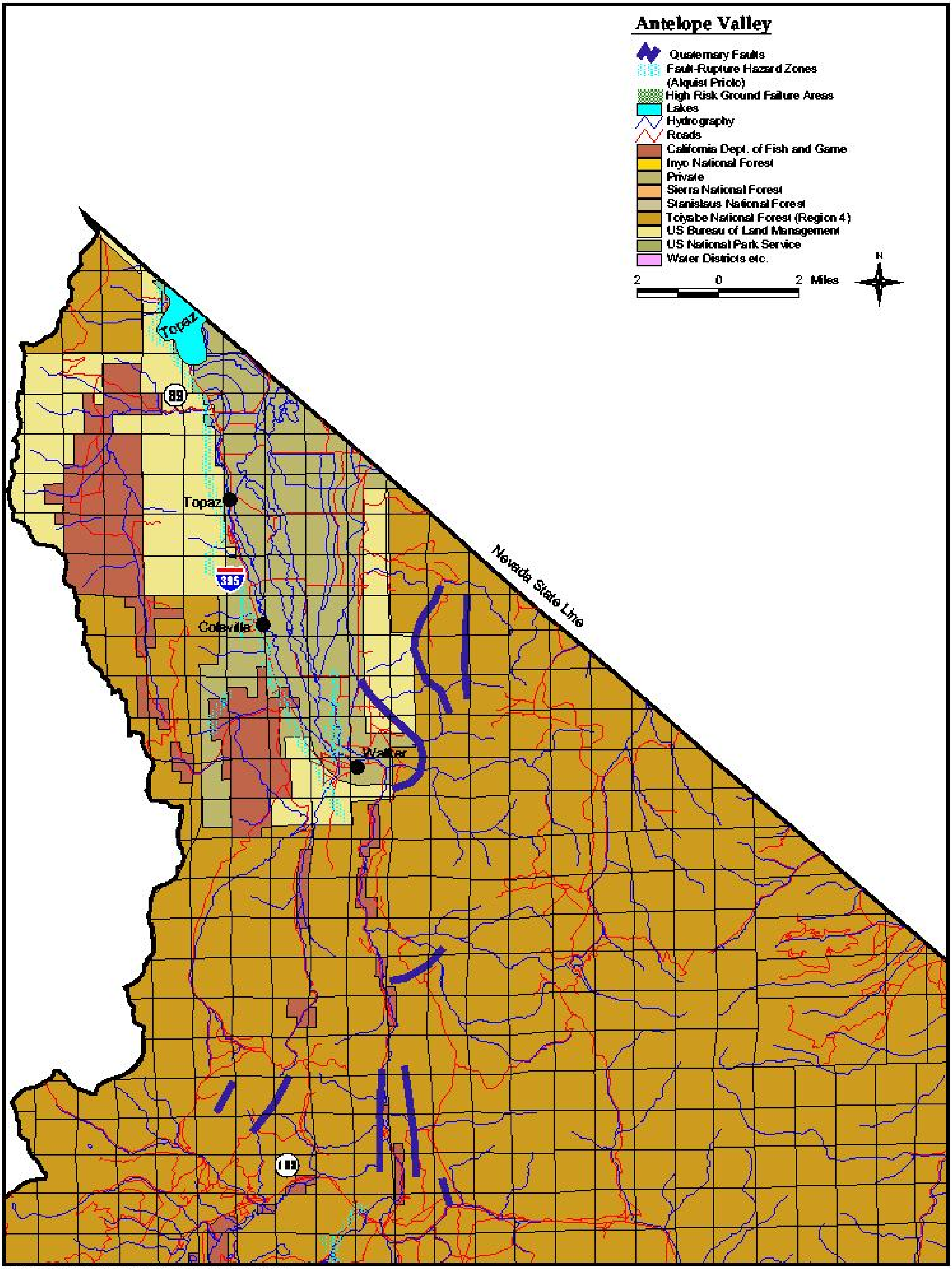
FIGURE 33 L & M
WILDLIFE USE AREAS - OTHER WILDLIFE



SOURCE: CDMG Special Studies Zones Maps, 1987;
Merrill and Seeley, 1981;
Lienkaemper et al., 1987;
CDMG Fault Map of California, 1975

Mono County MEA -- 2001

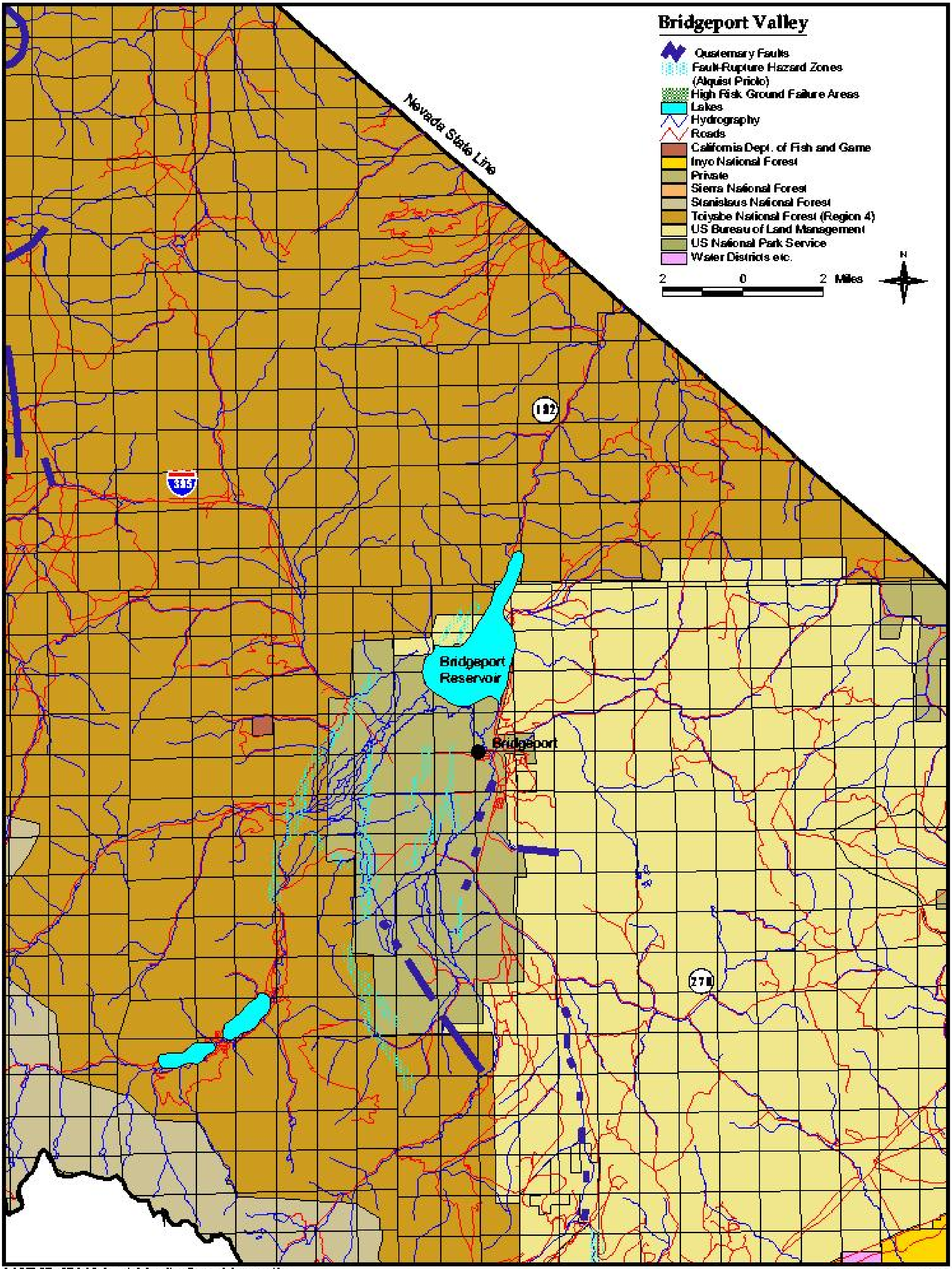
FIGURE 34 D
SEISMIC HAZARDS



SOURCE: CDMG Special Studies Zones Maps, 1987;
Merrill and Seeley, 1981;
Lienkaemper et al., 1967;
CDMG Fault Map of California, 1975

Mono County MEA -- 2001

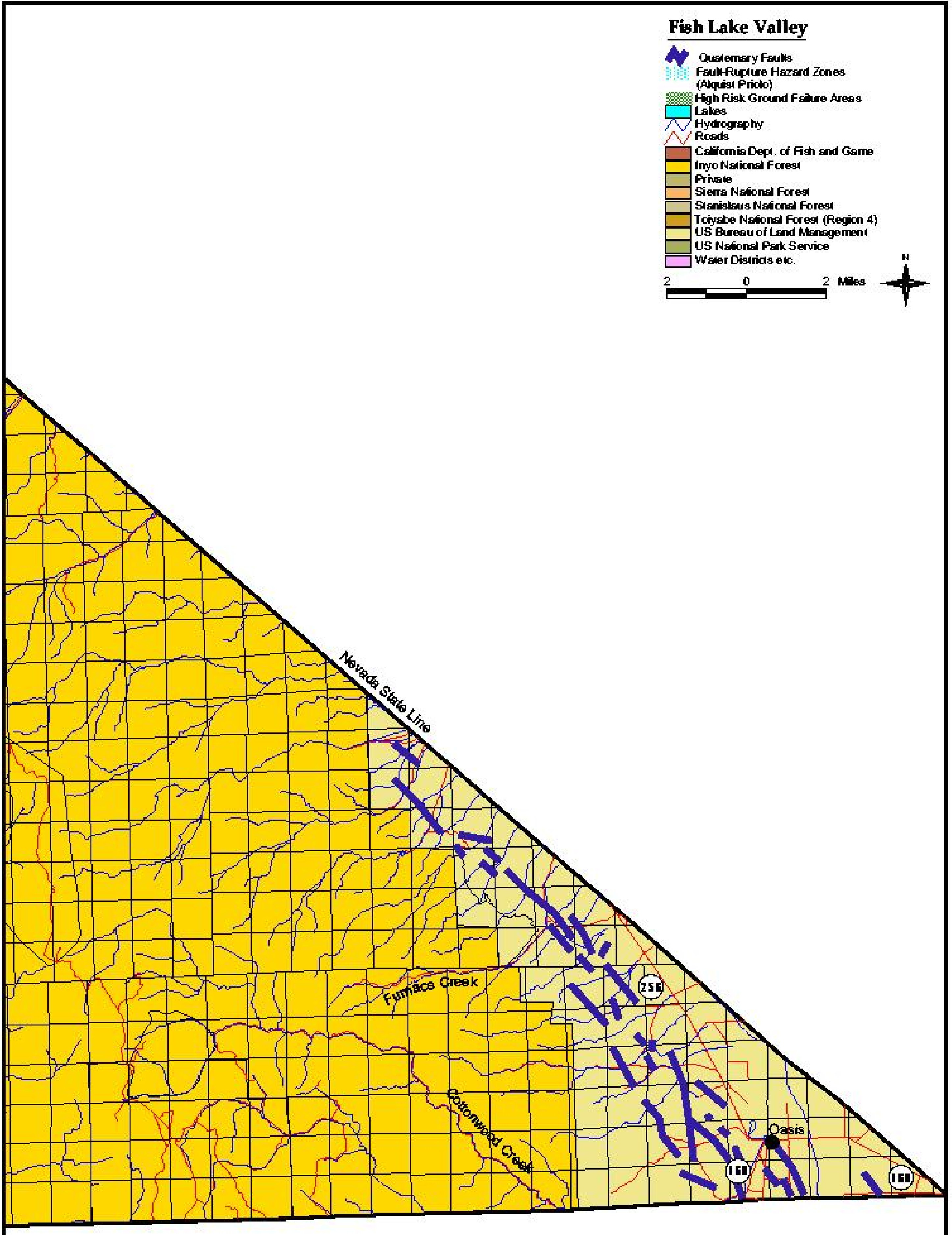
FIGURE 34 A
SEISMIC HAZARDS



SOURCE: CDMG Special Studies Zones Maps, 1987;
Merrill and Seeley, 1984;
Lienkaemper et al., 1967;
CDMG Fault Map of California, 1975

Mono County MEA -- 2001

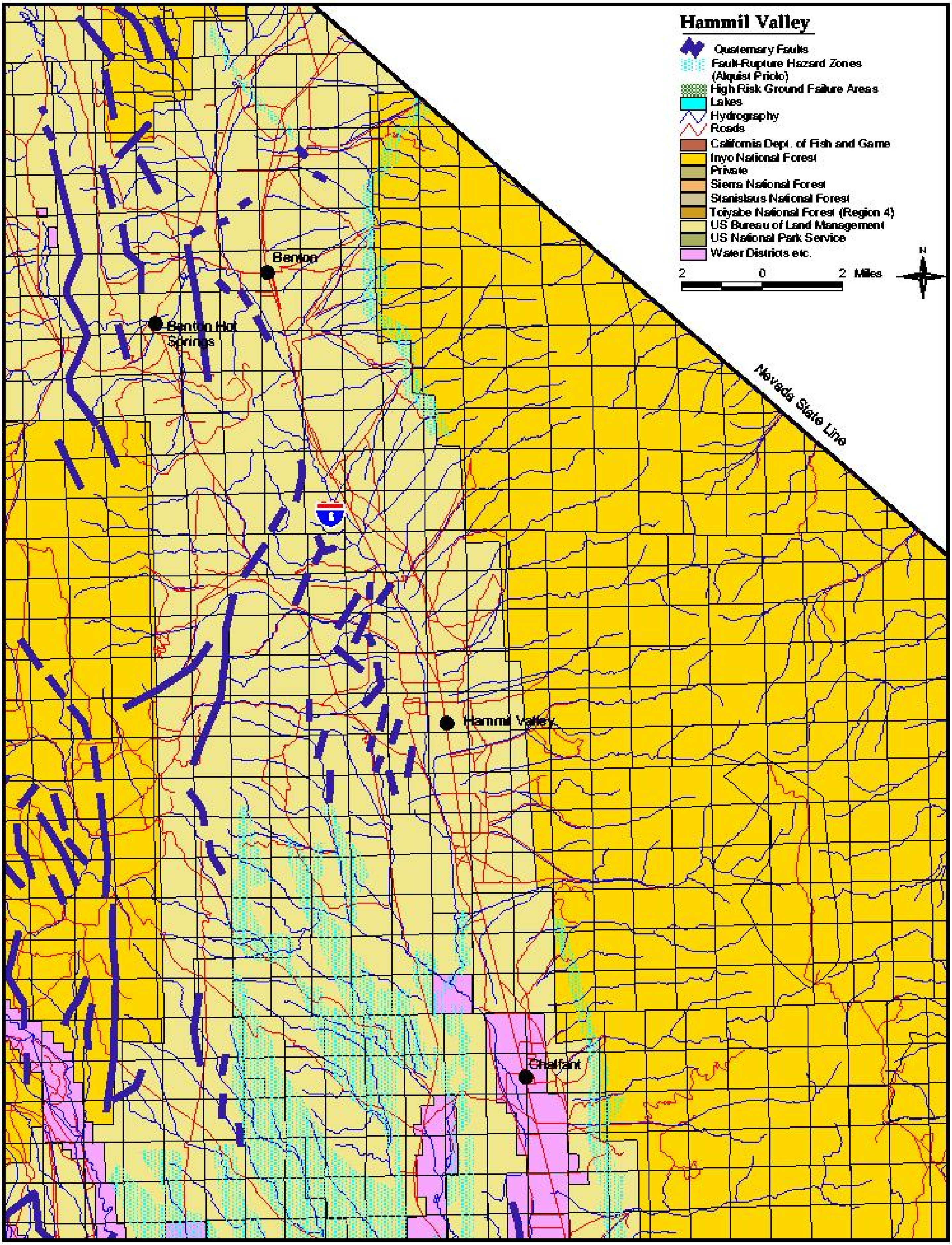
FIGURE 34 B
SEISMIC HAZARDS



SOURCE: CDMG Special Studies Zones Maps, 1987;
Merrill and Seeley, 1981;
Lienkaemper et al., 1987;
CDMG Fault Map of California, 1975

Mono County MEA -- 2001

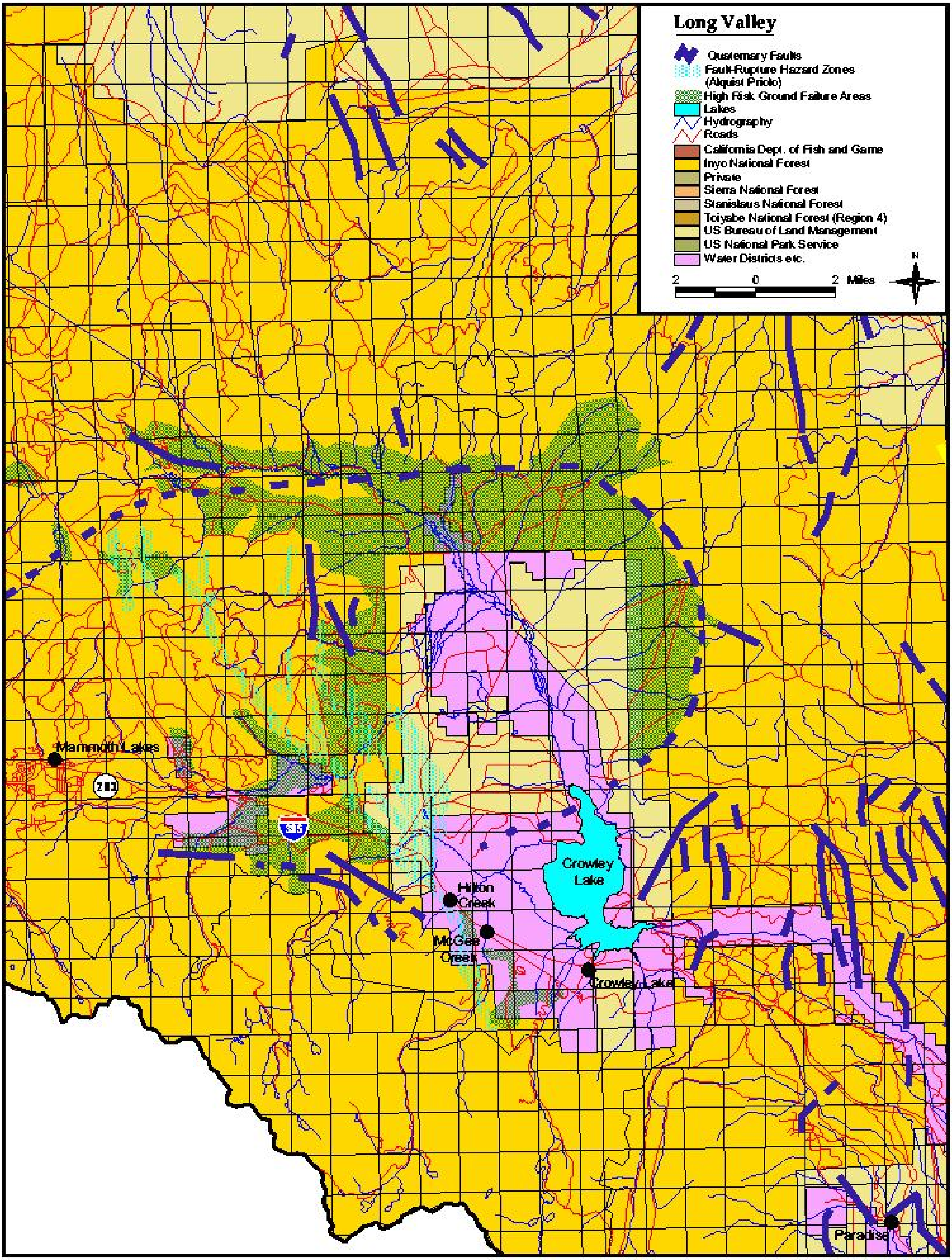
FIGURE 34 G
SEISMIC HAZARDS



SOURCE: CDMG Special Studies Zones Maps, 1987;
Merrill and Seeley, 1981;
Lienkaemper et al., 1987;
CDMG Fault Map of California, 1975

Mono County MEA -- 2001

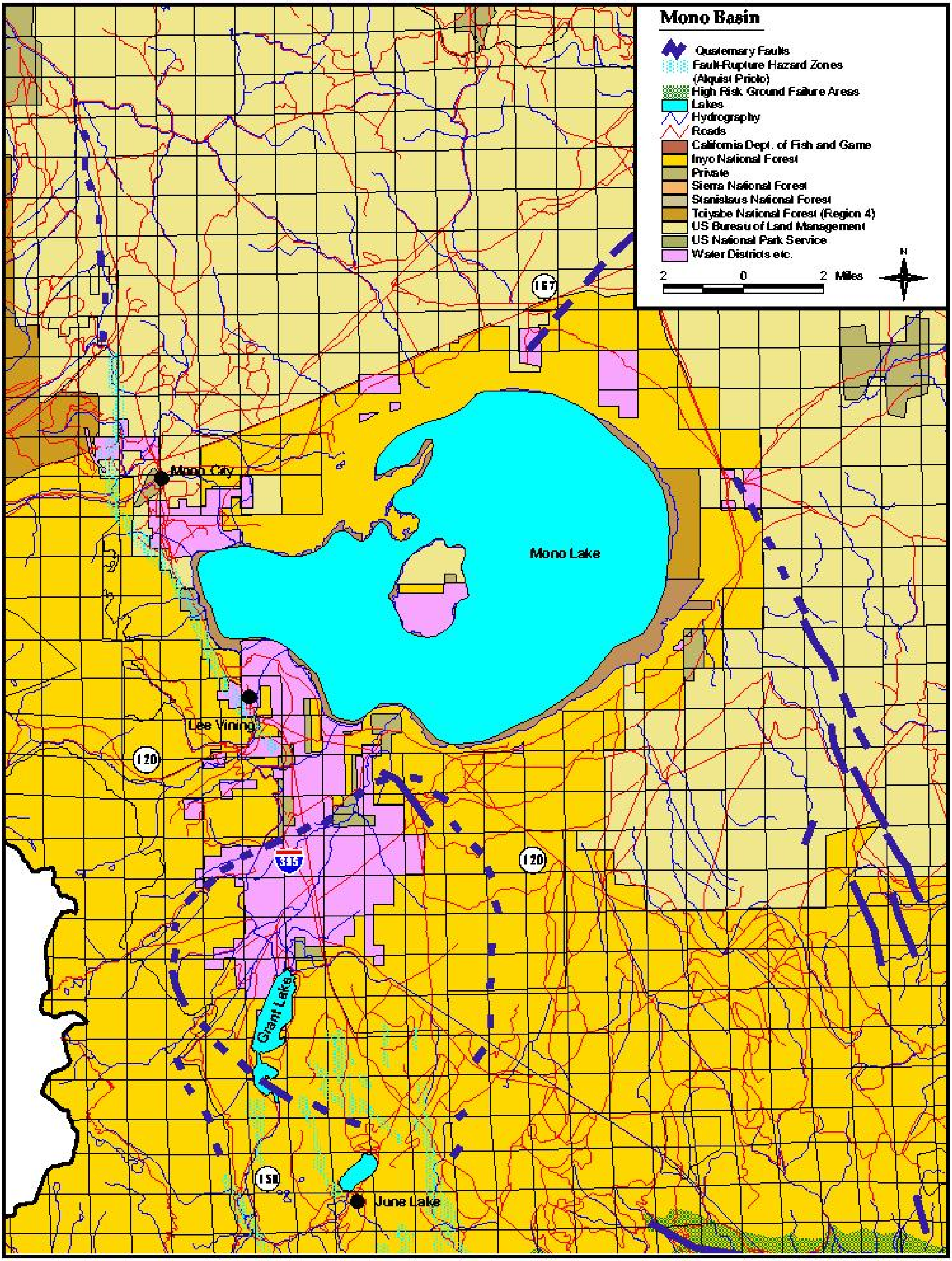
FIGURE 34 F
SEISMIC HAZARDS



SOURCE: CDMG Special Studies Zones Maps, 1987;
Merrill and Seeley, 1981;
Lienkaemper et al., 1967;
CDMG Fault Map of California, 1975

Mono County MEA -- 2001

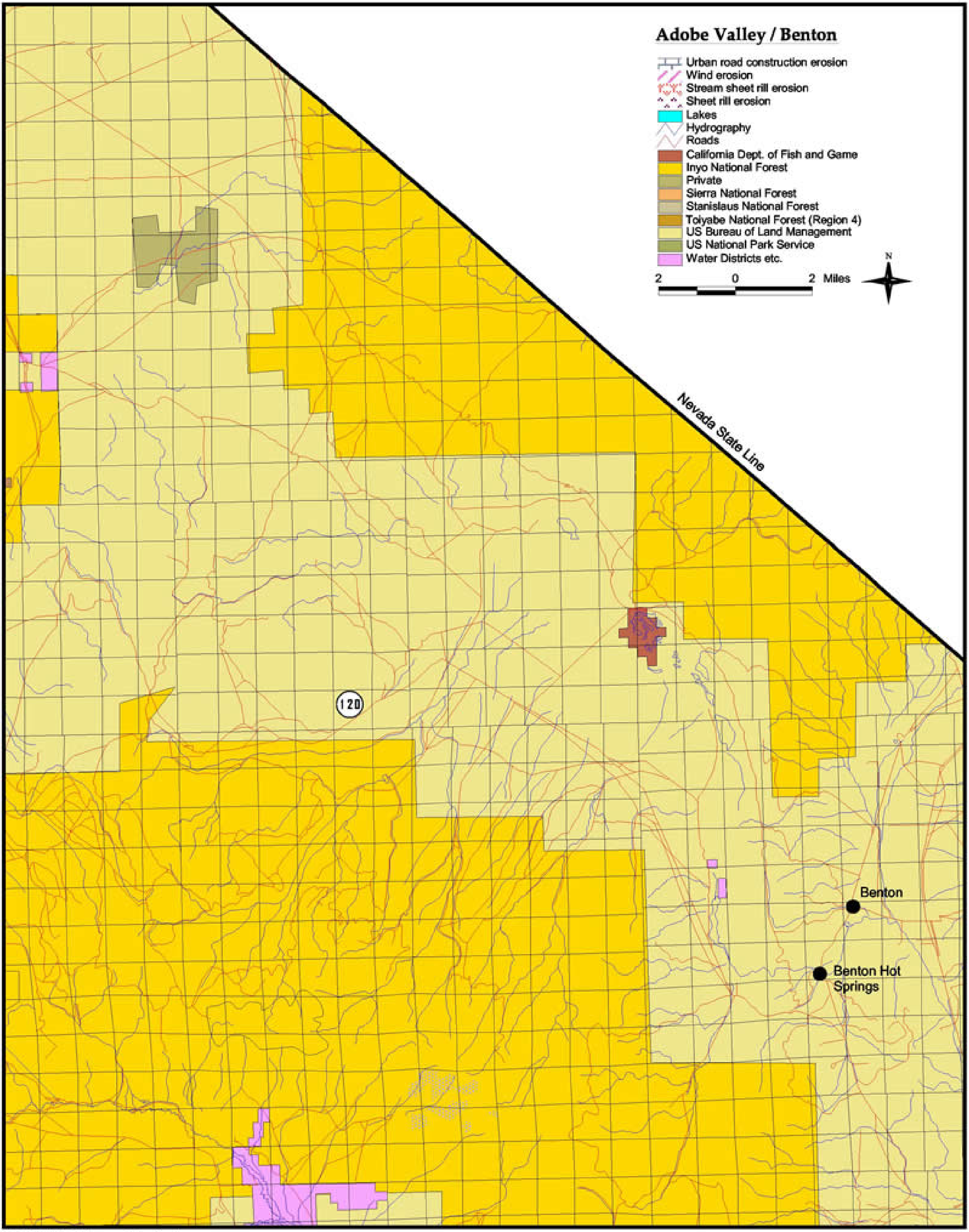
FIGURE 34 E
SEISMIC HAZARDS



SOURCE: CDMG Special Studies Zones Maps, 1987;
Merrill and Seeley, 1981;
Lienkaemper et al., 1967;
CDMG Fault Map of California, 1975

Mono County MEA -- 2001

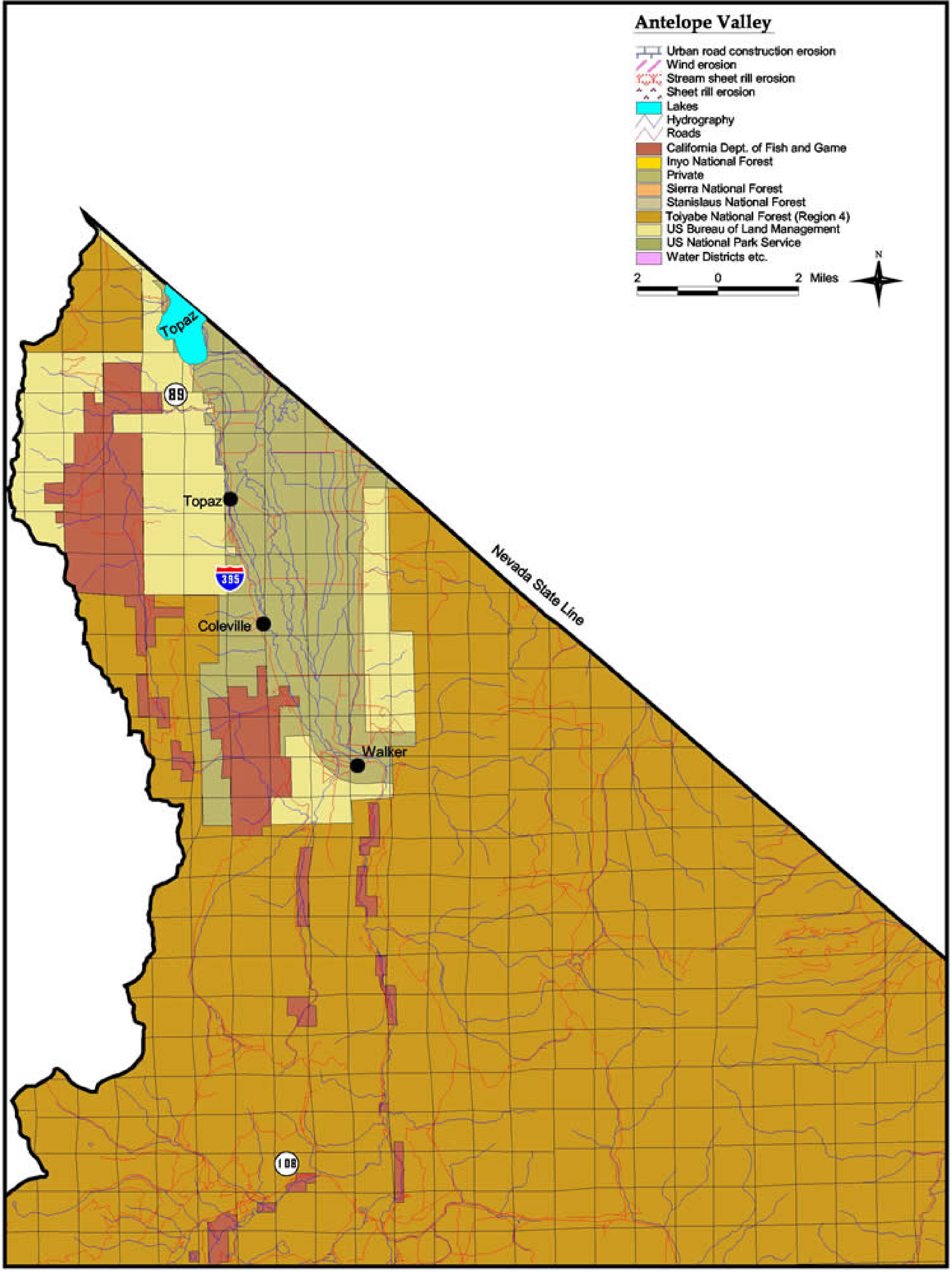
FIGURE 34 C
SEISMIC HAZARDS



SOURCE: Soil Conservation Service

FIGURE 35 C
ROCKFALL AND LANDSLIDE HAZARDS

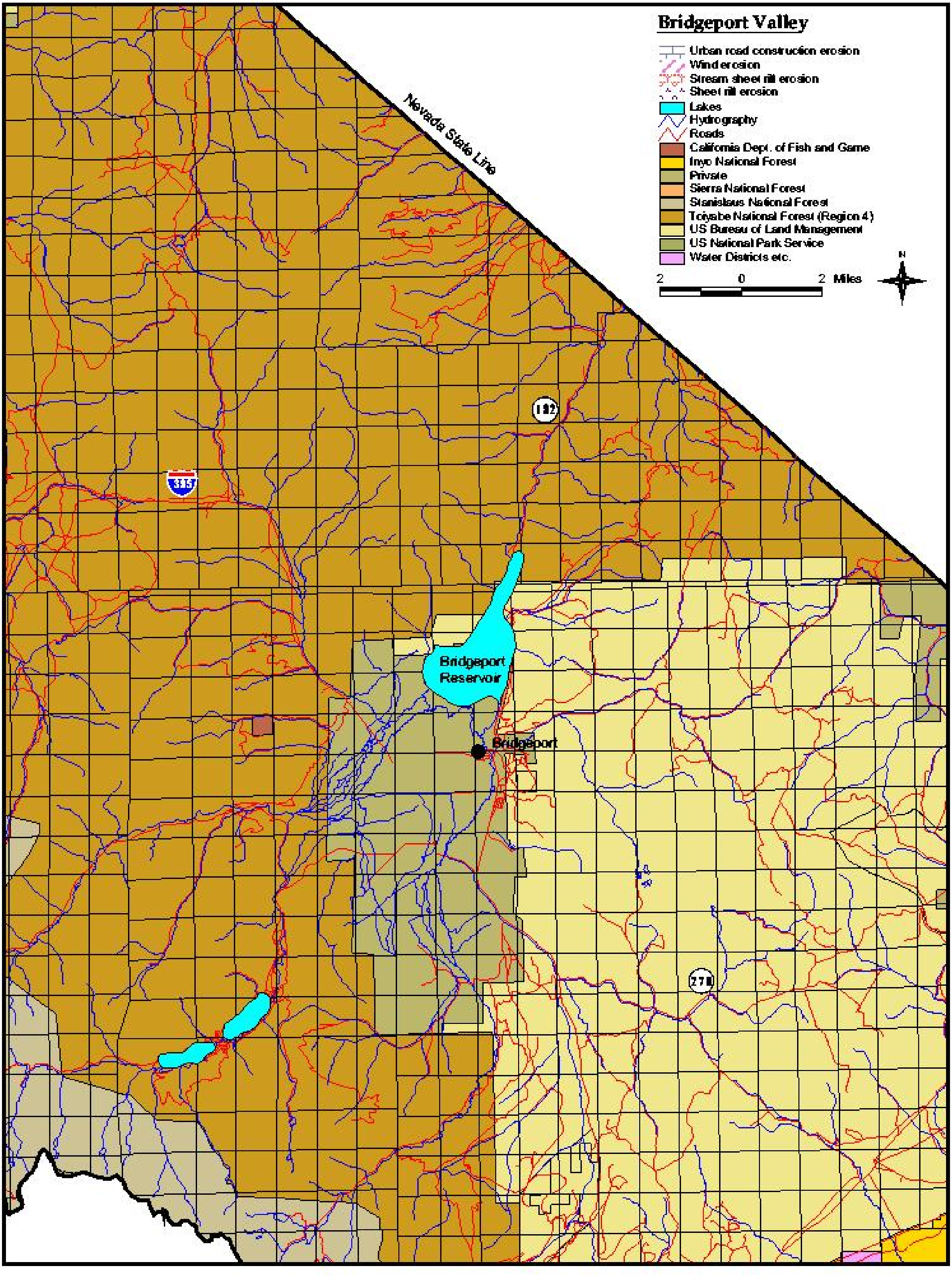
Mono County MEA – 2001



SOURCE: Soil Conservation Service

Mono County MEA – 2001

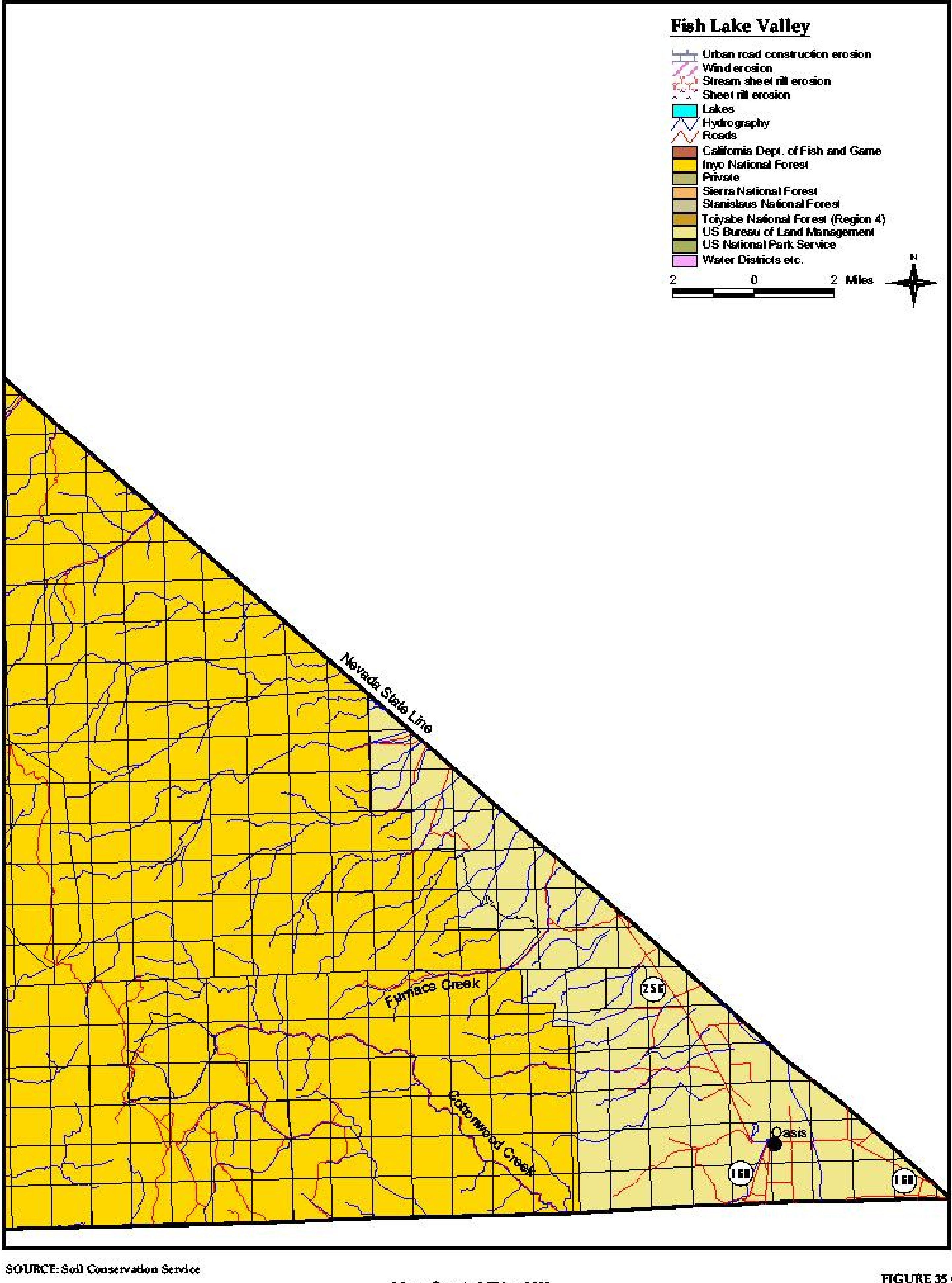
FIGURE 35 C
ROCKFALL AND LANDSLIDE HAZARDS



SOURCE: Soil Conservation Service

Mono County MEA – 2001

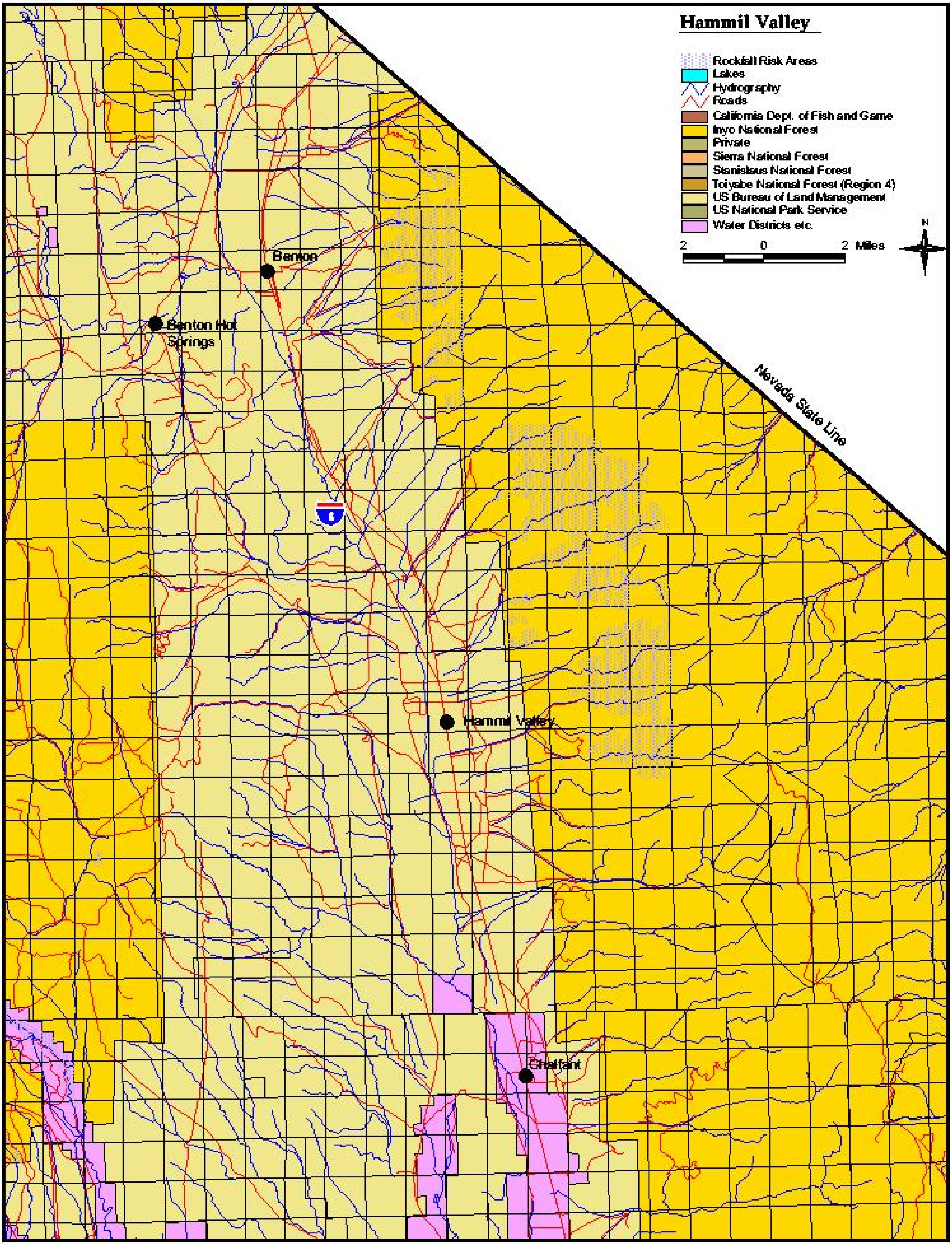
FIGURE 35 C
ROCKFALL AND LANDSLIDE HAZARDS



SOURCE: Soil Conservation Service

Mono County MEA – 2001

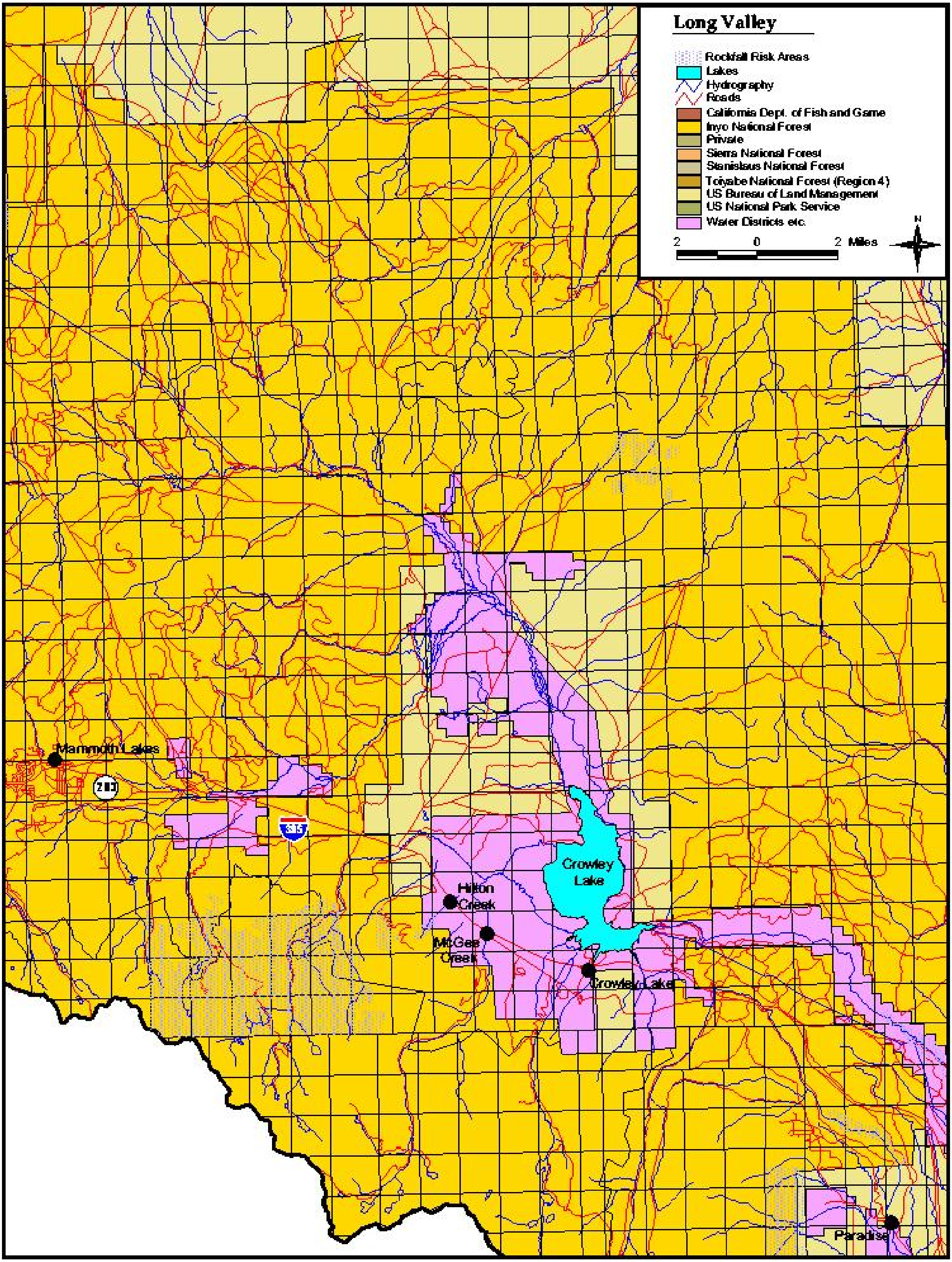
FIGURE 35 C
ROCKFALL AND LANDSLIDE HAZARDS



SOURCE: Merrill and Seeley, 1981

Mono County MEA – 2001

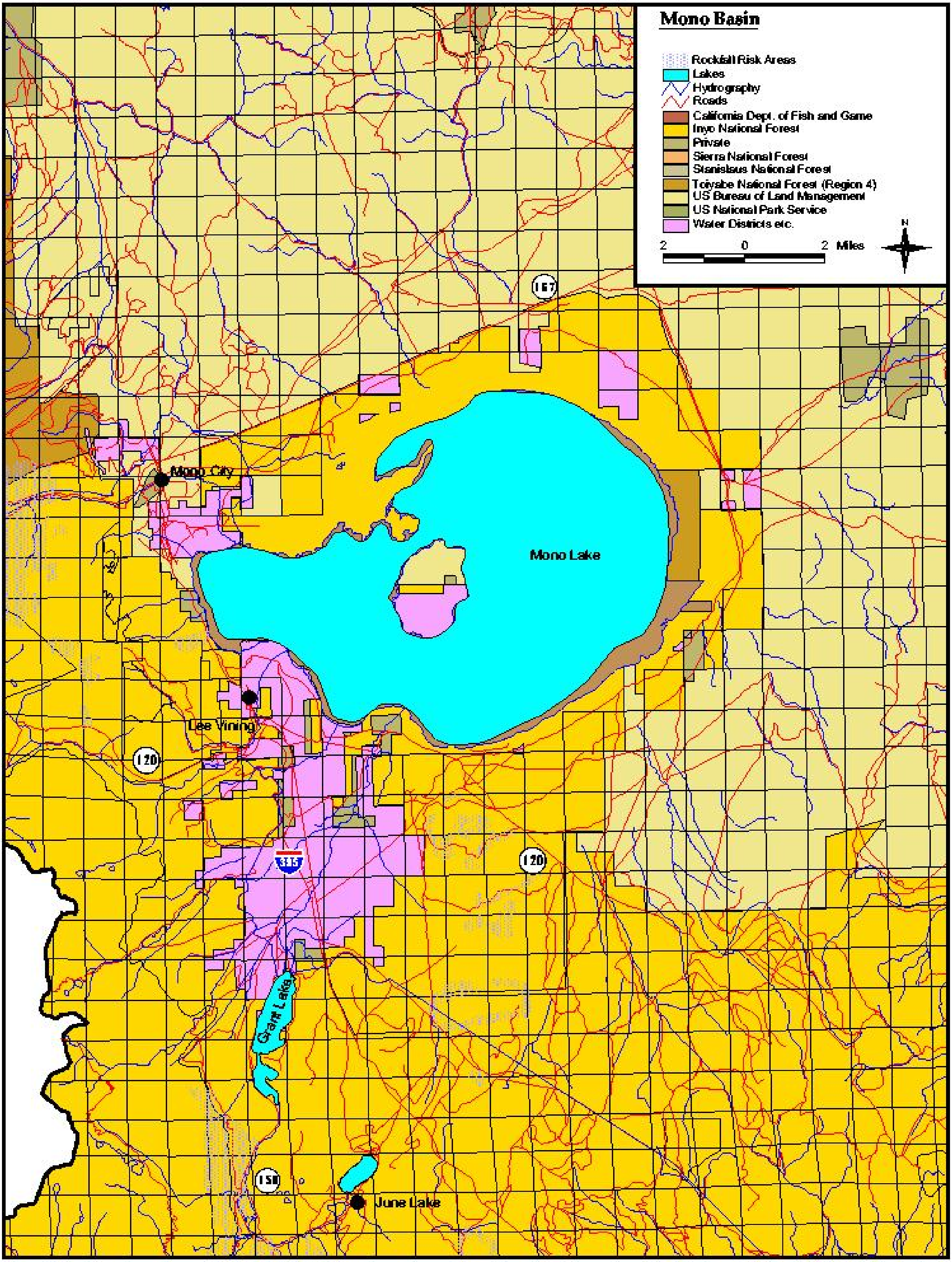
FIGURE 35 C
ROCKFALL AND LANDSLIDE HAZARDS



SOURCE: Merrill and Seeley, 1980

Mono County MEA -- 2001

FIGURE 35I
ROCKFALL AND LANDSLIDE HAZARDS



SOURCE: Merrill and Seeley, 1981

FIGURE 35 A
ROCKFALL AND LANDSLIDE HAZARDS

Figure 37

Avalanche Hazards

Conditional Development Area
A. Twin Lakes
B. Virginia Lakes – North
C. Virginia Lakes – South
D. Lundy Lake
E. June Lake
F. Long Valley & McGee Creek
G. Wheeler Crest

FIGURE 37 A
CONDITIONAL DEVELOPMENT AREA

FIGURE 37 B
CONDITIONAL DEVELOPMENT AREA

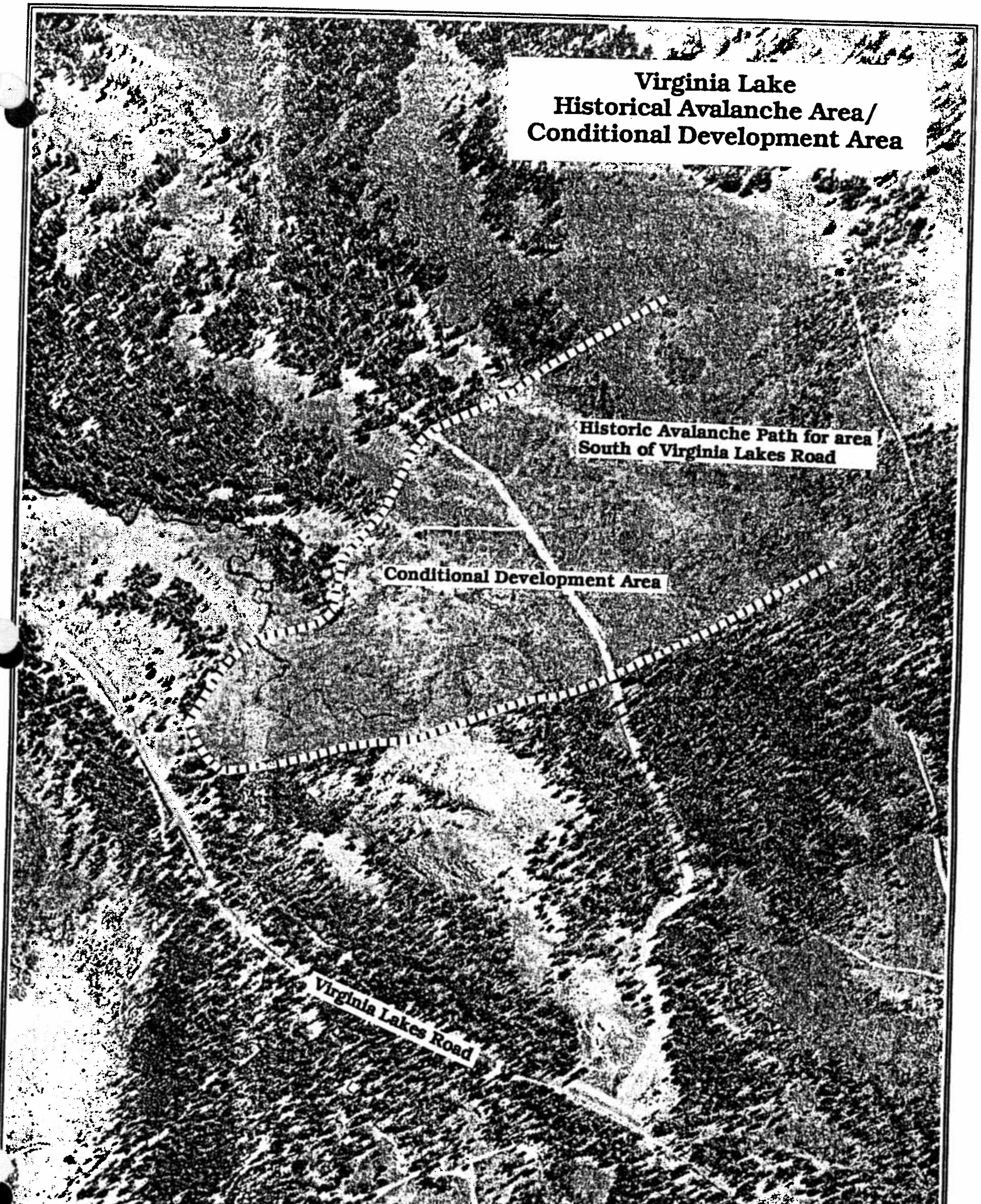


FIGURE 37 C
CONDITIONAL DEVELOPMENT AREA

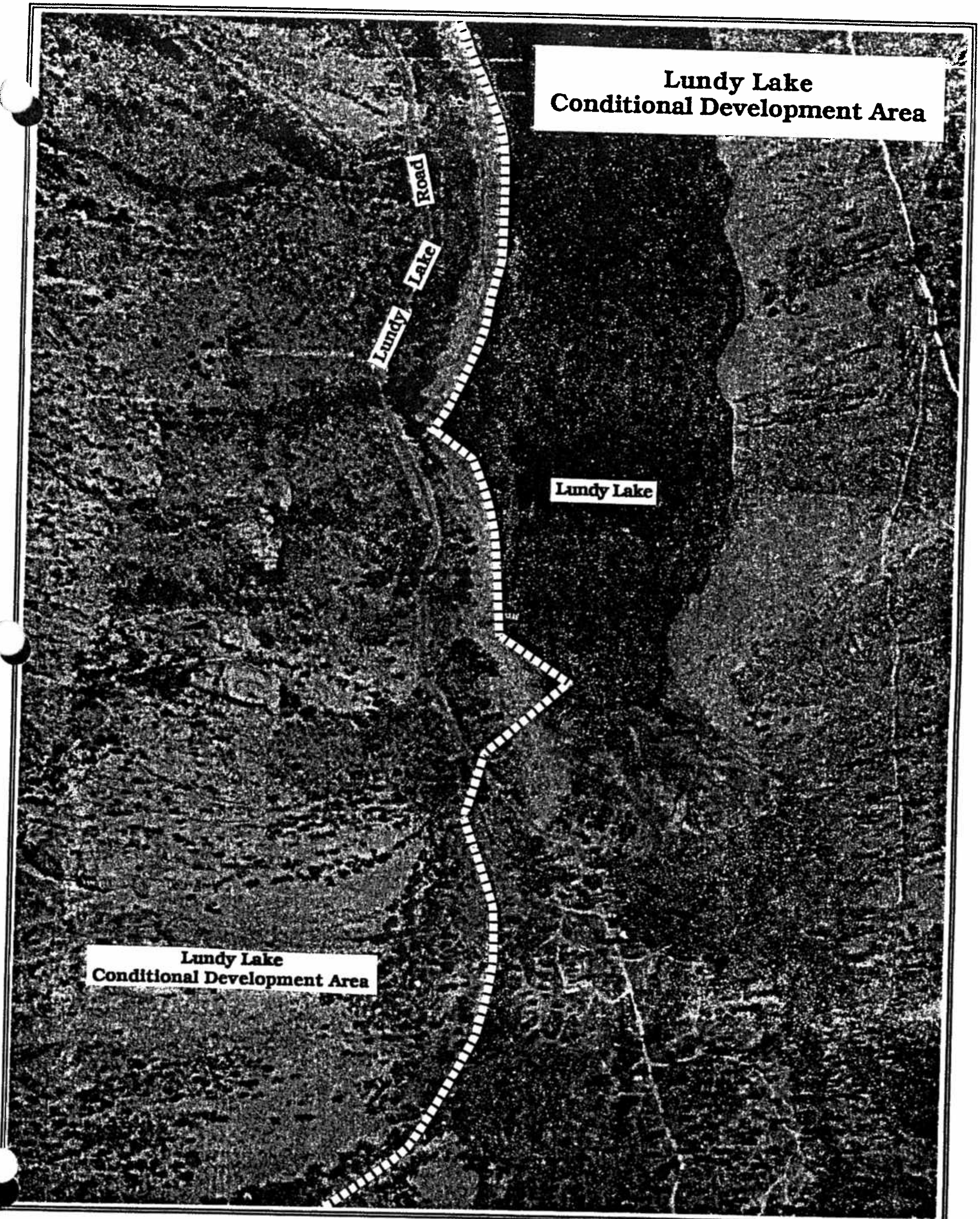


FIGURE 37 D
CONDITIONAL DEVELOPMENT AREA

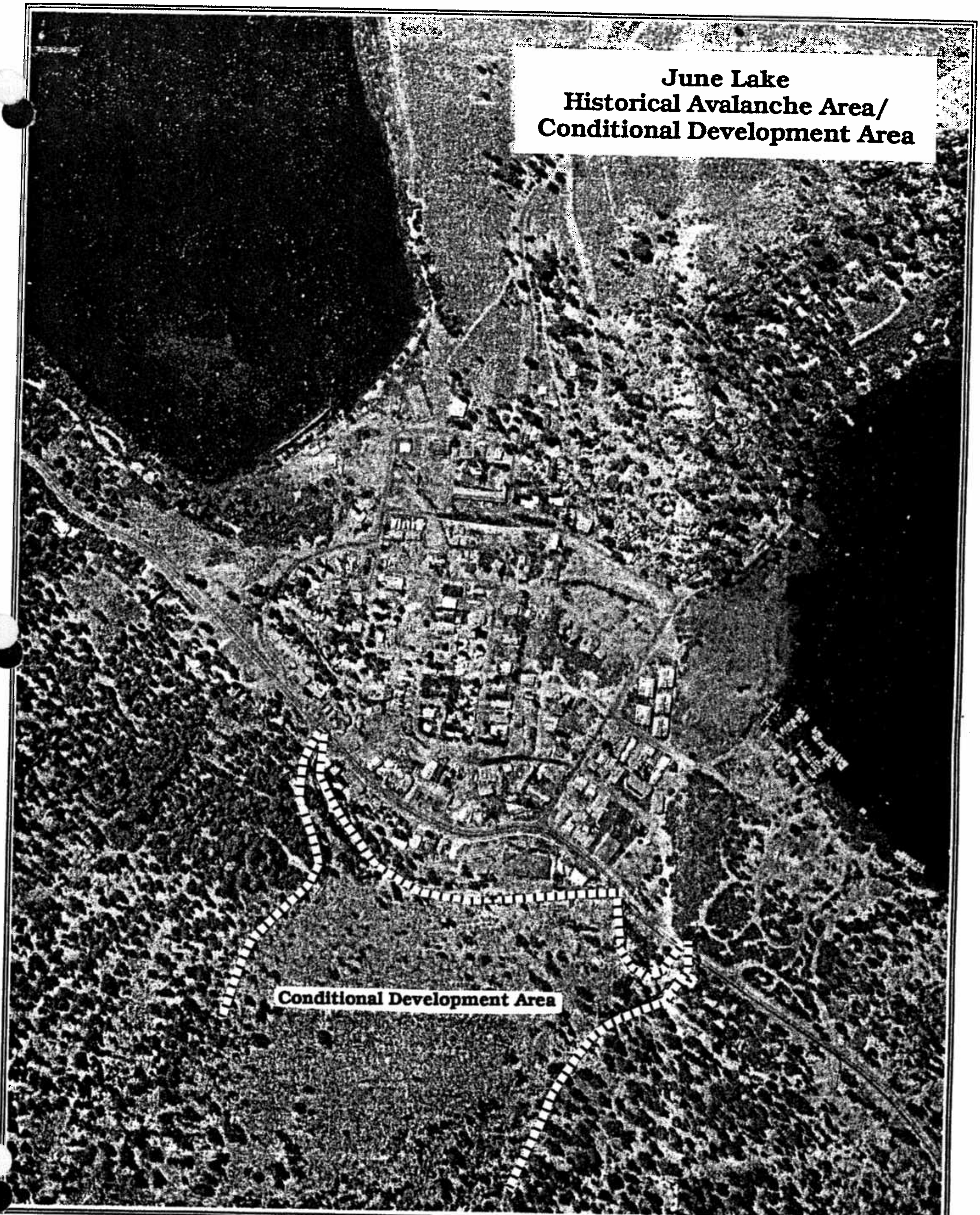
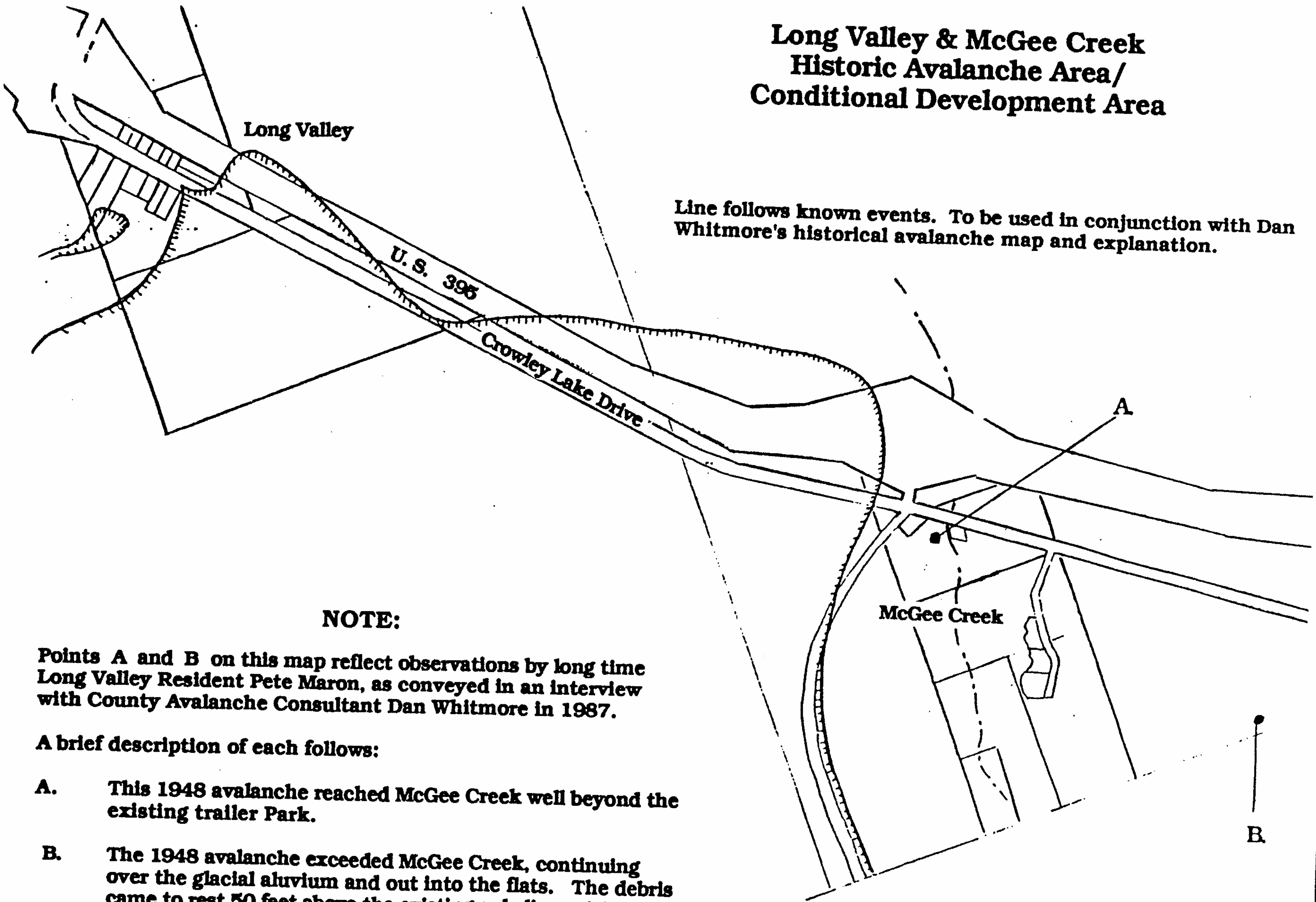


FIGURE 37 E
CONDITIONAL DEVELOPMENT AREA

Long Valley & McGee Creek Historic Avalanche Area/ Conditional Development Area

Line follows known events. To be used in conjunction with Dan Whitmore's historical avalanche map and explanation.



NOTE:

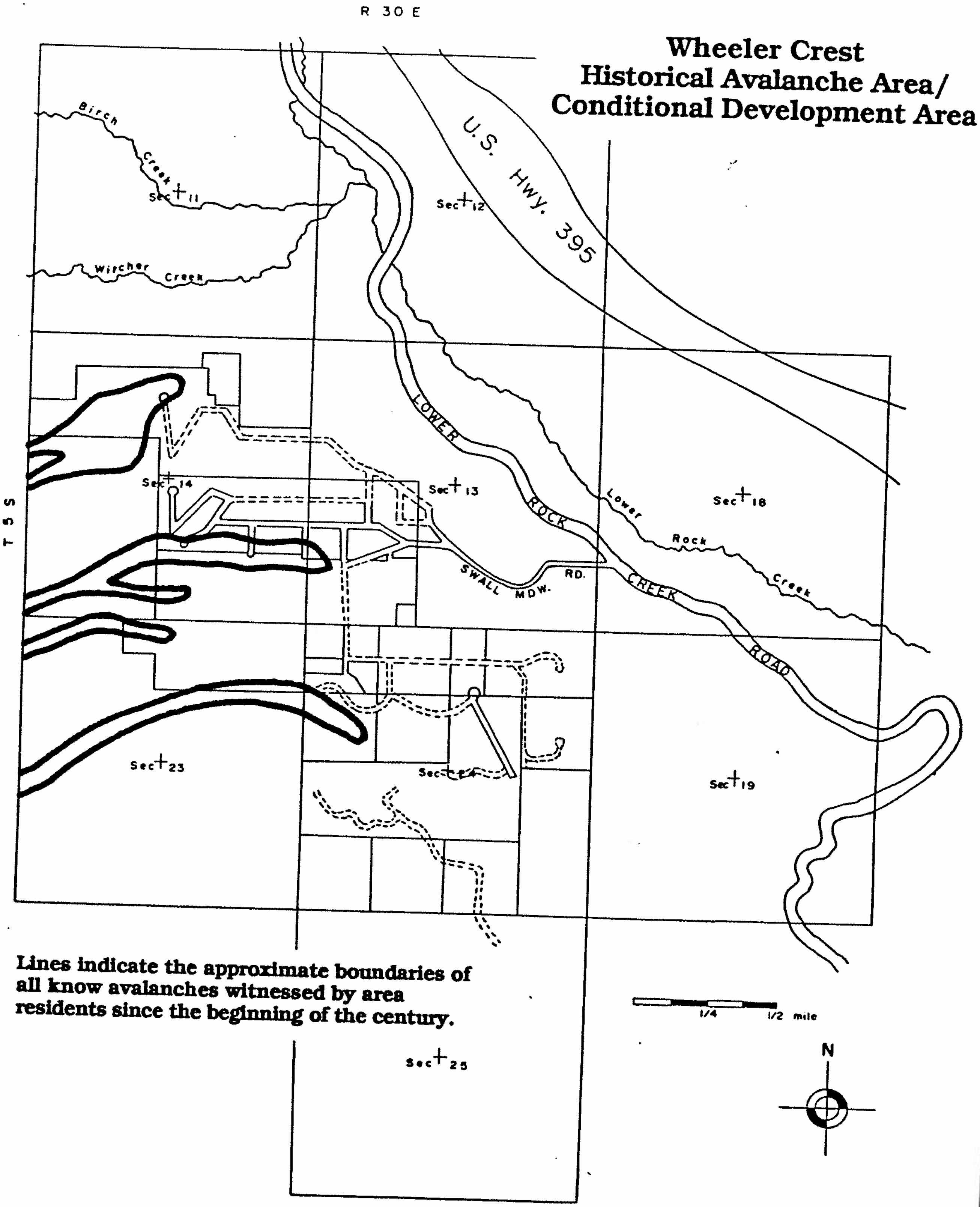
Points A and B on this map reflect observations by long time Long Valley Resident Pete Maron, as conveyed in an interview with County Avalanche Consultant Dan Whitmore in 1987.

A brief description of each follows:

A. This 1948 avalanche reached McGee Creek well beyond the existing trailer Park.

B. The 1948 avalanche exceeded McGee Creek, continuing over the glacial aluvium and out into the flats. The debris came to rest 50 feet above the existing pole line, with the average deposition depth 50 feet. The location is outside the private land holdings of the McGee Creek Community.

Wheeler Crest Historical Avalanche Area/ Conditional Development Area



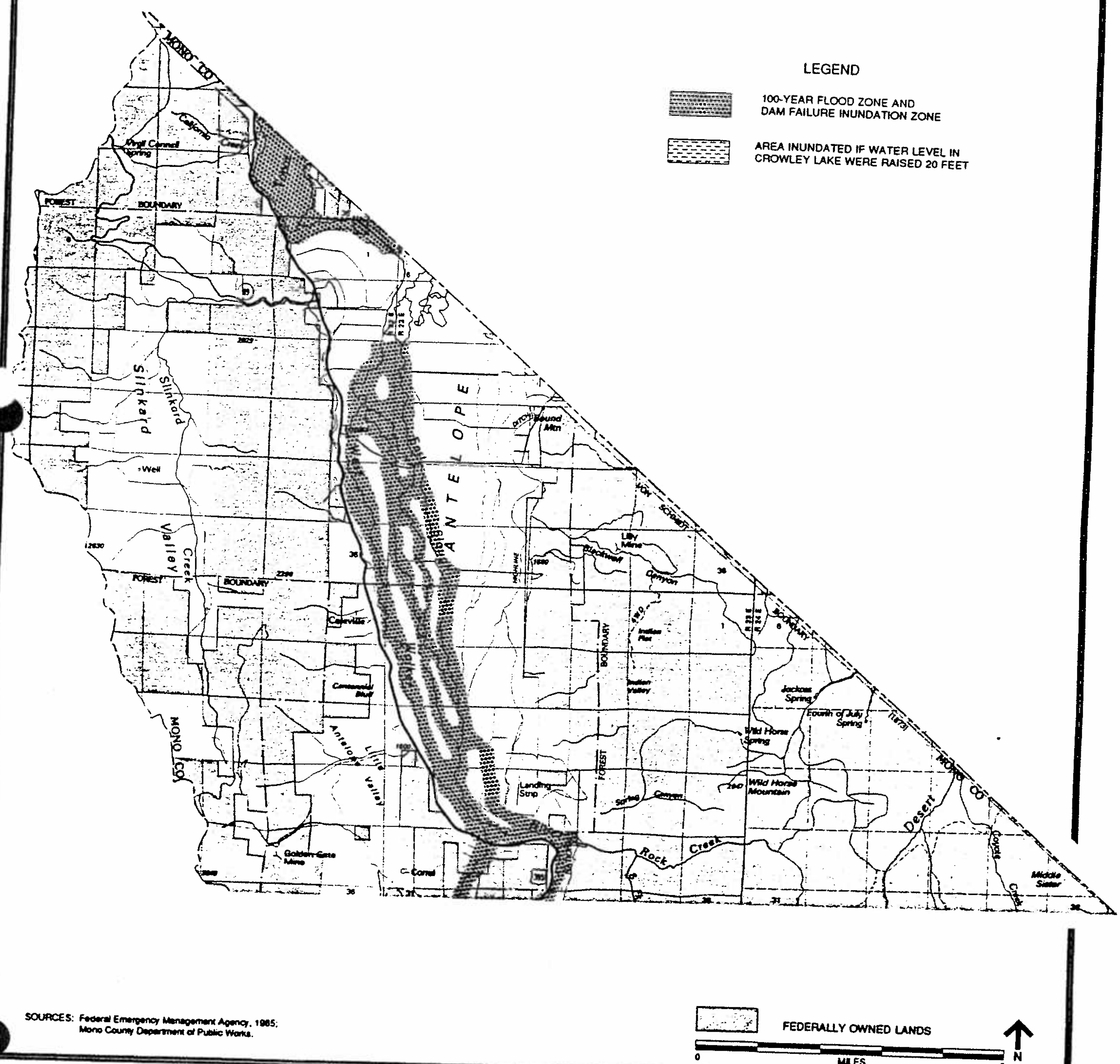
Lines indicate the approximate boundaries of all know avalanches witnessed by area residents since the beginning of the century.

Figure 38

Flood Hazards

A. Antelope Valley
B. Devil's Gate
C. East Walker
D. Bridgeport
F. Mono Lake
H. Adobe Valley / Benton
I. June Lake
J. Long Valley
K. Hammil Valley
L. Wheeler / Paradise
M. Chalfant Valley

A. Antelope Valley



SOURCES: Federal Emergency Management Agency, 1985;
Mono County Department of Public Works.

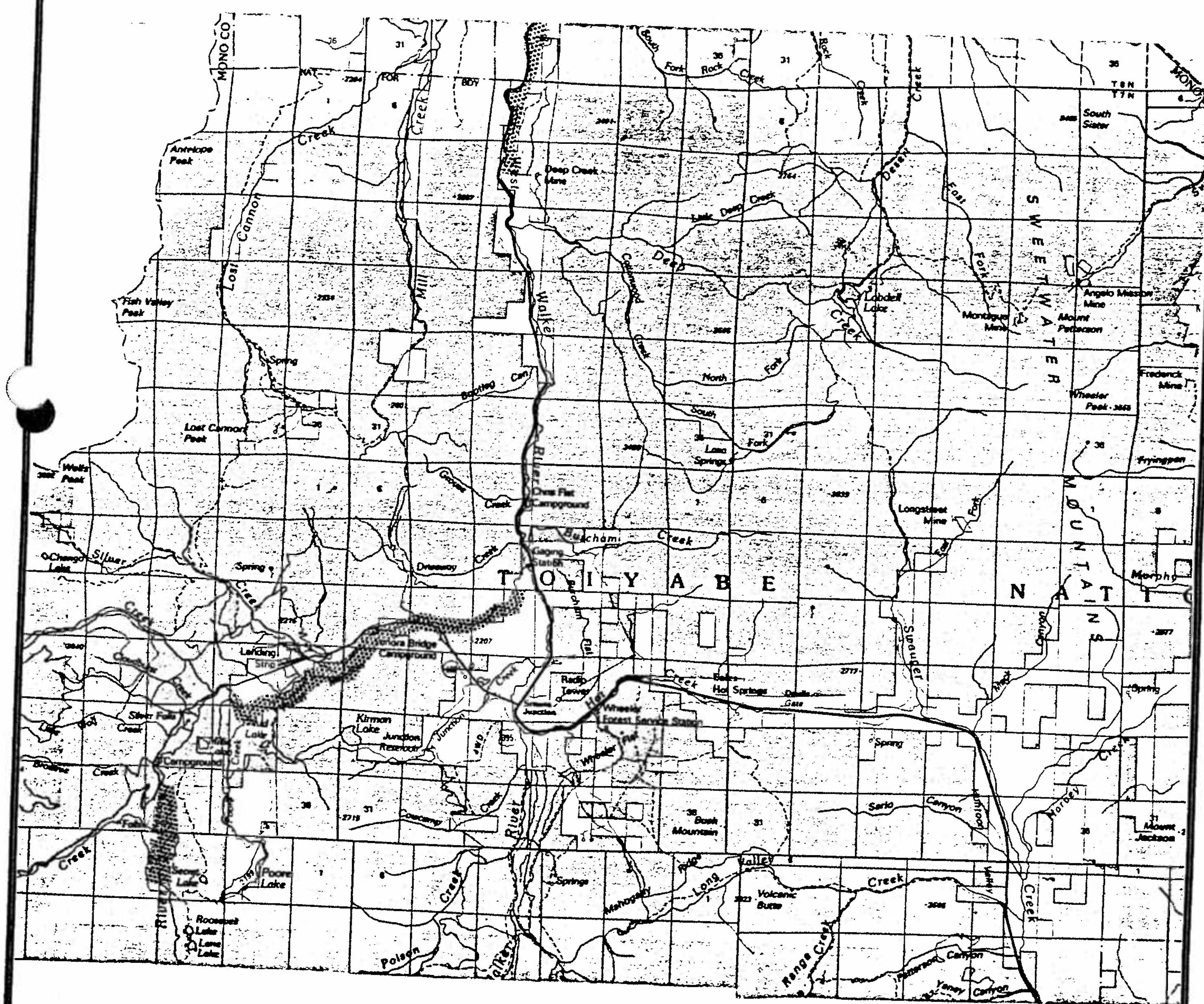
FIGURE 38 A
FLOOD HAZARDS

LEGEND

100-YEAR FLOOD ZONE AND
DAM FAILURE INUNDATION ZONE

AREA INUNDATED IF WATER LEVEL IN
CROWLEY LAKE WERE RAISED 20 FEET

B. Devil's Gate to Swauger Creek



SOURCES: Federal Emergency Management Agency, 1985;
Mono County Department of Public Works.

FEDERALLY OWNED LANDS

0 MILES 5

N

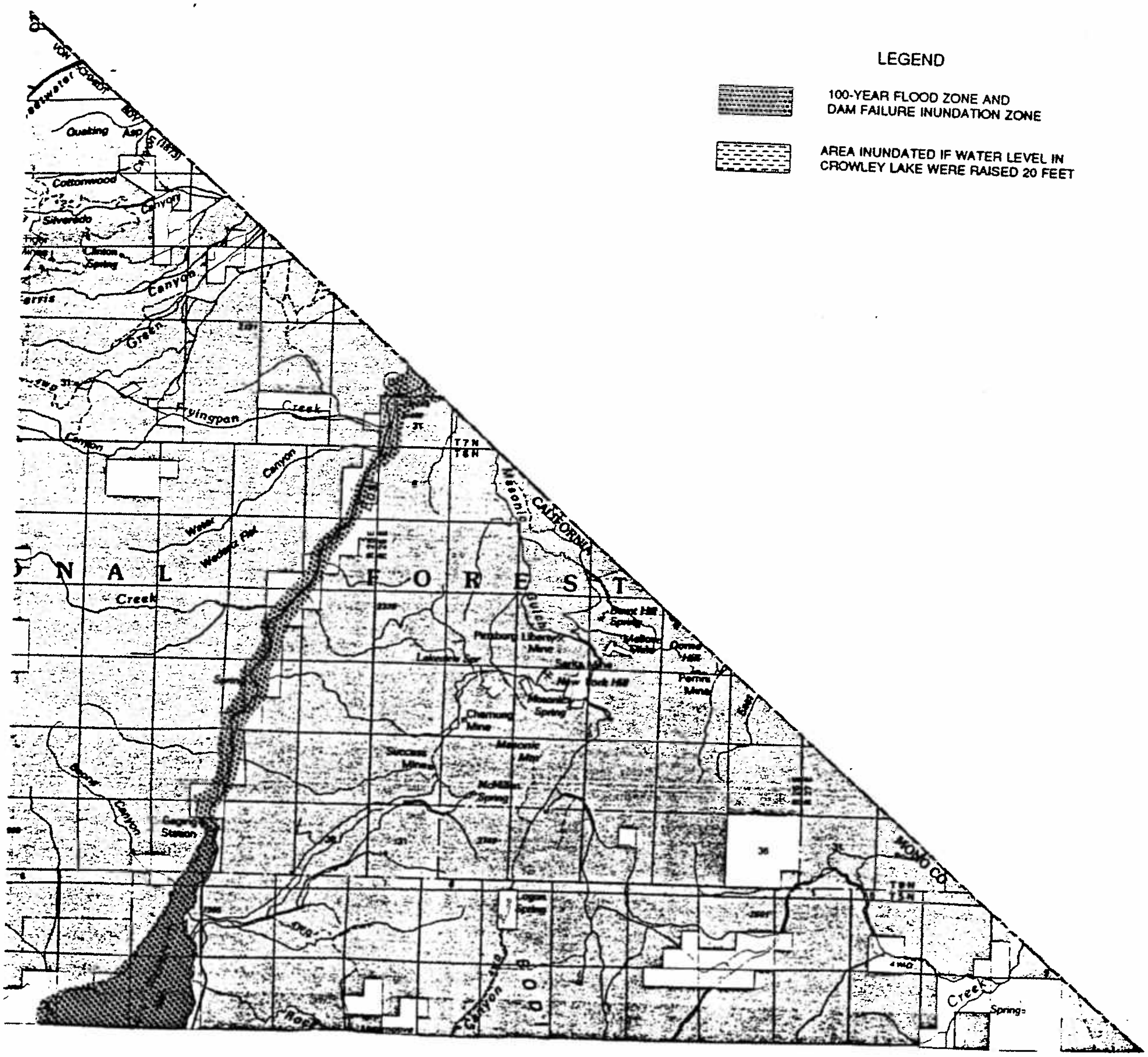
FIGURE 38 B
FLOOD HAZARDS

C. East Walker

LEGEND

100-YEAR FLOOD ZONE AND DAM FAILURE INUNDATION ZONE

AREA INUNDATED IF WATER LEVEL IN CROWLEY LAKE WERE RAISED 20 FEET



SOURCES: Federal Emergency Management Agency, 1985; Mono County Department of Public Works.

FEDERALLY OWNED LANDS

0 MILES 5

N

MONO COUNTY MEA

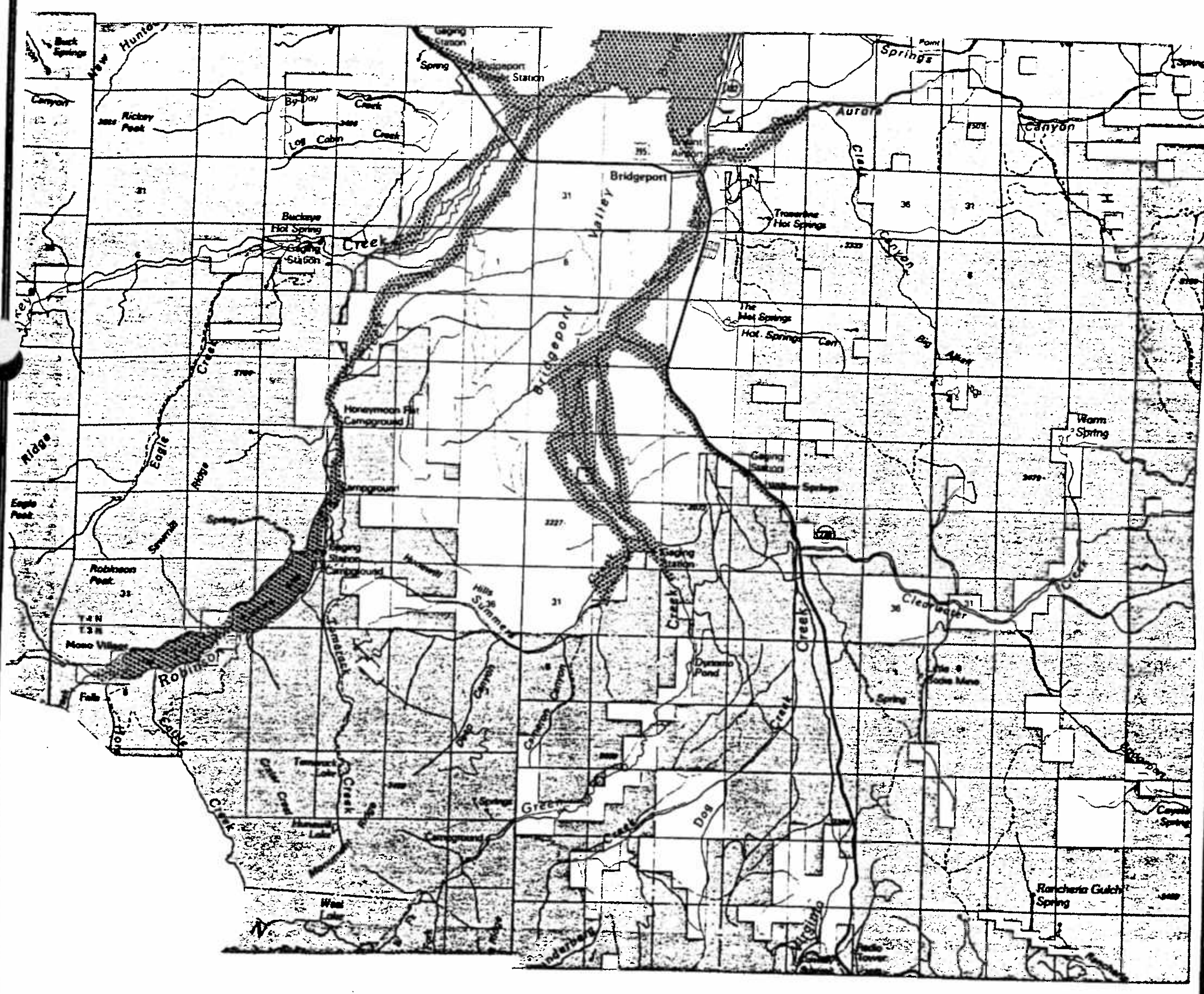
FIGURE 38 C
FLOOD HAZARDS

D. Bridgeport

LEGEND

100-YEAR FLOOD ZONE AND DAM FAILURE INUNDATION ZONE

AREA INUNDATED IF WATER LEVEL IN CROWLEY LAKE WERE RAISED 20 FEET



SOURCES: Federal Emergency Management Agency, 1985; Mono County Department of Public Works.

FEDERALLY OWNED LANDS

0 MILES 5

N

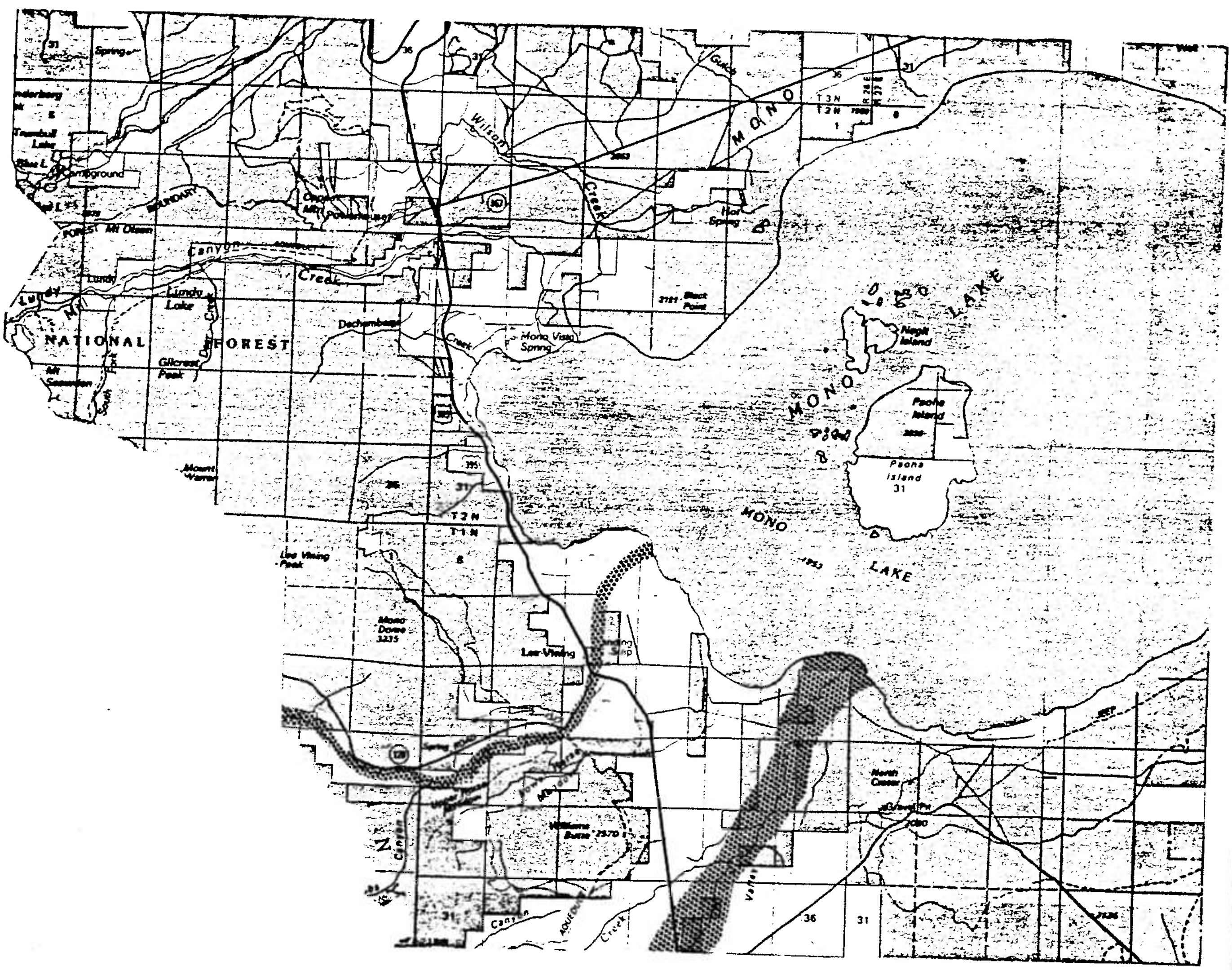
FIGURE 38 D
FLOOD HAZARDS

F. Mono Lake

LEGEND

100-YEAR FLOOD ZONE AND DAM FAILURE INUNDATION ZONE

AREA INUNDATED IF WATER LEVEL IN CROWLEY LAKE WERE RAISED 20 FEET



SOURCES: Federal Emergency Management Agency, 1985; Mono County Department of Public Works.

FEDERALLY OWNED LANDS

0 MILES 5

N

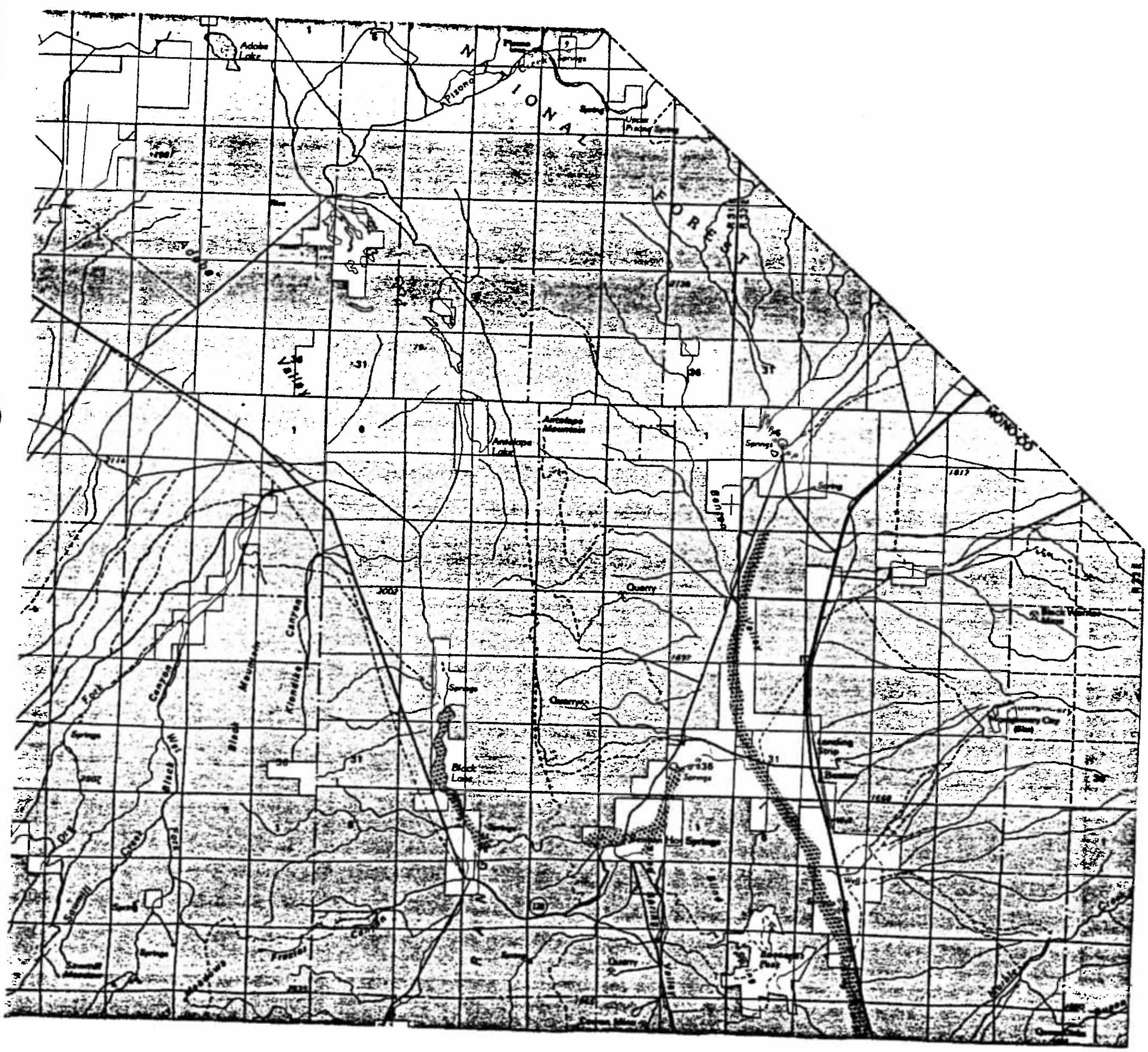
FIGURE 38 F
FLOOD HAZARDS

H. Adobe Valley / Benton

LEGEND

100-YEAR FLOOD ZONE AND DAM FAILURE INUNDATION ZONE

AREA INUNDATED IF WATER LEVEL IN CROWLEY LAKE WERE RAISED 20 FEET



SOURCES: Federal Emergency Management Agency, 1985; Mono County Department of Public Works.

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 38 H
FLOOD HAZARDS

I June Lake

LEGEND

100-YEAR FLOOD ZONE AND DAM FAILURE INUNDATION ZONE

AREA INUNDATED IF WATER LEVEL IN CROWLEY LAKE WERE RAISED 20 FEET

SOURCES: Federal Emergency Management Agency, 1985; Mono County Department of Public Works.

FEDERALLY OWNED LANDS

0 MILES 5

N

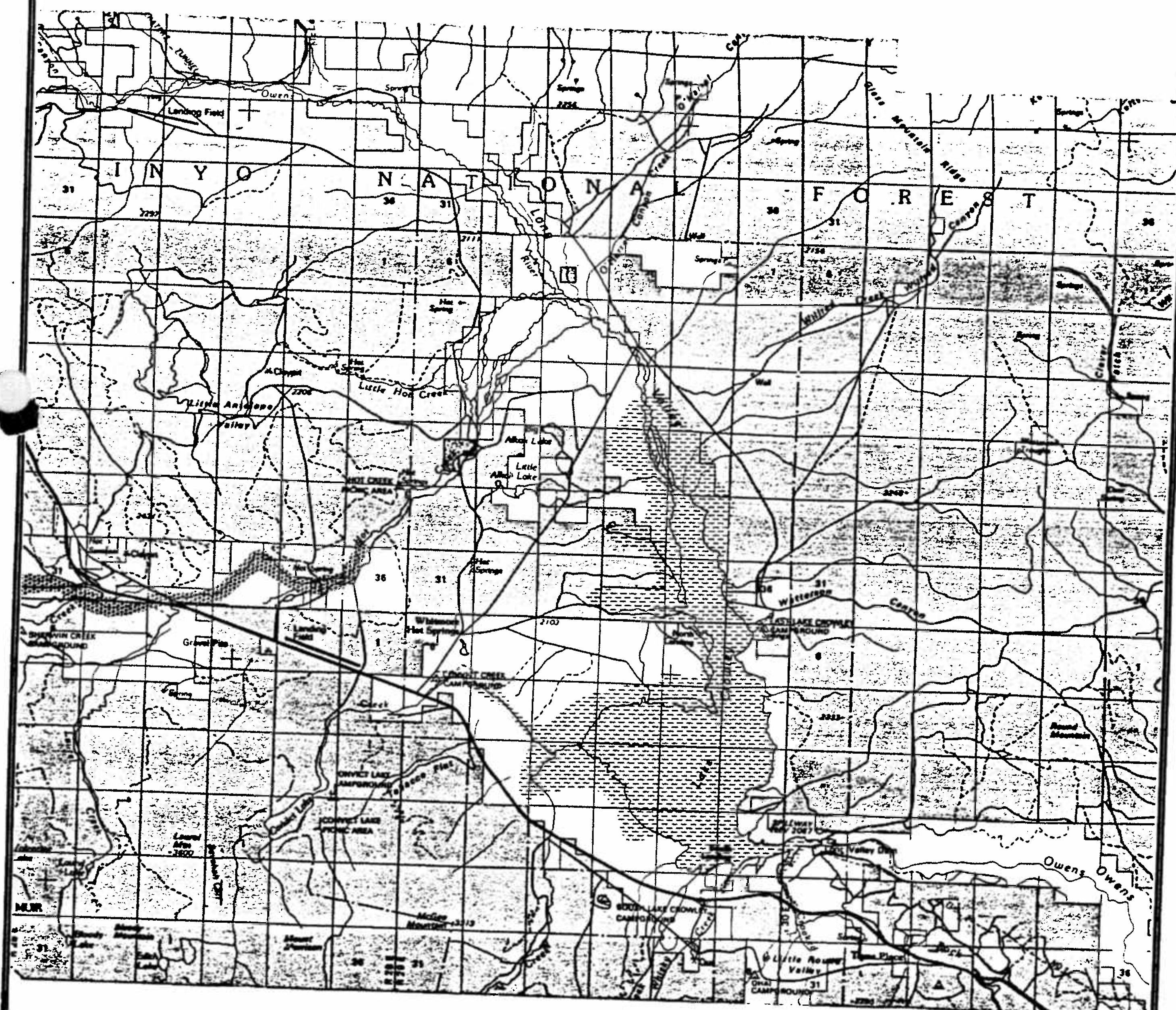
FIGURE 38 I
FLOOD HAZARDS

J. Long Valley

LEGEND

100-YEAR FLOOD ZONE AND DAM FAILURE INUNDATION ZONE

AREA INUNDATED IF WATER LEVEL IN CROWLEY LAKE WERE RAISED 20 FEET



SOURCES: Federal Emergency Management Agency, 1985; Mono County Department of Public Works.

FEDERALLY OWNED LANDS

0 MILES 5

N

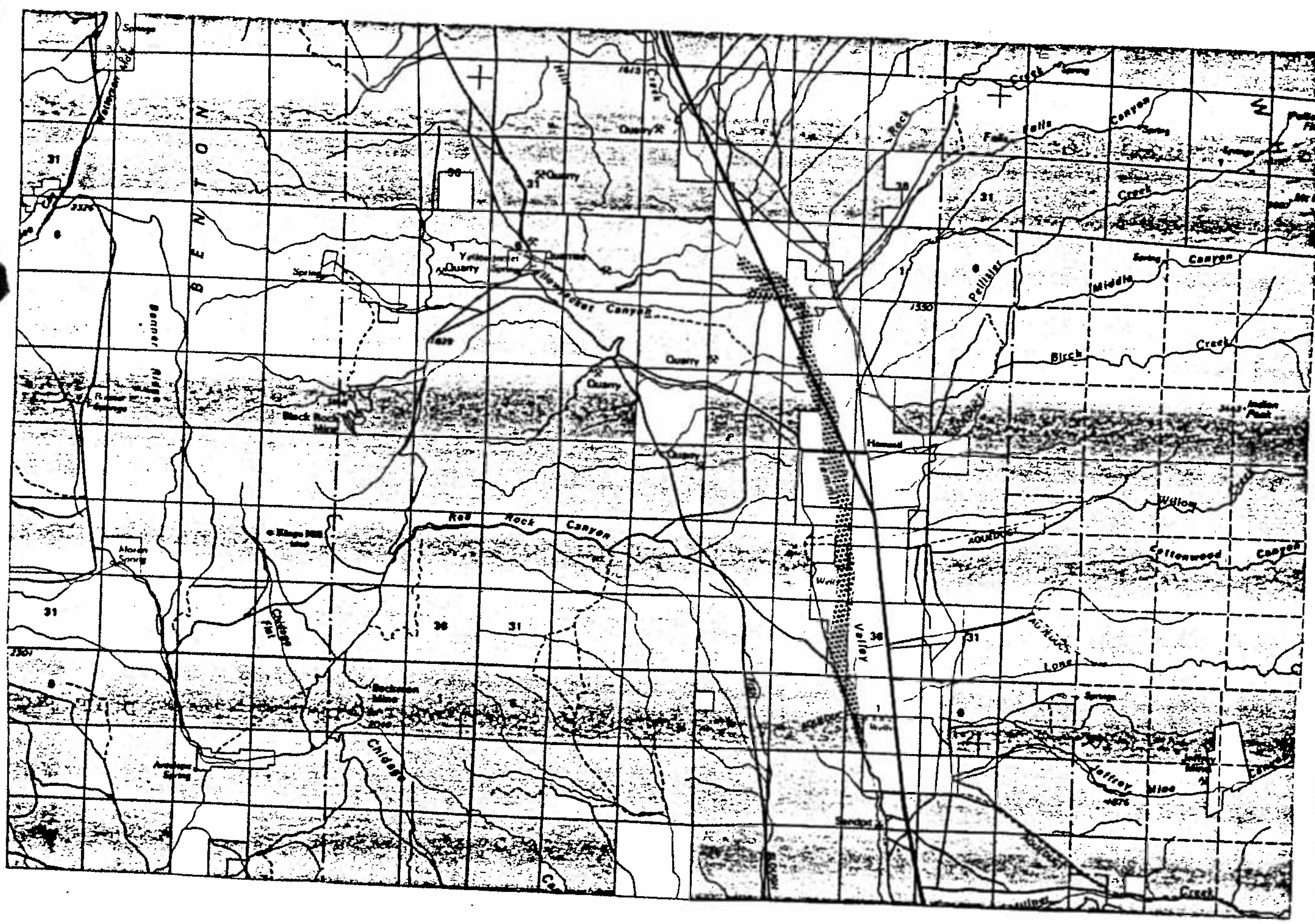
FIGURE 38 J
FLOOD HAZARDS

K. Hammil Valley

LEGEND

100-YEAR FLOOD ZONE AND
DAM FAILURE INUNDATION ZONE

AREA INUNDATED IF WATER LEVEL IN
CROWLEY LAKE WERE RAISED 20 FEET



SOURCES: Federal Emergency Management Agency, 1985;
Mono County Department of Public Works.

FEDERALLY OWNED LANDS

0 MILES 5

N

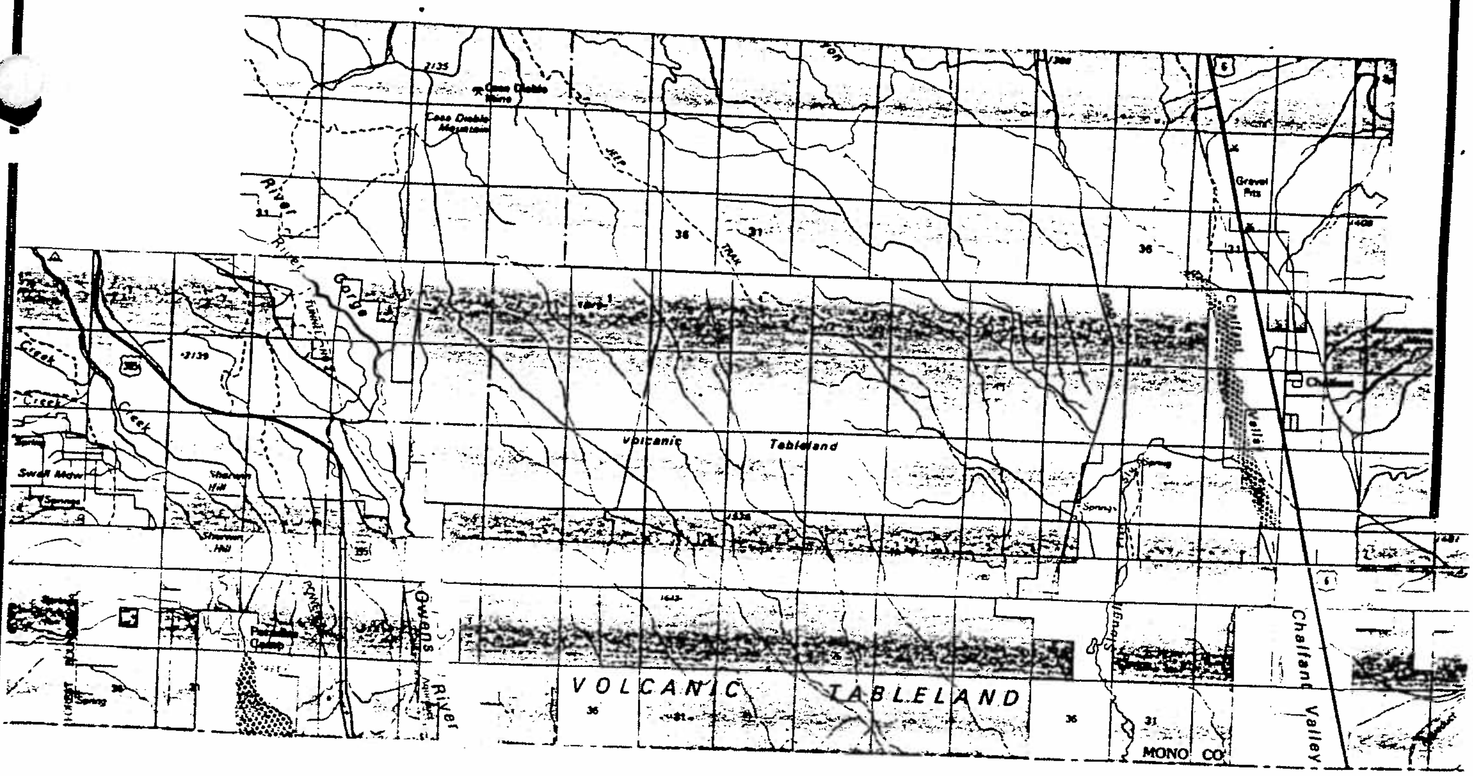
FIGURE 38 K
FLOOD HAZARDS

L. Wheeler / Paradise
M. Chalfant Valley

LEGEND

100-YEAR FLOOD ZONE AND DAM FAILURE INUNDATION ZONE

AREA INUNDATED IF WATER LEVEL IN CROWLEY LAKE WERE RAISED 20 FEET



SOURCES: Federal Emergency Management Agency, 1985; Mono County Department of Public Works.

FEDERALLY OWNED LANDS

0 MILES 5

N

FIGURE 38 L & M
FLOOD HAZARDS