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LIST OF ACRONYMS

Acronym or Abbreviation	Full Phrase
ACEC	area of critical environmental concern
AFY	acre-feet per year
AML	appropriate management level
AMP	allotment management plan
APHIS	Animal and Plant Health Inspection Service
APHIS-WS	Animal and Plant Health Inspection Service-Wildlife Services
AQ	air quality
ATV	all-terrain vehicle
AUM	animal unit month
BCB	Backcountry Byways
BEA	Bureau of Economic Analysis
BIA	US Department of the Interior, Bureau of Indian Affairs
BLM	US Department of the Interior, Bureau of Land Management
BMPs	best management practices
BPS	budget planning system
BRDHRCET	Black Rock Desert High Rock Canyon Emigrant Trails
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CK	cave and karst resources
CNHT	California National Historic Trail
CR	cultural resources
CWA	Clean Water Act
CWPP	Community Wildfire Protection Plan
CWMA	Cooperative Weed Management Area
EA	environmental assessment
EIS	environmental impact statement
EO	Executive Order
EPA	US Environmental Protection Agency
ERMA	extensive recreation management area
ES	Executive Summary
ESA	Endangered Species Act of 1973
ES&R	emergency stabilization and rehabilitation
FLPMA	Federal Land Policy and Management Act
FLTFA	Federal Land Transaction Facilitation Act
FMU	Fire Management Unit
FMUD	final multiple use decision
FOFEM	First Order Fire Effects Model
FPA	fire program analysis
FRCC	fire regime condition class
FW	fish and wildlife
G	geology
GAWS	general aquatic wildlife survey
GIS	geographical information system
HA	herd area

LIST OF ACRONYMS *(continued)*

Acronym or Abbreviation	Full Phrase
HAP	hazardous air pollution
HMA	herd management area
HMAP	herd management area plan
HMP	habitat management plan
HUA	herd use area
HVH	high value habitat
IBLA	Interior Board of Land Appeals
IDT	interdisciplinary team
IMP	interim management policy
IPM	Integrated Pest Management
ISA	instant study area
ITA	Indian Trust Assets
KGRA	known geothermal resource area
LCT	Lahontan cutthroat trout
LG	livestock grazing
LR	lands and realty
MACT	maximum available control technology
MBTA	Migratory Bird Treaty Act
MFP	management framework plan
MIST	minimum impact suppression tactics
MOU	memorandum of understanding
MR	minerals: leasable, locatable, salable
NASA	National Aeronautics and Space Administration
NCA	National Conservation Area
NDEP	Nevada Division of Environmental Protection
NDOA	Nevada Department of Agriculture
NDOM	Nevada Division of Minerals
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDVI	Normalized Difference Vegetation Index
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act of 1969
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NGO	non-government organizations
NHPA	National Historic Preservation Act
NHT	National Historic Trail
NRCS	US Department of Agriculture, Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	new source review
NSO	no surface occupancy
NWSRS	National Wild and Scenic River Systems
NV	Nevada
OCTA	Oregon-California Trail Association

LIST OF ACRONYMS *(continued)*

Acronym or Abbreviation	Full Phrase
OHV	off-highway vehicle
ORV	Outstanding Remarkable Value
PE	chemical and biological control
PFC	proper functioning condition
planning area	Winnemucca District Office boundary and scope for the RMP
$PM_{2.5}$	particulate matter smaller than 2.5 microns in diameter
PM_{10}	particulate matter smaller than 10 microns in diameter
PMU	population management unit
ppm	part per million
PR	paleontological resources
PS	public health and safety
PSD	prevention of significant deterioration
R	recreation
R&PP	Recreation and Public Purposes Act
RAC	resource advisory council
RAMS	risk assessment and mitigation strategy
RE	renewable energy
RFDS	Reasonably Foreseeable Development Scenario
RIP	range improvement project
RMIS	Recreation Management Information System
RMP	resource management plan
RMZ	recreation management zone
RNA	Research Natural Area
ROD	record of decision
ROI	region of influence
ROS	Recreation Opportunity Spectrum
ROW	right-of-way
S	soils
SASEM	Simple Approach Smoke Estimation Model
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SNPLMA	Southern Nevada Public Land Management Act
SOG	standard operating guideline
SOP	standard operating procedure
SRMA	special recreation management area
SRP	special recreation permit
SSS	special status species
T&E	threatened and endangered
TA	transportation and access
TC	tribal consultation
TCP	traditional cultural property
TDS	total dissolved solids
TM	transportation and travel management
TNEB	thriving natural ecological balance
TNR	temporary nonrenewable
TSP	total suspended particles

LIST OF ACRONYMS *(continued)*

Acronym or Abbreviation	Full Phrase
TSS	total suspended solids
US	United States
USC	United States Code
USDI	United States Department of the Interior
USFS	United States Department of Agriculture, Forest Service
USFWS	US Department of the Interior, Fish and Wildlife Service
USGS	US Geological Survey
VF	vegetation forest and woodland products
VR	vegetation rangelands
VRI	visual resource inventory
VRM	visual resource management
VRW	vegetation riparian and wetlands
VW	vegetation weeds
WA	wilderness area
WAFWA	Western Association of Fish and Wildlife Agencies
WD	Winnemucca District
WDM	wildlife damage management
WDO	Winnemucca District Office
WFDSS	Wildland Fire Decision Support System
WFM	wildland fire ecology management
WFSA	wildland fire situation analysis
WHB	wild horses and burros
WR	water resources
WSA	wilderness study area
WSR	wild and scenic river
WUG	Western Utility Group
WUI	Wildland Urban Interface
WWV	watchable wildlife viewing site

3. Affected Environment

CHAPTER 3 – AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter provides a description of the biological, physical, and socioeconomic characteristics, including human uses that could be affected by implementing the action alternatives for this RMP/EIS, as described in Chapter 2. Information from broad-scale assessments were used to help set the context for the planning area. The information and direction for BLM resources has been further broken down into fine-scale assessments and information where possible. Specific aspects of each resource discussed in this section (e.g., weeds, fire, and OHV use) were raised during the public and agency scoping process. The level of information presented in this chapter is commensurate with and sufficient to assess potential effects of the action alternatives in Chapter 4.

The planning area for the Winnemucca RMP is the WDO boundary outside of the NCA and includes all lands regardless of jurisdiction. However, the BLM makes decisions on only those lands under its jurisdiction, that is, those on BLM-administered lands.

3.2 RESOURCES

This section contains a description of the biological and physical resources of the WDO and follows the order of topics addressed in Chapter 2, as follows:

- Air quality;
- Geology;
- Soil resources;
- Water resources;
- Vegetation communities;
- Fish and wildlife;
- Special status species;
- Wild horse and burro;
- Wildland fire management;
- Cultural resources;
- Paleontological resources;
- Visual resources;
- Cave and karst;
- Livestock grazing;
- Minerals—leasable, locatable, and salable;
- Recreation;
- Renewable energy;
- Transportation and access;
- Lands and realty;
- Areas of Critical Environmental Concern and Research Natural Areas;
- Backcountry Byways;
- National Trails;
- Wild and Scenic Rivers;
- Wilderness, Wilderness Study Areas, and Lands with Wilderness Characteristics;
- Watchable wildlife viewing sites;
- Tribal interests;
- Public safety; and
- Social and economic conditions and environmental justice.

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3.2.1 Air Quality

Climate and Meteorology

The arid to semiarid climate of the area results from a rain shadow effect of the Sierra Nevada Mountain Range, which lies between the Pacific Ocean and Nevada. The Sierra Nevada absorbs most storm-front moisture moving east across the area. Annual precipitation varies from five to seven inches at lower elevations and up to 15 inches in the mountains. Seventy percent of the precipitation occurs in the late fall, winter, and spring. Summer precipitation is light and infrequent.

Average monthly temperatures vary from highs of about 40ºF in January, to 95ºF in July, and lows from around 20ºF in December and January to about 60ºF in July.

Prevailing wind from the west is strongest April through June. Wind gusts often reach 30 miles per hour and occasionally get higher. During other seasons, the wind is light and variable, occurring when weather fronts pass through the area, or as a result of daily heating and cooling of land surfaces. During the summer air quality is adversely affected by dust storms and wildfire.

Air Quality

Federal and state air quality management programs have evolved using two distinct management approaches:

- The State Implementation Plan (SIP) process of setting ambient air quality standards for acceptable exposure to air pollutants, conducting monitoring programs to identify locations experiencing air quality problems, and then developing programs and regulations designed to reduce or eliminate those problems; and
- The Hazardous Air Pollutant (HAP) regulatory process, identifying specific chemical substances that are potentially hazardous to human health and then setting emission standards to regulate the amount of those substances that can be released by individual commercial or industrial facilities or by specific types of equipment.

Air quality programs based on ambient air quality standards typically address air pollutants that are produced in large quantities by widespread types of emission sources and that are of public health concern because of their toxic properties. The US EPA has established ambient air quality standards for several different pollutants, which often are referred to as criteria pollutants (ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, suspended particulate matter, and lead). Standards for suspended particulate matter have been set for two size fractions: inhalable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). Federal ambient air quality standards are based primarily on evidence of acute and chronic health effects. Federal ambient air quality standards apply to outdoor locations to which the general public has access.

Nevada has adopted state ambient air quality standards that are equal to or more stringent than the comparable federal standards. Nevada also has adopted an ambient air quality standard for hydrogen sulfide, a pollutant that is not covered by federal ambient air quality standards. Table 3-1 summarizes current federal and Nevada ambient air quality standards.

Air pollutants covered by federal and state ambient air quality standards can be categorized by the nature of their toxic effects as:

- Irritants (such as ozone, particulate matter, nitrogen dioxide, sulfur dioxide, sulfate particles, and hydrogen sulfide) that affect the respiratory system, eyes, mucous membranes, and the skin;
- Asphyxiants (such as carbon monoxide and nitric oxide) that displace oxygen or interfere with oxygen transfer in the circulatory system, affecting the cardiovascular and central nervous systems;

Table 3-1
State and National Ambient Air Quality Standards Applicable in Nevada

Pollutant	Averaging Time	Nevada Standards in Parts Per Million by Volume (ppm)	National Standards in Parts Per Million by Volume (ppm)	Nevada Standards in Micrograms Per Cubic Meter	National Standards in Micrograms Per Cubic Meter	Nevada Violation Criteria	National Violation Criteria
Ozone	1 hour (outside Lake Tahoe Basin)	0.12	Standard rescinded	235	Standard rescinded	If exceeded	Not applicable
Ozone	1 hour (in Lake Tahoe Basin)	0.10	Standard rescinded	195	Standard rescinded	If exceeded	Not applicable
Ozone	8 hours	Not applicable	0.075	Not applicable	147	Not applicable	If exceeded by the mean of annual 4th highest daily values for a 3-year period
Carbon Monoxide	1 hour	35	35	40,500	40,000	If exceeded	If exceeded on more than 1 day per year
Carbon Monoxide	8 hours (areas below 5,000 feet elevation)	9	9	10,500	10,000	If exceeded	If exceeded on more than 1 day per year
Carbon Monoxide	8 hours (areas at or above 5,000 feet elevation)	6	9	7,000	10,000	If exceeded	If exceeded on more than 1 day per year
Nitrogen Dioxide	Annual average	0.05	0.053	100	100	If exceeded	If exceeded
Sulfur Dioxide	Annual average	0.03	0.03	80	80	If exceeded	If exceeded
Sulfur Dioxide	24 hours	0.14	0.14	365	365	If exceeded	If exceeded on more than 1 day per year
Sulfur Dioxide	3 hours	0.5	0.5	1,300	1,300	If exceeded on more than 1 day per year	If exceeded on more than 1 day per year
Inhalable Particulate Matter (PM_{10})	Annual arithmetic mean	Not applicable	Not applicable	50	Standard rescinded	If exceeded	Not applicable

Pollutant	Averaging Time	Nevada Standards in Parts Per Million by Volume (ppm)	National Standards in Parts Per Million by Volume (ppm)	Nevada Standards in Micrograms Per Cubic Meter	National Standards in Micrograms Per Cubic Meter	Nevada Violation Criteria	National Violation Criteria
Inhalable Particulate Matter (PM_{10})	24 hours	Not applicable	Not applicable	150	150	If exceeded	For 1997 non-attainment areas, if exceeded on more than 1 day per year. For other areas, if exceeded by the mean of annual 99th percentile values over 3 years
Fine Particulate Matter ($PM_{2.5}$)	Annual arithmetic mean	Not applicable	Not applicable	Not applicable	15.0	Not applicable	If exceeded as a 3-year spatial average of data from designated stations
Fine Particulate Matter ($PM_{2.5}$)	24 hours	Not applicable	Not applicable	Not applicable	35	Not applicable	If exceeded by the mean of annual 98th percentile values over 3 years
Lead Particles (TSP sampler)	Calendar quarter	Not applicable	Not applicable	1.5	1.5	If exceeded	If exceeded
Lead Particles (TSP sampler)	Rolling 3-month average	Not applicable	Not applicable	Not applicable	0.15	Not applicable	If exceeded in a 3-year period
Hydrogen Sulfide	1 hour	0.08	Not applicable	112	Not applicable	If exceeded	Not applicable

Notes:
All standards except the national PM_{10} and $PM_{2.5}$ standards are based on measurements corrected to 25 degrees C and 1 atmosphere pressure.
The national PM_{10} and $PM_{2.5}$ standards are based on direct flow volume data without correction to standard temperature and pressure.
The national 1-hour ozone standard was rescinded for 41 states (including Nevada) prior to June 2005 but remains in effect for portions of Colorado, Georgia, Maryland, North Carolina, South Carolina, Tennessee, Texas, Virginia, and West Virginia.
The national 8-hour ozone standard was revised from 0.08 ppm to 0.075 ppm effective May 27, 2008.
The national annual average standard for PM_{10} was rescinded effective December 17, 2006.
The national 24-hour standard for $PM_{2.5}$ was revised from 65 micrograms per cubic meter to 35 micrograms per cubic meter effective December 17, 2006.
The "$_{10}$" in PM_{10} and the "$_{2.5}$" in $PM_{2.5}$ are not particle size limits but identify the particle size class (aerodynamic diameter in microns) collected with 50 percent mass efficiency by certified sampling equipment. The maximum particle size collected by PM_{10} samplers is about 50 microns. The maximum particle size collected by $PM_{2.5}$ samplers is about 6 microns.

The national 3-month rolling average standard for lead was adopted in November 2008. The previous calendar quarter lead standard will remain in effect for a minimum of one year.
The Nevada standard for hydrogen sulfide represents an increment above naturally occurring background concentrations.
Sources:
40 CFR Parts 50, 53, and 58 (EPA No Date a, b, c).
Nevada Bureau of Air Quality Planning 2008.
US Environmental Protection Agency 2009 National Ambient Air Quality Standards (EPA 2009a).

- Necrotic agents (such as ozone, nitrogen dioxide, and sulfur dioxide) that directly cause cell death; or
- Systemic poisons (such as lead particles) that affect a range of tissues, organs, and metabolic processes.

Ozone, suspended particulate matter, and carbon monoxide are the air pollutants of greatest concern in most parts of the country. Ozone is seldom released directly into the atmosphere but forms from complex chemical reactions that occur in sunlight. The chemical reactions that produce ozone involve a wide range of organic compounds, nitric oxide, nitrogen dioxide, and oxygen. Reactive organic compounds and nitrogen oxides (the combination of nitric oxide and nitrogen dioxide) are the precursor emission products that form ozone. The atmospheric chemical reaction processes that produce ozone also produce chemically formed particulate matter and acidic compounds. Combustion processes and evaporation of volatile organic compounds are the major emission sources for organic compounds. Common fuel combustion sources include fuel combustion in motor vehicles, fuel combustion in industrial processes, agricultural burning, prescribed burning, and wildfires. Common evaporative sources of organic compounds include paints, solvents, liquid fuels, or liquid chemicals. Combustion processes are the major source of emissions for nitrogen oxides.

The major emission source categories for suspended particulate matter include combustion sources (fuel combustion in motor vehicles and industrial processes, agricultural burning, prescribed burning, and wildfires); industrial grinding and abrasion processes; soil disturbance by construction equipment, agricultural and forestry equipment, recreational vehicles, or other vehicles and equipment; mining and other mineral extraction activities; and wind erosion from exposed soils and sediments. Suspended particulate matter is also formed by the types of atmospheric chemical reactions that produce ozone and acidic compounds.

The major sources of carbon monoxide are combustion processes, such as fuel combustion in motor vehicles and industrial processes, agricultural burning, prescribed burning, and wildfires.

Ozone is a strong oxidizing agent that reacts with a wide range of materials and biological tissues. It is a respiratory irritant that can have acute and chronic effects on the respiratory system. Recognized effects include reduced pulmonary function, pulmonary inflammation, increased airway reactivity, aggravation of existing respiratory diseases (such as asthma, bronchitis, and emphysema), physical damage to lung tissue, decreased exercise performance, and increased susceptibility to respiratory infections. In addition, ozone is a necrotic agent that significantly damages leaf tissues of crops and natural vegetation. Ozone also damages many materials by acting as a chemical oxidizing agent. Because of its chemical activity, indoor ozone levels are usually much lower than outdoor levels.

Suspended particulate matter represents a diverse mixture of solid and liquid material having size, shape, and density characteristics that allow the material to remain suspended in the air for meaningful time periods. The physical and chemical composition of suspended particulate matter is

highly variable, resulting in a wide range of public health concerns. Many components of suspended particulate matter are respiratory irritants. Some components (such as crystalline or fibrous minerals) are primarily physical irritants. Other components are chemical irritants (such as sulfates, nitrates, and various organic chemicals). Suspended particulate matter also can contain compounds (such as heavy metals and various organic compounds) that are systemic toxins or necrotic agents. Suspended particulate matter or compounds adsorbed on the surface of particles can also be carcinogenic or mutagenic chemicals.

Public health concerns for suspended particulate matter focus on the particle size ranges likely to reach the lower respiratory tract or the lungs. Inhalable particulate matter (PM_{10}) represents particle size categories that are likely to reach either the lower respiratory tract or the lungs after being inhaled. Fine particulate matter ($PM_{2.5}$) represents particle size categories likely to penetrate to the lungs after being inhaled. The "$_{10}$" in PM_{10} and the "$_{2.5}$" in $PM_{2.5}$ are not upper size limits but refer to the particle size range collected with 50 percent mass efficiency by certified sampling devices; larger particles are collected with lower efficiencies, and smaller particles are collected with higher efficiencies.

In addition to public health impacts, suspended particulate matter causes a variety of material damage and nuisance effects: abrasion; corrosion, pitting, and other chemical reactions on material surfaces; soiling; and transportation hazards due to visibility impairment.

Carbon monoxide is a public health concern because it combines readily with hemoglobin in the blood and thus reduces the amount of oxygen transported to body tissues. Relatively low concentrations of carbon monoxide can significantly affect the amount of oxygen in the blood stream since carbon monoxide binds to hemoglobin 200 to 250 times more strongly than oxygen. Both the cardiovascular system and the central nervous system can be affected when 2.5 to 4.0 percent of the hemoglobin in the blood is bound to carbon monoxide rather than to oxygen. Because of its low chemical reactivity and low solubility, indoor carbon monoxide levels usually are similar to outdoor levels.

Air quality programs based on regulation of other hazardous substances typically address chemicals used or produced by limited categories of industrial facilities. Programs regulating hazardous air pollutants focus on substances that alter or damage the genes and chromosomes in cells (mutagens); substances that affect cells in ways that can lead to uncontrolled cancerous cell growth (carcinogens); substances that can cause birth defects or other developmental abnormalities (teratogens); substances with serious acute toxicity effects; and substances that undergo radioactive decay processes, resulting in the release of ionizing radiation. Federal air quality management programs for hazardous air pollutants focus on setting emission limits for particular industrial processes rather than setting ambient exposure standards. Federal emission standards for hazardous air pollutants have been promulgated as National Emission Standards for Hazardous Air Pollutants (NESHAPS) and as Maximum Available Control Technology (MACT) standards. The federal MACT standard for mercury emissions from coal-fired power plants represents an example of such hazardous air pollutant control programs. Nevada has adopted a state MACT standard for mercury emissions from thermal process units at precious metals mining operations. The NESHAPS and MACT standards are implemented through federal and state air quality permit programs.

The federal Clean Air Act establishes a basic air quality permit program for industrial emission sources. Key elements of the federal requirements include preconstruction permits and annual operating permits. Separate preconstruction requirements have been established for nonattainment pollutants and for attainment pollutants. The federal New Source Review (NSR) Program applies in nonattainment areas to the applicable nonattainment pollutants. A key element of the NSR Program is a requirement to implement emission offsets so that a new source of emissions will not cause a net increase in nonattainment pollutant emissions for the nonattainment area. The federal Prevention of Significant Deterioration (PSD) Program applies to attainment pollutants. Key elements of the PSD Program include potential requirements for preconstruction and post-construction ambient air quality monitoring; establishment of baseline ambient air quality levels maximum cumulative pollutant increments allowed above those baseline levels; evaluation of proposed emission sources to determine their consumption of available PSD pollutant increments; and evaluation of visibility impacts in designated Class I wilderness, national park, and national monument areas. The federal operating permit program is referred to as the Title V permit program, which imposes reporting and recordkeeping requirements to ensure that conditions imposed by preconstruction permits are being met.

In general, states have assumed primary responsibility for enforcing most federal permit requirements, with the US EPA exercising a formal review and oversight responsibility. Some states, including Nevada, have separate air permit programs authorized by state legislation. State air permit requirements typically cover emission sources that are smaller than those subject to federal permit requirements. In most cases, state air permit programs have been integrated with federal NSR, PSD, and Title V requirements to provide a consolidated permit program. Under most consolidated permit programs, basic state permit requirements apply to all sources that are not specifically exempted. Additional NSR and PSD program requirements (including US EPA review of the permit) become applicable if sources exceed various size or emission thresholds.

There are no PSD program Class I visibility protection areas within the WDO area. The only Class I area in Nevada is the Jarbidge Wilderness in north-central Elko County. Class I areas in southwestern Oregon include the Gearheart Mountain Wilderness, the Mountain Lakes Wilderness, and Crater Lake National Park. Class I areas in southern Idaho include the Craters of the Moon National Monument. Class I areas in northeastern California include the Lava Beds Wilderness, the South Warner Wilderness, Lassen Volcanic National Park, the Caribou Wilderness, the Desolation Wilderness, and the Mokelumne Wilderness.

The federal Clean Air Act requires each state to identify areas that have ambient air quality in violation of federal standards. States are required to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce federal ambient air quality standards in these nonattainment areas. Deadlines for achieving the federal air quality standards vary according to air pollutant and the severity of existing air quality problems. The SIP must be submitted to and approved by the US EPA. SIP elements are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated.

The status of areas with respect to federal ambient air quality standards is categorized as nonattainment, attainment (better than national standards), or unclassified (due to an absence of monitoring data). Areas that have been redesignated from nonattainment to attainment are considered maintenance areas, although this designation is seldom indicated in formal listings of

attainment status designations. Unclassified areas are treated as attainment areas for most regulatory purposes. All of the WDO area is considered attainment or unclassified for all federal ambient air quality standards. The closest areas with nonattainment designations are the Reno-Sparks area in Washoe County and the Lake Tahoe Basin.

The Nevada Division of Environmental Protection, Bureau of Air Quality Planning, operates a system of ambient air quality monitoring stations in those parts of Nevada outside Clark County and Washoe County. The Washoe County Health Department operates a network of air quality monitoring stations in the Reno-Sparks and Lake Tahoe parts of the county. There presently are no air quality monitoring stations within the WDO area, although a PM_{10} monitoring station was operated in Lovelock between 1992 and 1997. PM_{10} monitoring stations previously operated outside the WDO area in Fernley and Fallon. A $PM_{2.5}$ monitoring station is currently operating outside the WDO area in Fernley. Ozone monitoring stations are currently operating outside of the WDO area in Fernley and Fallon. Table 3-2 below is a summary of available PM_{10} monitoring data from Lovelock, Fernley, and Fallon; Table 3-3 is a summary of available $PM_{2.5}$ monitoring data from Fernley; Table 3-4 is a summary of available 1-hour ozone monitoring data from Fernley and Fallon; and Table 3-5 is a summary of available 8-hour ozone monitoring data from Fernley.

Table 3-2
Summary of 24-Hour PM_{10} Monitoring Data

Lovelock Post Office Year	Lovelock Post Office Number of Samples	Lovelock Post Office Highest Micrograms per Cubic Meter	Lovelock Post Office 2nd High Micrograms per Cubic Meter	Lovelock Post Office Arithmetic Mean	Lovelock Post Office Exceedances of 24-Hour Standard
1992	53	44	44	22	0
1993	51	67	59	31	0
1994	43	56	53	25	0
1995	27	55	55	24	0
1996	56	69	62	26	0
1997	27	47	42	24	0
Fernley School Year	**Fernley School Number of Samples**	**Fernley School Highest Micrograms per Cubic Meter**	**Fernley School 2nd High Micrograms per Cubic Meter**	**Fernley School Arithmetic Mean**	**Fernley School Exceedances of 24-Hour Standard**
1995	40	37	35	21	0
1996	59	104	96	19	0
1997	59	43	37	16	0
1998	47	43	40	16	0
Fallon West End School Year	**Fallon West End School Number of Samples**	**Fallon West End School Highest Micrograms per Cubic Meter**	**Fallon West End School 2nd High Micrograms per Cubic Meter**	**Fallon West End School Arithmetic Mean**	**Fallon West End School Exceedances of 24-Hour Standard**
1993	35	111	103	40	0
1994	45	66	62	27	0
1995	47	74	60	28	0

Fallon West End School Year	Fallon West End School Number of Samples	Fallon West End School Highest Micrograms per Cubic Meter	Fallon West End School 2nd High Micrograms per Cubic Meter	Fallon West End School Arithmetic Mean	Fallon West End School Exceedances of 24-Hour Standard
1996	54	102	61	25	0
1997	53	53	53	26	0
1998	25	79	47	19	0

Source: Nevada Bureau of Air Quality Planning 2003 Trend Report (NBAQP 2003)

Table 3-3
Summary of 24-Hour $PM_{2.5}$ Monitoring Data

Fernley School Year	Fernley School Number of Samples	Fernley School Highest Micrograms per Cubic Meter	Fernley School 2nd High Micrograms per Cubic Meter	Fernley School Arithmetic Mean	Fernley School Exceedances of 24-Hour Standard
1999	187	32	24	4.4	0
2000	358	37	30	3.8	0
2001	345	55	41	5.5	0
2002	328	46	40	4.3	0
2003	295	13	11	2.9	0

Source: Nevada Bureau of Air Quality Planning 2003 Trend Report (NBAQP 2003)

Table 3-4
Summary of 1-Hour Ozone Monitoring Data

Fernley Fire Department Year	Fernley Fire Department Highest 1-Hour parts per million	Fernley Fire Department 2nd High 1-Hour parts per million	Fernley Fire Department Exceedance Hours	Fernley Fire Department Exceedance Days
1998	0.08	0.08	0	0
1999	0.09	0.08	0	0
2000	0.08	0.07	0	0
2001	0.08	0.08	0	0
2002	0.08	0.08	0	0
2003	0.09	0.08	0	0
Fallon West End School Year	**Fallon West End School Highest 1-Hour parts per million**	**Fallon West End School 2nd High 1-Hour parts per million**	**Fallon West End School Exceedance Hours**	**Fallon West End School Exceedance Days**
1999	0.07	0.06	0	0
2000	0.08	0.07	0	0
2001	0.07	0.07	0	0
2002	0.07	0.07	0	0
2003	0.08	0.07	0	0

Source: Nevada Bureau of Air Quality Planning 2003 Trend Report (NBAQP 2003)

Table 3-5
Summary of 8-Hour Ozone Monitoring Data

Fernley Fire Department Year	Fernley Fire Department 4th Highest 8-Hour Parts Per Million	Fernley Fire Department Exceedance Year
1998	0.07	No
1999	0.07	No
2000	0.07	No
2001	0.065	No
2002	0.066	No
2003	0.067	No

Source: Nevada Bureau of Air Quality Planning 2003 Trend Report (NBAQP 2003)

Climate Change

Climate is the long-term average of annual and seasonal weather conditions in a region. Greenhouse gases are compounds in the atmosphere that absorb infrared radiation and re-radiate a portion of that back to the earth's surface, thus trapping heat and warming the atmosphere. Greenhouse gases have the potential to affect climate patterns, which in turn can affect resource management. The most important naturally occurring greenhouse gas compounds are carbon dioxide, methane, nitrous oxide, ozone, and water vapor. Carbon dioxide, methane, and nitrous oxide are produced naturally by the following processes:

- Respiration and other physiological processes of plants, animals, and microorganisms;
- Decomposition of organic matter;
- Volcanic and geothermal activity;
- Naturally occurring wildfires; and
- Natural chemical reactions in soil and water.

Ozone is not released directly by natural sources but forms during complex chemical reactions in the atmosphere, among organic compounds and nitrogen oxides in the presence of ultraviolet radiation. While water vapor is a strong greenhouse gas, its concentration in the atmosphere is primarily a result of, not a cause of, changes in surface and lower atmospheric temperature conditions.

Although naturally present in the atmosphere, concentrations of carbon dioxide, methane, and nitrous oxide also are due to industrial processes, transportation technology, urban development, agricultural practices, and other human activity. The Intergovernmental Panel on Climate Change (IPCC) estimates the following changes in global atmospheric concentrations of the most important greenhouse gases (IPCC 2001, 2007):

- Atmospheric concentrations of carbon dioxide have risen from a preindustrial background of 280 parts per million (ppm) by volume to 379 ppm in 2005;
- Atmospheric concentrations of methane have risen from a preindustrial background of about 0.70 ppm to 1.774 ppm in 2005; and

- Atmospheric concentrations of nitrous oxide have risen from a preindustrial background of 0.270 ppm to 0.319 ppm in 2005.

The IPCC has concluded that these changes in atmospheric composition are almost entirely the result of human activity, not the result of changes in natural processes that produce or remove these gases (IPCC 2007).

The US EPA estimates that national greenhouse gas emissions in 2007 were 7,881 million tons of carbon dioxide equivalents (EPA 2009b). National greenhouse gas emissions in 2007 represented a 17.24 percent increase from estimated 1990 national greenhouse gas emissions (6,722 million tons of carbon dioxide equivalents). The EPA categorized the major economic sectors contributing to US emissions of greenhouse gas compounds as follows:

- Electric power generation (34.2%);
- Transportation (27.9%);
- Industrial processes (19.4%);
- Agriculture (7.0%);
- Commercial land uses (5.7%);
- Residential land uses (5.0%); and
- US Territories (0.8%).

The Nevada Division of Environmental Protection (2008) has estimate Nevada's statewide greenhouse gas emissions at 56.7 million tons of carbon dioxide equivalent in 2005. This was 0.79% of the US national greenhouse gas emission inventory for 2005. The major sectors contributing to Nevada's greenhouse gas emissions in 2005 were as follows:

- Electric power generation (46.6%);
- Transportation (30.1%);
- Industrial processes (4.4%);
- Agriculture (2.8%);
- Residential, commercial, and industrial land uses (12.1%);
- Waste management (2.5%); and
- Fossil fuel industries (1.4%).

Sources of greenhouse gas emissions in the WDO area are fossil-fueled power plants, wildfires and prescribed burns, vehicles (including OHVs), construction and operation for mineral and energy development, and grazing livestock, wild horses, and burros. To the extent that these activities increase, greenhouse gas emissions are also likely to increase.

Chambers (2008) notes that historical data show an increase in mean annual temperature in the Great Basin, with most of the change resulting from higher minimum temperatures rather than higher maximum temperatures. Most portions of the Great Basin show a warming of 0.6 to 1.1°F over the past century. Regional climate models typically predict an additional warming of 3.6 to 9°F

over the next century. Historical data also indicate an increase in annual precipitation amounts in the Great Basin over the past century, together with increased year-to-year variability in precipitation amounts and a decrease in winter snow pack. These changes have resulted in earlier snowmelt, higher winter streamflow volumes, reduced spring peak volumes, and lower summer and fall streamflow volumes.

3.2.2 Geology

The WDO lies within the western part of the Basin and Range physiographic province (west of longitude 117 degrees W; Barker et al. 1995). The Basin and Range province extends west to the Sierra Nevada and Cascade Ranges in California and Oregon, and east to the Wasatch Mountains in Utah.

From Paleozoic to Middle Jurassic time, this area of Nevada was dominated by marine deposition, varying between broad open seaways and relatively restricted basins.

The Paleozoic sequences are thought to have been deposited in western Nevada and subsequently transported to the east, first on the Roberts Mountain thrust during the Antler orogeny of Late Devonian/Early Mississippian age, then on the Golconda thrust during the Sonoma orogeny of Early Triassic age. The lithologic and structural complexity of the involved formations precludes any detailed mapping of the structural features in most areas.

Another deformation during Jurassic and Cretaceous time is considered to be part of the Nevadan orogeny, an episode of low-grade metamorphism, variably directed folding, and thrust faulting. Thrust faults mapped in the Sonoma Range indicate overriding from east to west, and folds are overturned to the west.

Basaltic flows and rhyolitic lavas and ash flows were extruded during Tertiary and Quaternary time. Concurrent with the volcanism, Cenozoic normal (Basin and Range) faulting has been intermittently active from about 16 million years ago until the present, resulting in maximum uplifts of probably several thousand feet. During regional extension thick sequences of Tertiary sediments were deposited in the basins. Some of the highly extended basins are as deep as 10,000 feet to bedrock. The sedimentary rocks in these basins are primarily of lacustrine and fluvial-lacustrine origin and were deposited contemporaneously with volcanism.

Thick sequences of lake sediments were also deposited in the basins in Pleistocene time, when pluvial Lake Lahontan inundated large areas of western Nevada. The interbedding of alluvium and colluvium with the lacustrine deposits records the history of high-stand and low-stand cycles of the lake.

Among the youngest regional deposits of Quaternary age are assemblages of fluvial, aeolian, lacustrine, and alluvial deposits primarily associated with Pleistocene Lake Lahontan and local tributaries (Figure 3-1). These younger sediments cover large portions of the planning area and are sources for many of the mineral material sources in the planning area. These basin-fill deposits locally have hydrocarbon generation potential, resulting mainly from hydrothermal alteration of algal organic matter in lacustrine marls and humic coals or coaly rocks, but no commercial hydrocarbon production has been established in the region (Barker et al. 1995).

Regional tectonic, igneous, and volcanic events accompanying regional extension have fractured the upper crust. This region of Nevada exhibits high heat flow, which, combined with the fractures and deep basins, provides conduits for thermal fluids to migrate through permeable zones to create ore deposits. The basins are reservoirs for geothermal resources.

Throughout geologic time there have been granitic intrusions accompanying the major tectonic events. Many of the granitic events are sources of fluids that create ore deposits. The granites also provide mineral material sources, such as decorative boulders and decomposed granite.

The Paleozoic and Mesozoic rocks include high-quality limestone that is mined in the planning area. It is considered possible, although no exploration has been done to confirm the hypothesis, that Permian-Triassic rocks may have potential for petroleum generation where traps are created by faulting and hydrothermal or contact metamorphism has altered organic matter contained in marine shales. Evidence includes oil or gas shows in the Augusta and Clan Alpine Ranges and in Buena Vista Valley. Figure 3-2 presents representative stratigraphic columns from the region.

3.2.3 Soil Resources

The overall resource condition for soils is good, with some areas demonstrating diminished, unstable, or eroded soils due to rangeland wildfires, overgrazing, and commercial operations.

Setting

Soil surveys in the region began in the Fallon area in 1909. By the 1940s the field surveys were supplemented with aerial photography. These surveys were known as Physical Surveys and Surveys for Better Land Use. Between 1950 and 1970, the surveys became more detailed, with soil taxonomy information and better aerial photography. The surveys concentrated on agricultural areas and uses. In the 1970s the surveys for key agricultural areas were completed as well as those for urban areas.

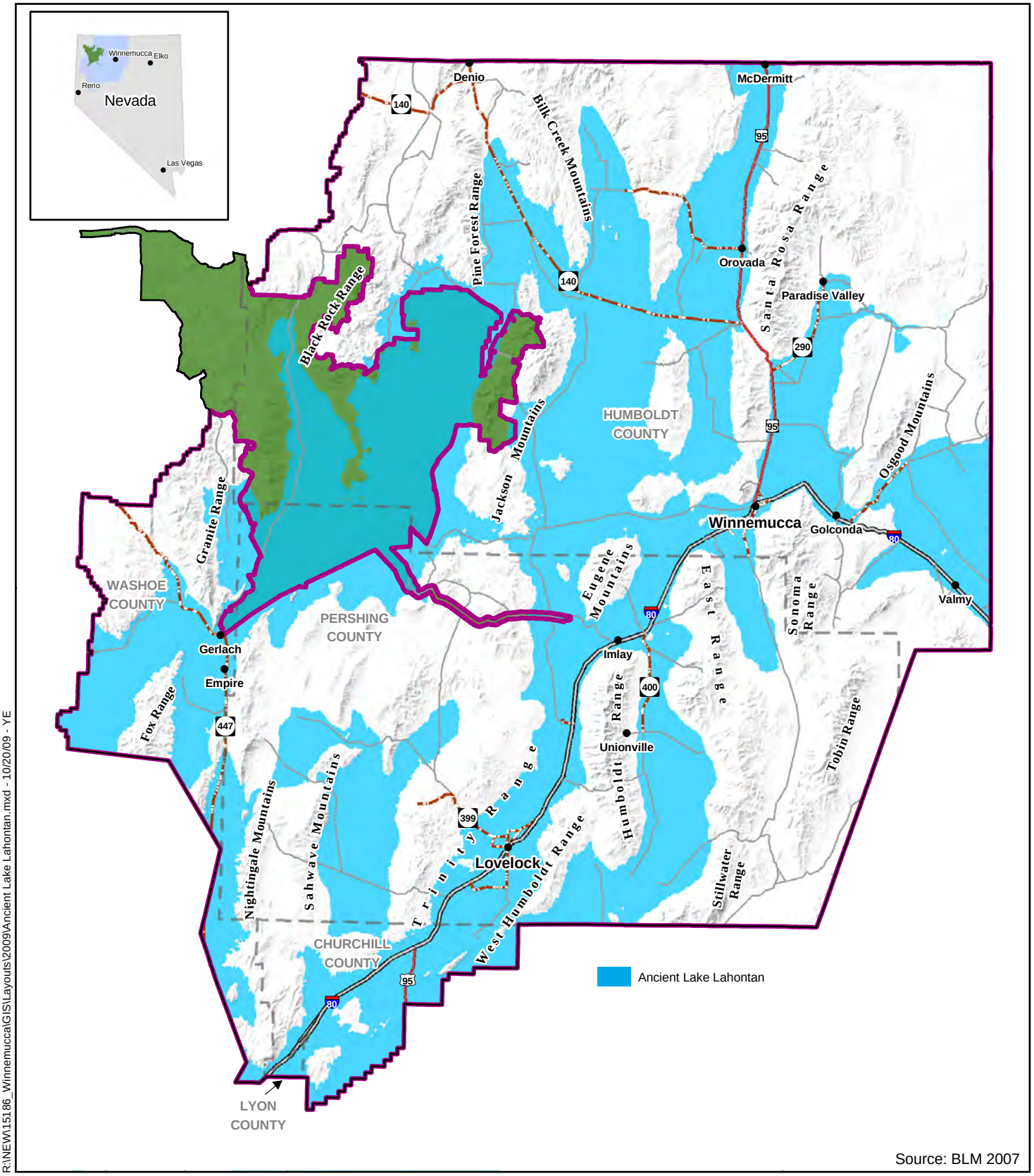
Between 1970 and 1978, a new relationship was forged between the US Department of Interior's Bureau of Land Management and the Soil Conservation Service. This relationship paved the way for the rapid acceleration of the soil survey program, with major input of both time and money from the BLM. Since then, the number of soil surveys, their quality, and their use by the government and the public has greatly increased.

There are over a hundred different soils within the WDO area. Special soils that require attention for management purposes include prime and unique farmlands and the presence of biological crusts. There are many soils within WDO that are designated as potential prime farmlands but that would require irrigation or reclamation of excess salts and sodium.

Biological crusts grow on or just below the surface of the soil. They can also be known as microbiotic, cryptogamic, cryptobiotic, microphytic, or microfloral crusts or soils. The biological crusts are composed of a community of algae, cyanobacteria (blue-green algae), bacteria, lichens, mosses, liverworts, and fungi and their byproducts. They commonly occur in arid and semiarid environments.

Biological crusts are important for:

- Stabilizing the soil;



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Winnemucca District Office RMP
Ancient Lake Lahontan

Legend

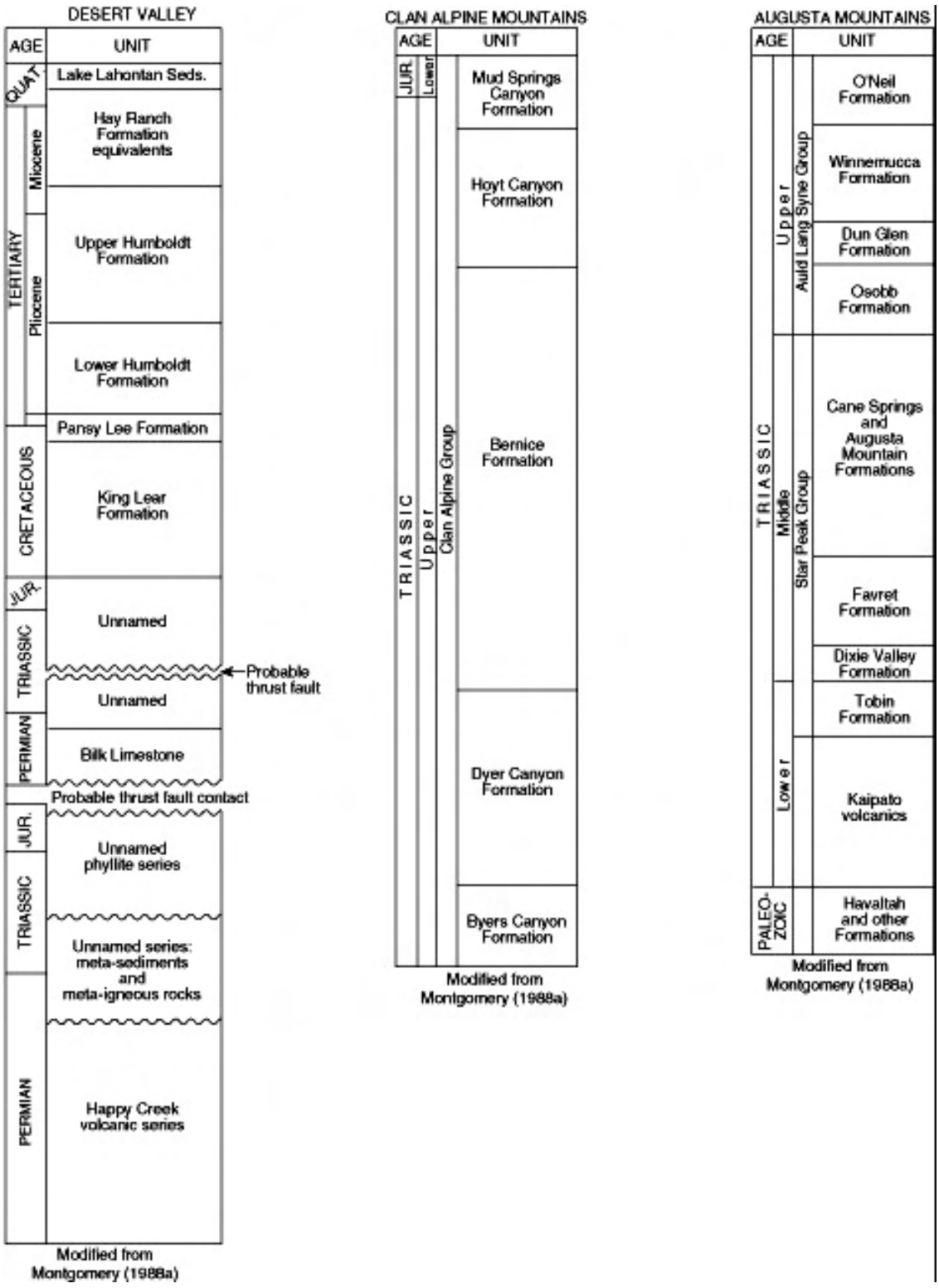
- BLM Winnemucca Field Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-1

Figure 3-2. Stratigraphic units present in the planning area (from Barker et al. 1995)



- Increasing the soil's fertility, making nutrients more available for use by grasses, forbs, and shrubs;
- Helping the soil retain more moisture; and
- Keeping out unwanted plants, such as exotic weeds.

Because of their functions in rangeland systems, biological soil crusts can be an indicator of rangeland health. Figure 3-3 shows where biological crusts are present in the WDO.

Crusts are well adapted to severe growing conditions, but are extremely susceptible to physical disturbances. Domestic livestock grazing and recreational activities (such as hiking, biking, and off-road driving) disturb the integrity of the crusts. Crust disruption brings decreased organism diversity, soil nutrients, stability, and organic matter. Another indirect physical disturbance occurs through crust burial. When the integrity of the crust is broken, the soil is more susceptible to wind and water erosion. Figure 3-4 shows those areas with high potential for wind erosion, and Figure 3-5 shows those areas with high potential for water erosion. This soil can be moved long distances, covering intact crusts. Crusts tolerate shallow burial by extending sheaths to the surface to begin photosynthesis again. Deeper burial by eroded sediment will kill crusts. Fire can also damage the crust, although recovery depends on the intensity of the fire. Low-intensity fires do not remove all of the crust structure, which allows for regrowth without significant soil loss.

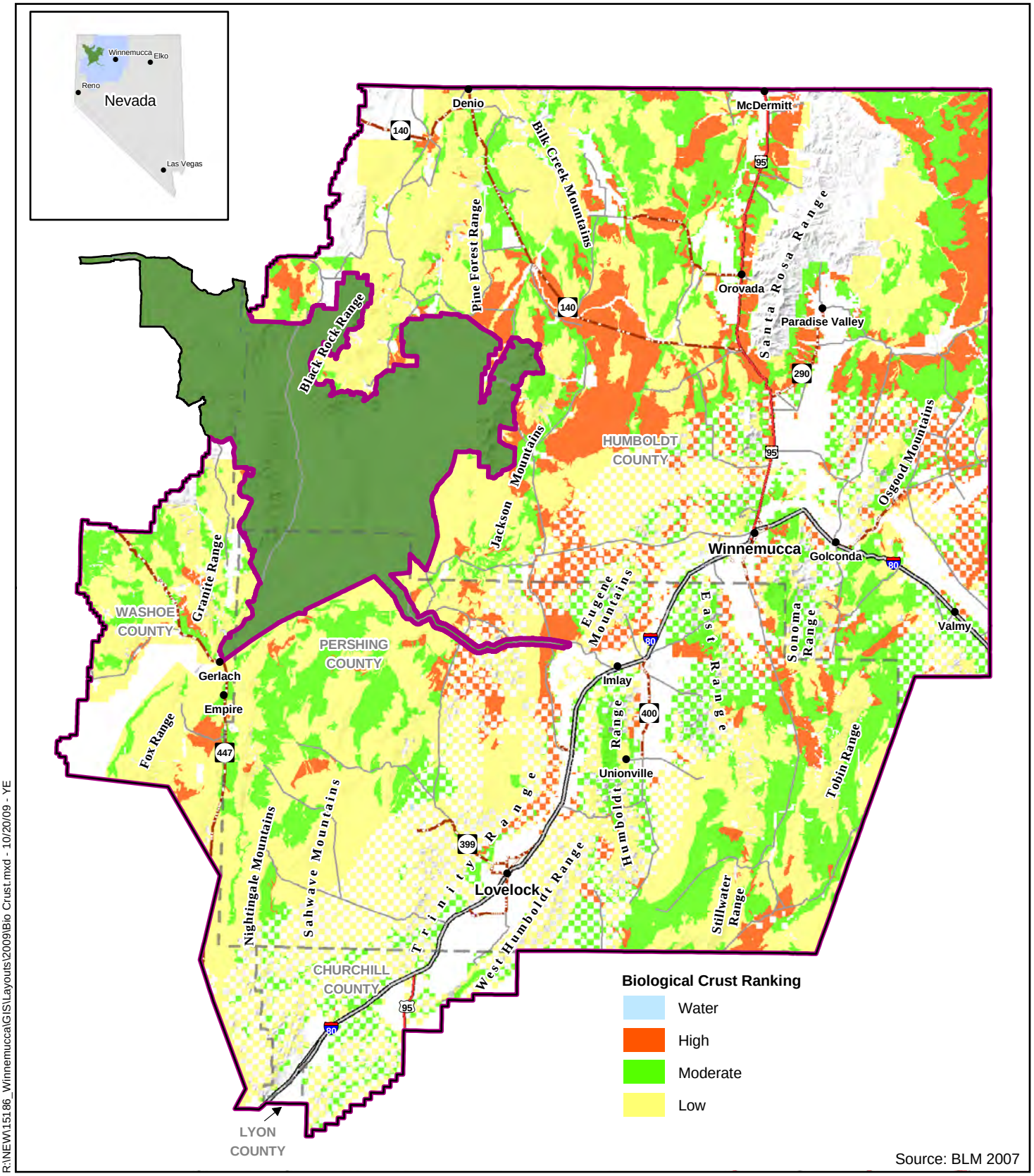
Erosion affects environmental aspects other than biological crusts. It can remove topsoil and bury prime and unique farmlands, degrading their agricultural potential. Erosion can also affect water sources and physical features, such as roads, pipelines, and power lines.

3.2.4 Water Resources

Water uses in the planning area include agricultural (mainly for irrigation, with a much smaller amount used for stock watering), potable (including municipal, small public water systems, and individual domestic wells), and industrial (mainly mining and milling). Geothermal groundwater production is significant, but geothermal waters are typically saline and nonpotable. Recreation and fish and wildlife uses are also important but as a rule do not consume appreciable quantities of water and are generally incidental to other uses. Stock watering is an important use on public lands. If water for livestock is not otherwise available, it is developed by various means on grazing ranges and other places of need, though quantities are not great.

Surface Water

Most of the land administered by the WDO receives low rainfall, due to the shadow effect created by the Sierra Nevada Mountains. Average annual precipitation in the planning area varies between 5 and 15 inches, with most occurring as snow from November through March. Numerous small mountain streams flow within the area, many of which are perennial within their respective headwaters. Many of the streams are in terminal basins, and many basins contain deposits of salts remaining from evaporated Pleistocene lakes. In addition, because evaporation greatly exceeds rainfall in the valleys, salts tend to be transported from the higher elevations to the valleys, where they accumulate. Therefore, water quality tends to decline as it moves downstream within the basin.



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Winnemucca District Office RMP
Potential Biological Crust

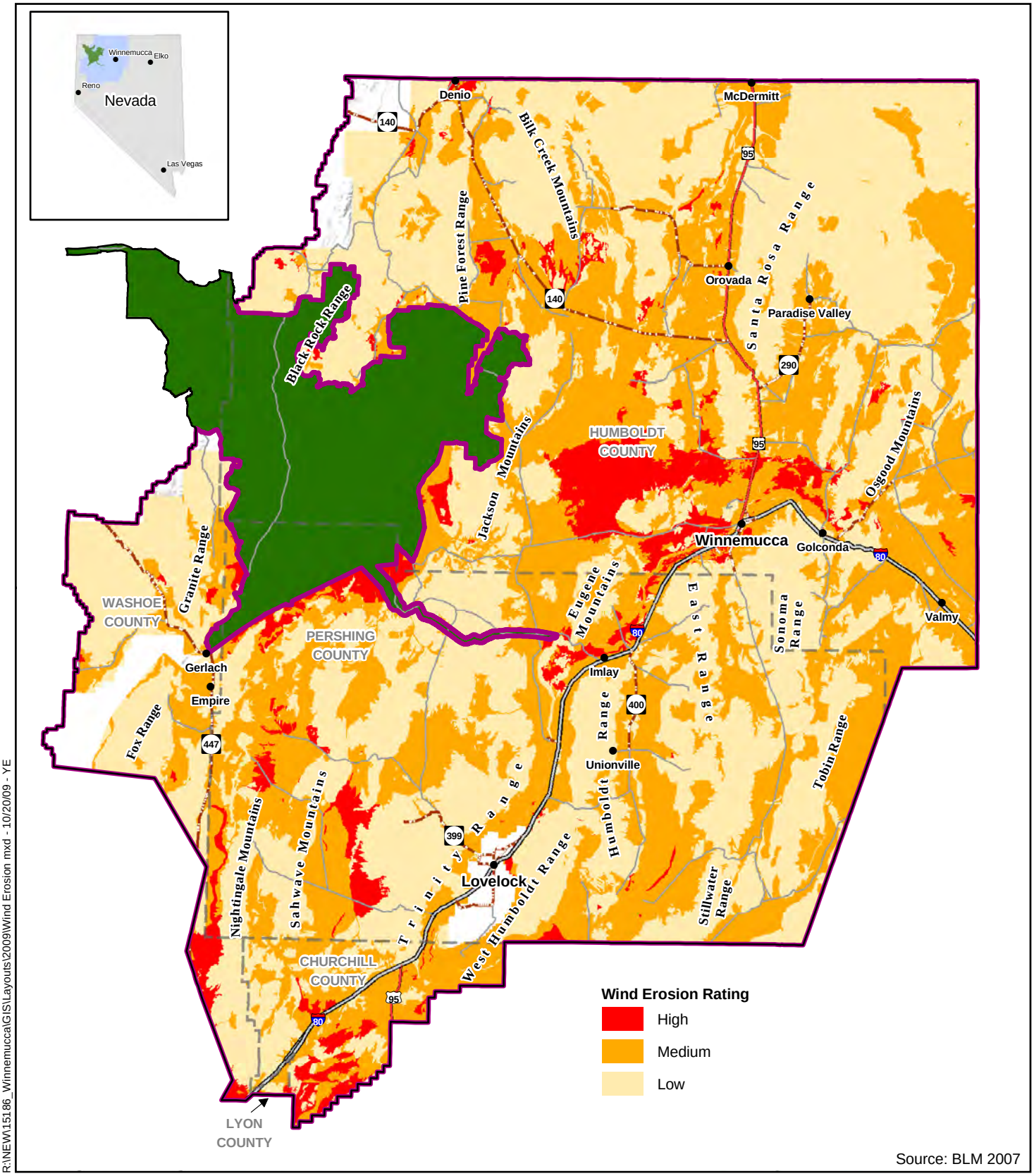
Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-3



Source: BLM 2007

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Winnemucca District Office RMP Areas of Potential Wind Erosion

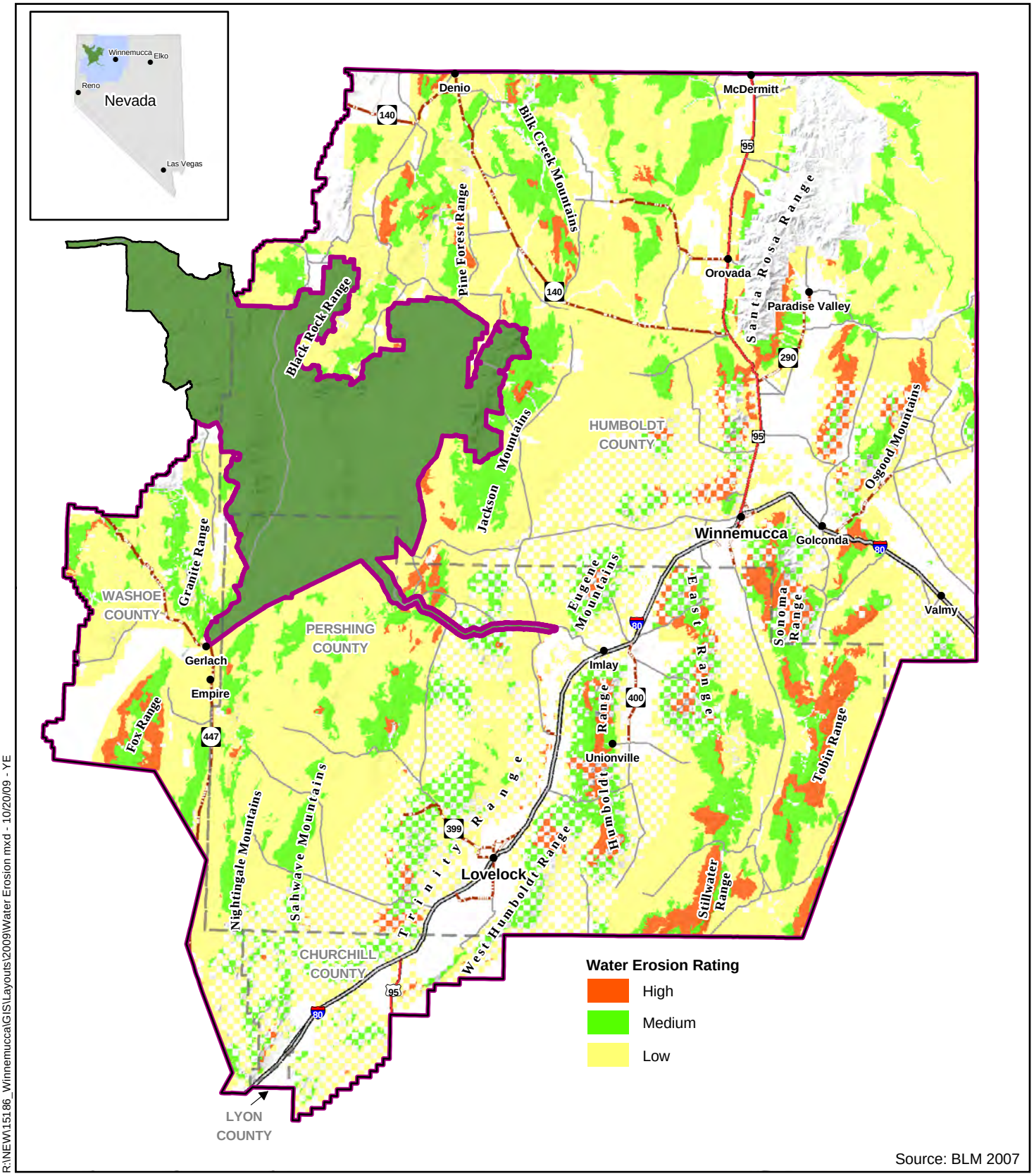
Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-4



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Winnemucca District Office RMP Areas of Potential Water Erosion

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-5

Most stream flow occurs during the spring in direct response to the melting of the snow pack. Typical stream flow originates at the upper elevations and enters the stream by way of overland flow and shallow groundwater discharge (interflow). As this flow exits the mountain block and moves onto the alluvial fan, the surface expression is quickly lost as it infiltrates into the alluvium. Riparian vegetation exists in the mountainous areas prior to the water being lost as recharge to the alluvial aquifer.

There are approximately 891 miles of perennial streams on lands administered by the WDO, featuring three primary drainage features that have helped shape the landscape. These are the Quinn, Owyhee, and Humboldt Rivers.

Humans have had a significant influence on water resources in the planning area, mainly by consuming freshwater resources for irrigation, which reduces stream flow and recharge. Biological diversity, water quantity, and water quality in many surface water bodies diverge significantly from their historic ranges of variability as a result of these influences. Where this occurs, it is usually downstream of the first point of diversion for irrigation. Watersheds in the WDO are identified in Figure 3-6.

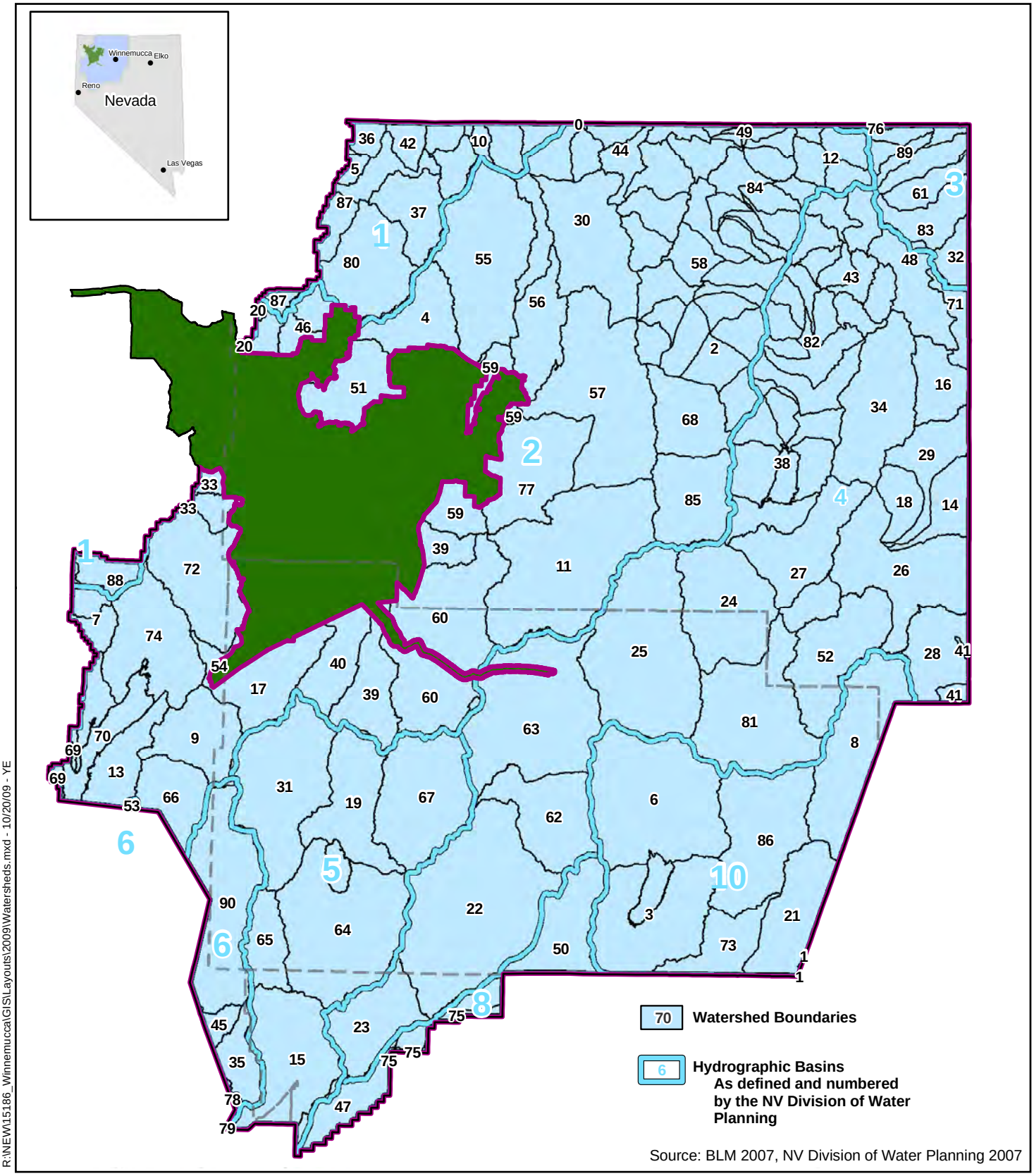
Surface Water Quality

The chemical character and quality of a natural water source is determined by mineral content of the rock that water flows across or through and the ease with which the rock minerals dissolve into the water. Among the variables that influence the concentrations of dissolved constituents in water are contact time between water and rock minerals, evaporation (which reduces the volume of water and causes salts to concentrate), temperature (which influences solubility), and the concentration and character of the mineral constituents in the rock or sediment.

Precipitation, because it has not yet come in contact with geologic materials, typically has very low concentrations of dissolved minerals and is considered very good quality. The contact time between precipitation runoff and rock minerals is short for water in streams and lakes at higher elevations, where precipitation is most common. Generally, these waters also have low concentrations of dissolved minerals and are considered good quality. Groundwater moves relatively slowly through rocks that comprise an aquifer and therefore has greater potential to dissolve minerals. Greater distance from the recharge area implies greater contact time between groundwater and the aquifer rocks. As a result, groundwater chemistry at discharge areas generally exhibits somewhat higher concentrations of dissolved minerals and is of somewhat lesser quality than water in the recharge area. However, these variations may be masked by other influences in complicated flow systems.

Evaporation and evapotranspiration can have a significant impact on water quality. Because these processes remove water molecules from the source but leave dissolved minerals, the concentration of dissolved minerals increases in the water that remains. In some circumstances, lakes or ponds that do not have a consistent supply of fresh water and are subject to evaporation would exhibit a decrease in water quality owing to the increase in dissolved minerals.

This condition also occurs in groundwater that rises to near ground surface and is subject to evaporation and evapotranspiration. For these reasons, groundwater resources near the center or near the terminal playa of hydrographic basins are often somewhat saline. Temperature also has the



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0 10 20 Miles

Legend

- BLM Winnemucca District Office Administra ive Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries

Winnemucca District Office RMP
5th Order HUC

Northwest Nevada

Figure 3-6

FID	WATERSHED_	WATERSHED
0	ALVORD LAKE	1712000902
1	ANTELOPE CREEK	1604010706
2	ANTELOPE CREEK/ PINE CREEK	1604020106
3	ANTELOPE VALLEY WASH	1606000112
4	BARTLETT CREEK	1604020203
5	BIG SPRING CREEK	1604020501
6	BUENA VISTA WASH	1606000111
7	BUFFALO CREEK	1604020304
8	BUFFALO VALLEY WASH	1606000101
9	COTTONWOOD CREEK	1604020302
10	COTTONWOOD CREEK	1712000901
11	DESERT VALLEY WASH	1604020109
12	EAST FORK QUINN RIVER	1604020103
13	EAST SMOKE CREEK DESERT WASH COM	1604020306
14	EVANS CREEK	1604010509
15	FERNLEY SINK	1605010402
16	FORKS OF THE LITTLE HUMBOLDT RIVE	1604010903
17	GERLACH WASH	1604020210
18	GRANITE CREEK	1604010510
19	GRANITE SPRINGS VALLEY WASH	1605010405
20	HIGH ROCK CANYON CREEK	1604020310
21	HOME STATION WASH	1606000103
22	HUMBOLDT LAKE	1604010807
23	HUMBOLDT RIVER TERMINAL DEPRESSI	1604010808
24	HUMBOLDT RIVER/ CLEAR CREEK	1604010803
25	HUMBOLDT RIVER/ DUN GLEN	1604010804
26	HUMBOLDT RIVER/ HERRIN SLOUGH	1604010511
27	HUMBOLDT RIVER/ ROCK CREEK	1604010801
28	HUMBOLDT RIVER/ SHEEP CREEK	1604010507
29	KELLY CREEK	1604010508
30	KINGS RIVER	1604020111
31	KUMIVA VALLEY WASH	1605010403
32	LAKE CREEK	1705010602
33	LITTLE HIGH ROCK CREEK	1604020309
34	LITTLE HUMBOLDT RIVER/ EDEN CREEK	1604010904
35	LITTLE VALLEY WASH	1605010306
36	LONG DRAW	1604020502
37	LOWER CRAINE CREEK	1604020504
38	LOWER LITTLE HUMBOLDT RIVER	1604010907
39	LOWER QUINN RIVER	1604020207
40	LOWER QUINN RIVER	1604020209
41	LOWER REESE RIVER	1604010710
42	LOWER RINCON CREEK	1604020507
43	MARTIN CREEK	1604010905
44	MC DERMITT CREEK	1604020102
45	MUD LAKE SLOUGH	1605010305
46	MUD MEADOWS CREEK	1604020208
47	MUSTANG POND	1605020304
48	NORTH FORK LITTLE HUMBOLDT RIVER	1604010901
49	OREGON CANYON CREEK	1604020101
50	PACKARD WASH	1605020306
51	PAHUTE CREEK	1604020204
52	PUMPERNICKEL VALLEY	1604010512
53	PYRAMID LAKE FRONTAL	1605010304
54	QUINN RIVER DEPRESSION	1604020211
55	QUINN RIVER/ BIG CREEK	1604020202
56	QUINN RIVER/ BILK CREEK	1604020201
57	QUINN RIVER/ BOTTLE CREEK	1604020112
58	QUINN RIVER/ CROWLEY CREEK	1604020105
59	QUINN RIVER/ MARY SLOAN CREEK	1604020205
60	RABBITHOLE CREEK	1604020206
61	RAVEN CREEK	1705010604
62	ROCHESTER CANYON WASH	1604010806
63	RYE PATCH RESERVOIR	1604010805
64	SAGE HEN CREEK	1605010407
65	SAGE HEN WASH	1605010406
66	SAN EMIDIO WASH	1604020301
67	SEVEN TROUGHS WASH	1605010404
68	SILVER STATE VALLEY WASH	1604020108
69	SMOKE CREEK	1604020305
70	SMOKE CREEK DEPRESSION	1604020307
71	SOUTH FORK LITTLE HUMBOLDT RIVER	1604010902
72	SOUTH WILLOW CREEK	1604020308
73	SPRING CREEK/ SHOSHONE CREEK	1606000104
74	SQUAW CREEK	1604020303
75	STILLWATER MARSH	1605020307
76	TENT CREEK	1705010606
77	TROUT CREEK/ SHAWNEE CREEK	1604020110
78	TRUCKEE RIVER/ DEFIANCE CREEK	1605010307
79	TRUCKEE RIVER/ LONG VALLEY CREEK	1605010201
80	UPPER CRAINE CREEK	1604020503
81	UPPER GRASS VALLEY WASH COMPLEX	1604010802
82	UPPER LITTLE HUMBOLDT RIVER	1604010906
83	UPPER LITTLE OWHYEE RIVER	1705010603
84	UPPER QUINN RIVER	1604020104
85	UPPER SILVER STATE VALLEY WASH	1604020107
86	UPPER SPRING CREEK	1606000102
87	VIRGIN CREEK	1604020505
88	WALL CREEK	1604020404
89	WILLOW CREEK	1705010605
90	WINNEMUCCA LAKE	1605010302

Source: BLM 2007, NV Division of Water Planning 2007

Winnemucca Field Office RMP
5th Order HUC

Northwest Nevada

Figure 3-6 - Legend

potential to affect water chemistry and quality. Most rock minerals dissolve more easily under higher temperatures. Thus, groundwater that has been heated in geothermal systems typically contains higher levels of dissolved minerals than do low temperature groundwater resources. Additionally, thermal water may dissolve minerals that have potential to affect the pH (acidity) of the water.

In a typical hydrographic basin, water quality would be best in the mountains, where precipitation is most frequent and abundant. Surface water flowing from the mountains and groundwater near the mountain front would generally be of good quality. However, near the basin center or in discharge areas water quality would be poorer due to evapotranspiration.

Perhaps the two most important physical water quality indicators are temperature and turbidity. (Turbidity is the opposite of clarity and results from suspension of particles, such as fine sediment, in the water column. This causes the water to appear cloudy or muddy). Temperature is important because many species are adapted to a specific range of temperatures. Temperature also affects water chemistry, especially the concentration of oxygen that can be dissolved in the water. Elevated water temperatures can result from both natural and human-related causes. For example, removal of shade vegetation along streams can increase the amount of solar energy that reaches the stream. Shallow water tends to heat faster than deep water, so sediment deposition in a stream channel, which can cause a stream to become wider and shallower, can lead to increased water temperature. Slower stream velocity allows more time for water to equilibrate to ambient temperature and increases heat from solar radiation, so anything that causes a reduction in flow can also result in increased water temperatures. On the other hand, high flows can prevent sediment deposition and can cause scouring of the channel. Bedrock tends to heat faster than sediment and stores more solar energy.

One of the functions of a stream is to move sediment down slope. The amount of sediment that can be carried by a stream depends on the volume and velocity of the water, which in turn are dependent on factors such as climate and topography. The amount of sediment actually carried by a stream depends on these, as well as on the nature of the geologic materials drained by the stream. Fine particles, such as clay, silt, and fine sand, are more easily suspended in the water column, while large particles, such as coarse sand, gravel, and cobbles, tend to be dragged along the bottom of the stream. In arid climates, streams tend to be unable to remove sediment at the rate it is generated, and streams terminate in closed basins. A few infrequent large-flow events are responsible for moving most of the sediment, and over time streams become clogged with sediment and sediment accumulates in the basins. As a result, the turbidity of desert streams can vary over a wide range. At higher elevations, where there is more precipitation, steeper slopes, and smaller channels, streams convey a larger percentage of the sediment carried to them by runoff, but as the streams reach lower elevations, the energy of the stream decreases and the sediment load is deposited, forming broad alluvial fans on the basin margins.

Land management activities can disturb the ground and accelerate erosion. Concentrated runoff, such as in roadside ditches, can also accelerate erosion. Vegetation tends to hold soils in place, absorbs the impacts of raindrops, and slows overland flow of runoff, so erosion can also be accelerated in areas where vegetation cover is removed because of fires, grazing, or other activities.

Erosion rates in a watershed are reflected in channel geometry and streambed characteristics (the drainage condition). Stable channels tend to have graded streambeds and well-vegetated banks that

are neither steep nor deeply incised. Unstable drainages show evidence of recent down cutting and gullying.

Biological indicators of water quality are of two types: those that are used as a direct measure of water quality, such as pathogens; and those that indirectly reflect the quality of the water, such as excessive algae production (which may be an indicator of elevated nutrient concentrations) or presence and abundance of indicator species or populations, such as trout or amphibians. Pathogens include a large variety of organisms that are present in the digestive systems of birds and mammals and are harmful to human health when present in drinking water, including fecal coliform bacteria, giardia, and cryptosporidia. Although pathogens may be present under natural conditions, elevated concentrations of pathogens suggest a human-caused condition, such as improper discharge or disposal of human or animal waste, or livestock watering at a stream or spring.

The State of Nevada is required to identify impaired surface water bodies under Section 303(d) of the Clean Water Act. A list of these impaired water bodies and a discussion of the status of each stream is presented in the final 303(d) report (NDEP 2005). The impaired water bodies identified within the planning area are presented in Table 3-6. In addition to the list of impaired streams, the report identifies water bodies warranting further investigation, which are also included in Table 3-7 below.

Table 3-6
Impaired Water Bodies in the Planning Area, from 303(d) List (NDEP 2004a)

Hydrologic Unit/Watershed	Water Body	Reach	Size	Existing TMDLs	Pollutant or Stressor of Concern
16040105	Humboldt River	Battle Mountain to Comus	81.36 miles	Total phosphorus, TDS, TSS	Boron, iron, TDS, total phosphorus, TSS, turbidity, zinc
16040108	Humboldt River	Comus to Imlay	114.09 miles	Total phosphorus, TDS, TSS	Iron, molybdenum TDS, total phosphorus, TSS, turbidity, zinc
16040108	Humboldt River	Imlay to Woolsey	44.43 miles	None	Molybdenum
16040108	Humboldt River	Woolsey to Rodgers Dam	13.22 miles	None	TDS, iron
16040108	Humboldt River	Rodgers Dam to Humboldt Sink	22.77 miles	None	Boron, iron, molybdenum
16040109	Little Humboldt River	Entire length	53.52 miles	None	Total phosphorus, zinc

Notes: TDS = total dissolved solids; TSS = total suspended solids
Source: NDEP 2004a

Table 3-7
Water Bodies Warranting Further Investigation (NDEP 2004a)

Hydrologic Unit/Watershed	Water Body	Reach	Existing TMDLs	Pollutant or Stressor of Concern
16040109	N Fork Little Humboldt River	Below Buckskin Mine to forest boundary	None	Metals, pH
16040109	Little Humboldt River	Entire length	None	Dissolved oxygen, iron, temperature
16040108	Rochester Canyon Creek	Below historic mine site	None	Metals

Source: NDEP 2004a

Riparian areas and wetlands are those that support vegetation requiring free water and saturated soil conditions to survive. As shown in Table 3-8, the condition of an estimated 891 miles of stream bank habitat and more than 2,100 acres of wetland habitat on public land in the planning area have been assessed. All of the perennial streams and more than two-thirds of the wetlands have been assessed. Table 3-8 presents a summary of the riparian functioning condition of stream (lotic) and wetland (lentic) riparian areas within the WDO.

Table 3-8
Riparian Functioning Condition Summary

PFC Lotic (Stream) in Miles (and Percent)	Functioning-at-Risk Trend Up Lotic (Stream) in Miles (and Percent)	Functioning-at-Risk Trend Down Lotic (Stream) in Miles (and Percent)	Functioning-at-Risk Trend Not Apparent Lotic (Stream) in Miles (and Percent)	Nonfunctional Lotic (Stream) in Miles (and Percent)	Unknown Lotic (Stream) in Miles (and Percent)	Total Lotic (Stream) in Miles
339 (38)	154 (17)	98 (11)	247 (28)	53 (6)	0 (0)	891
PFC Lentic (Wetlands) in Acres	**Functioning-at-Risk Trend Up Lentic (Wetlands) in Acres**	**Functioning-at-Risk Trend Down Lentic (Wetlands) in Acres**	**Functioning-at-Risk Trend Not Apparent Lentic (Wetlands) in Acres**	**Nonfunctional Lentic (Wetlands) in Acres**	**Unknown Lentic (Wetlands) in Acres**	**Total Lentic (Wetlands) in Acres**
694 (23)	110 (4)	441 (15)	821 (27)	37 (1)	897 (30)	3000

Groundwater

The hydrographic basin is the basic management unit used by the Nevada Division of Water Resources (NDWR). Generally, a hydrographic basin is defined by the topographic divide, or ridgeline, that separates adjacent basins. Most basins in the Basin and Range Physiographic Province are closed; surface waters in the basin originate in adjacent mountains and remain in the valley. In

some cases, the boundary between basins may be arbitrarily defined at low divides covered by alluvial sediments. Surface drainage channels link a few of the hydrographic basins within the planning area. Because of the fault-bounded basin and range geology of the region, the boundaries of groundwater basins generally correlate well with surface water hydrographic units (watersheds). Figure 3-7 and Table 3-9 identify the groundwater hydrographic basins of the planning area.

Summary of Groundwater Resource Conditions in the Planning Area

Below is a summary of current groundwater supply and groundwater quality conditions in each of the groundwater regions identified by Rush (Rush 1968) and used by Garcia and Jacobini (Garcia and Jacobini 1991). Communities in the planning area collect and use groundwater and surface water. Figure 3-8 shows the locations in the planning area that supply water to these communities.

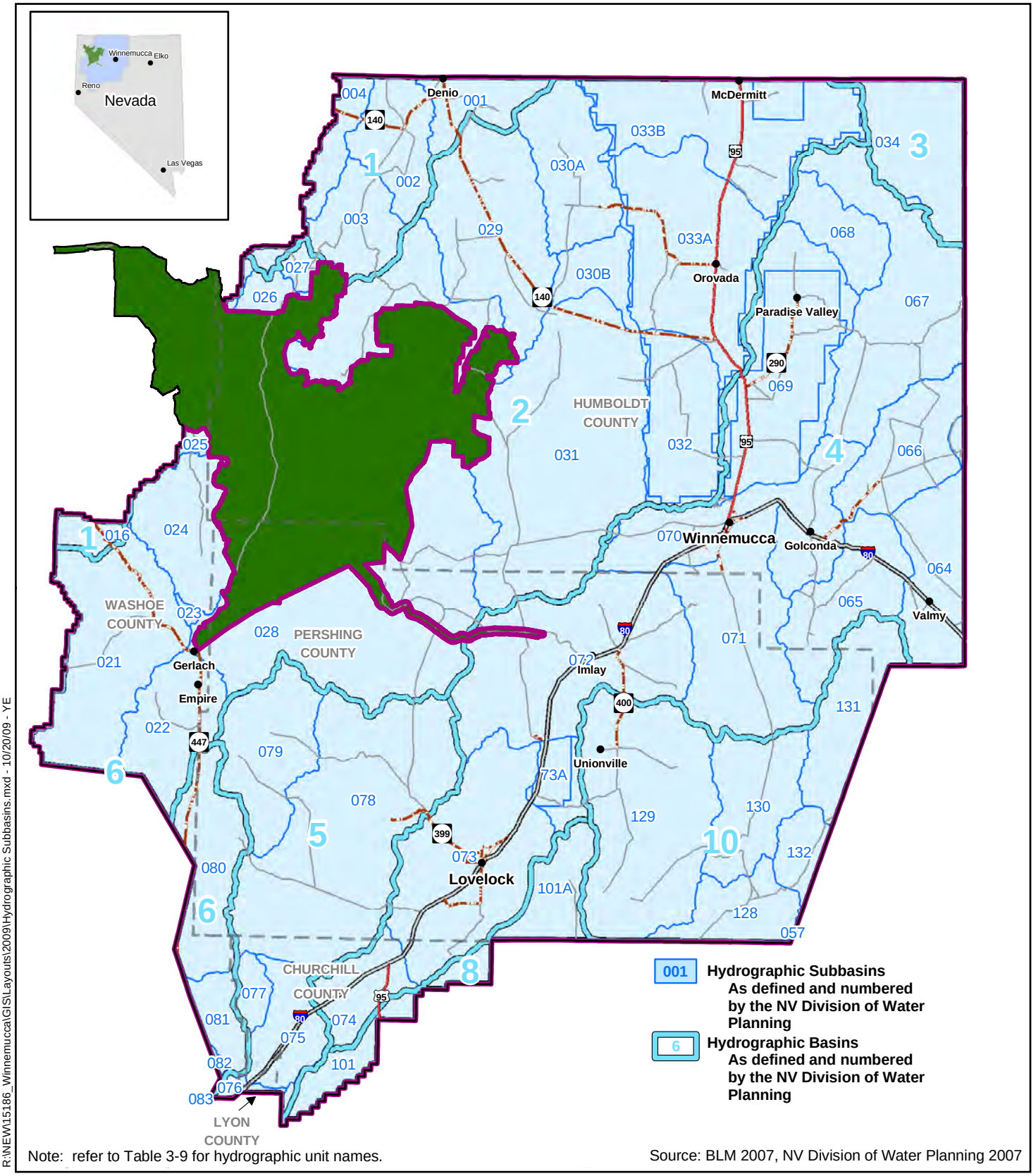
The term perennial yield is used to describe the volume of water that can be extracted over the long term without resulting in a decline in groundwater storage. The official definition used by the Nevada Division of Water Resources is: "The amount of usable water of a groundwater reservoir that can be withdrawn and consumed economically each year for an indefinite period of time. It cannot exceed the sum of the Natural Recharge, the Artificial (or Induced) Recharge, and the Incidental Recharge without causing depletion of the groundwater reservoir."

Groundwater tends to be in constant motion, flowing from areas of recharge to areas of discharge, and groundwater basins are not typically isolated or independent from each other but may comprise a large dynamic regional system. Under natural conditions, groundwater tends to overflow or leak from one basin into adjacent basins. Therefore, although capturing the perennial yield of an upstream basin may not cause a noticeable decline in storage in that basin, it would reduce the perennial yield of the adjacent downstream basins. The amount of interbasin flow is influenced by the geometry and geology of the basin and the groundwater elevation, which in turn is influenced by the amount, timing, and location of recharge. In general, it requires a certain amount of recharge to maintain groundwater levels at a given elevation.

The groundwater basins in the WDO have no outlet to the sea. Excess regional groundwater flow eventually flows into a terminal basin (such as the Carson Sink). If there is sufficient groundwater flow, the terminal basin fills to capacity and overflows at the surface, forming a lake or wetlands where the water evaporates and leaves behind its accumulated salts.

Note that limiting groundwater withdrawals to the perennial yield of the basin may not always result in the greatest long-term public good. Furthermore, even natural groundwater conditions change over time, and natural groundwater elevations merely reflect the current climate conditions. The climate and regional hydrologic regime of northern and central Nevada has changed radically even during the relatively brief period of human occupation, becoming increasingly drier during the past 10,000 years.

Note also that different groundwater uses can have very different effects on groundwater quality and sustainability. For example, water used for irrigation tends to dissolve salts from the soil, and some of this water recharges the aquifer. Similarly, treated municipal wastewater contains salts that may eventually contribute to groundwater recharge.



Note: refer to Table 3-9 for hydrographic unit names.

Source: BLM 2007, NV Division of Water Planning 2007

R:\NEW\15186_Winnemucca\GIS\Layouts\2009\Hydrographic Subbasins.mxd - 10/20/09 - YE

Winnemucca District Office RMP Hydrographic Subbasins

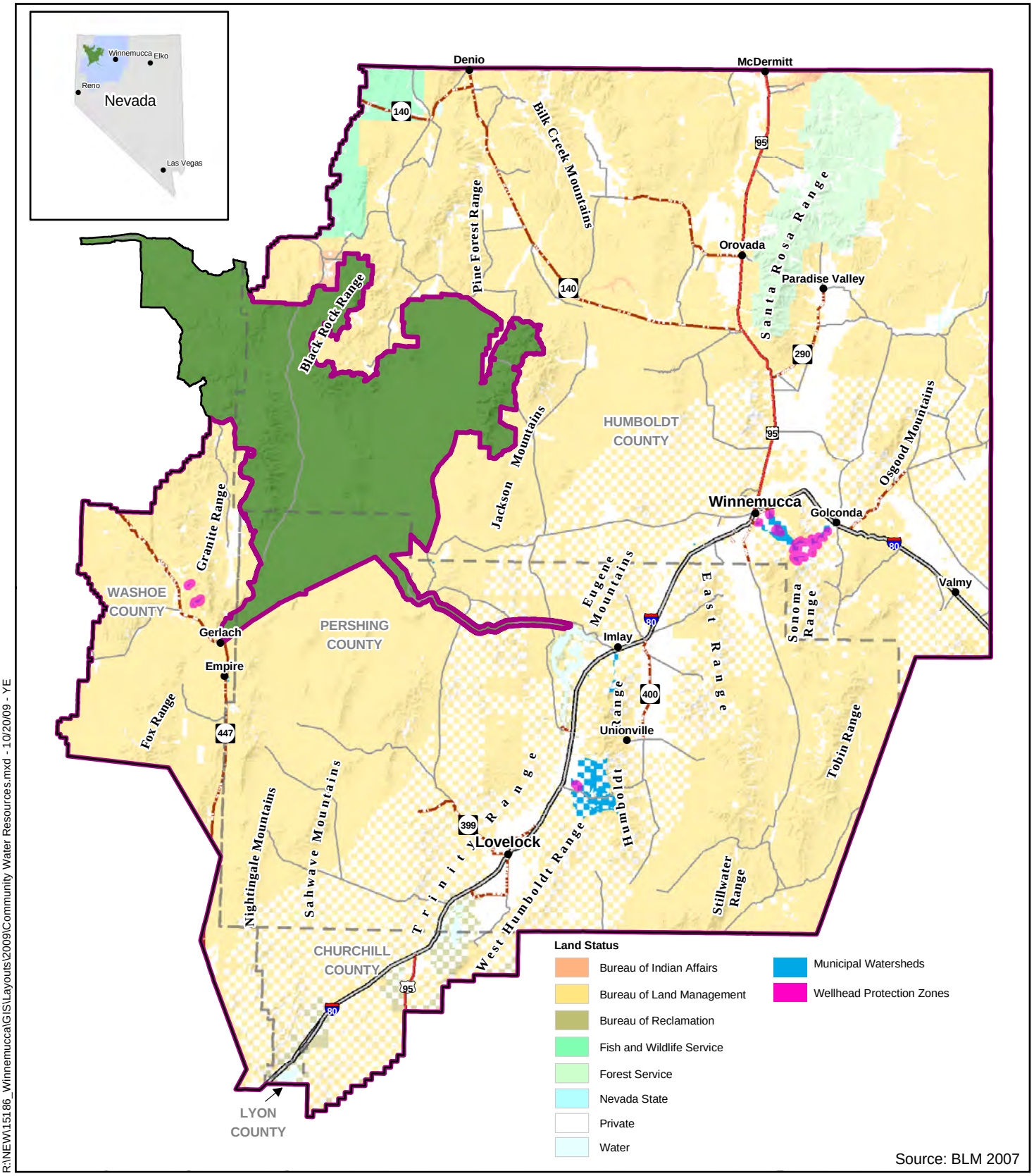
Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-7



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No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Winnemucca District Office RMP Community Water Sources

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-8

Table 3-9
Groundwater Use by Hydrographic Basins

Northwest Region (1)	Northwest Region (1) Perennial Yield (AFY)	Northwest Region (1) Principal Groundwater Uses	Northwest Region (1) Active Annual Water Duty (geothermal)	Northwest Region (1) Over-Subscribed?	Northwest Region (1) Designated Basin? (Year)
1. Pueblo Valley	2,000	I >>D	1,913	N	
2. Continental Lake Valley	11,000	I >>M	7,812		
3. Gridley Lake Valley	3,000	I	4,751		
4. Virgin Valley	6,000	M	8.5		
Black Rock Desert Region (2)	**Black Rock Desert Region (2) Perennial Yield (AFY)**	**Black Rock Desert Region (2) Principal Groundwater Uses**	**Black Rock Desert Region (2) Active Annual Water Duty (geothermal)**	**Black Rock Desert Region (2) Over-Subscribed?**	**Black Rock Desert Region (2) Designated Basin? (Year)**
21. Smoke Creek Desert	16,000	I >>W>C	12,205		
22. San Emidio Desert	2,500	I >M>Ind, G	7,440 (1,303)	Y	Y (1980)
23. Granite Basin	200	-	0		
24. Hualapai Flat	6,700	I	28,046	Y	Y (2003)
25. High Rock Lake Valley	5,000	M>S	309		
26. Mud Meadow	13,000	I	3,971		
27. Summit Lake Valley	1,000	S	12		
28. Black Rock Desert	30,000	I>M>S	29,643		
29. Pine Forest Valley	11,000	I >>S>D	37,002	Y	Y (1978)
30. Kings River Valley		I/S	24,790?		
31. Desert Valley	9,000	I>M>Ind	38,178	Y	Y (1975)
32. Silver State Valley	5,900	I >>M>S	20,182	Y	Y (1965)
33. Quinn River Valley		I >>M&E	53,140?		
Humboldt River Basin (4)	**Humboldt River Basin (4) Perennial Yield (AFY)**	**Humboldt River Basin (4) Principal Groundwater Uses**	**Humboldt River Basin (4) Active Annual Water Duty (geothermal)**	**Humboldt River Basin (4) Over-Subscribed?**	**Humboldt River Basin (4) Designated Basin? (Year)**
64. Clovers Area	72,000	M&E>I>M	41,094	Y (w/Clovers Area)	Y (1977)
65. Pumpernickel Valley	w/Clovers Area	I>M	14,336	Y (w/Clovers Area)	
66. Kelly Creek Area	w/Clovers Area	M>I	29,956	Y (w/Clovers Area)	Y (1975)
67. Little Humboldt Valley	34,000	I >>S	10,236	Y (w/Little Humboldt)	Y (1971)
68. Hardscrabble Area	w/Little Humboldt	-	0	Y (w/Little Humboldt)	Y (1971)

Humboldt River Basin (4)	Humboldt River Basin (4) Perennial Yield (AFY)	Humboldt River Basin (4) Principal Groundwater Uses	Humboldt River Basin (4) Active Annual Water Duty (geothermal)	Humboldt River Basin (4) Over-Subscribed?	Humboldt River Basin (4) Designated Basin? (Year)
69. Paradise Valley	w/Little Humboldt	I>>S>D	116,173	Y (w/Little Humboldt)	Y (1971)
70. Winnemucca Segment	17,000	I >M&E>Env	46,374	Y	Y (1975, 2003)
71. Grass Valley	13,000	I >>M&E>M	42,961	Y	Y (1972, 2003)
72. Imlay Area	3,000	M>> I/S>>S	7,508	Y	Y (1978)
73. Lovelock Valley	43,000	I>>M>M&E	7,200		
74. White Plains	100	M	315	Y	Y (1978)
West Central Region (5)	**West Central Region (5) Perennial Yield (AFY)**	**West Central Region (5) Principal Groundwater Uses**	**West Central Region (5)) Active Annual Water Duty**	**West Central Region (5) Over-Subscribed?**	**West Central Region (5) Designated Basin? (Year)**
75. Brady's Hot Springs Area	2,500	I>Ind>M	42 (15,862)	Y	Y (1986)
77. Fireball Valley	100	I	160	Y	N
78. Granite Springs Valley	4,500	I>>M	2,809		
79. Kumiva Valley	500	-	0		
Truckee Basin (6)	**Truckee Basin (6) Perennial Yield (AFY)**	**Truckee Basin (6) Principal Groundwater Uses**	**Truckee Basin (6) Active Annual Water Duty**	**Truckee Basin (6) Over-Subscribed?**	**Truckee Basin (6) Designated Basin? (Year)**
80. Winnemucca Lake Valley	3,300	I	305		
Carson River Basin (8)	**Carson River Basin (8) Perennial Yield (AFY)**	**Carson River Basin (8) Principal Groundwater Uses**	**Carson River Basin (8) Active Annual Water Duty**	**Carson River Basin (8) Over-Subscribed?**	**Carson River Basin (8) Designated Basin? (Year)**
101A. Packard Valley (Carson Desert)	710	M	451	Y (w/Carson Desert)	Y (1978)
101. Carson Desert (Packard Valley)	2,500	M&E>I>Ind, G	18,237 (1,479)	Y	Y (1978, 1995)
Central Region (10)	**Central Region (10) Perennial Yield (AFY)**	**Central Region (10) Principal Groundwater Uses**	**Central Region (10) Active Annual Water Duty**	**Central Region (10) Over-Subscribed?**	**Central Region (10) Designated Basin? (Year)**
128. Dixie Valley	15,000	I >Ind>>S, G	18,364 (13,428)	Y	Y (1978)
129. Buena Vista Valley	10,000	I >>M	27,903	Y	Y (1979)
130. Pleasant Valley	2,600	I>>M	3,348	Y (w/Dixie Valley)	Y (1978)
131. Buffalo Valley	8,000	M>I	20,850	Y	M
132. Jersey Valley	250	S	27	Y (w/Dixie Valley)	Y (1978)

Notes: I = irrigation; S = stock watering; M=mining; M&E=municipal & industrial; Ind = industrial; D = domestic; G=geothermal
Source: Nevada Division of Water Resources 1999 (NDWR 1999)

Accurate estimates of perennial yield and of the interconnections between basins require measurements over a wide area over a long period of time. Detailed information is lacking for many basins in the WDO, and the historical record of groundwater conditions tends to be relatively recent. The following information represents the most current estimates and interpretations of basin water budgets and water quality conditions.

Northwest Region. The planning area overlies the eastern third of the Northwest Region.

Groundwater Supply. The current estimate of the perennial yield of the basins within the Northwest Region is 22,000 acre-feet per year (AFY). Committed water rights total 14,485 AFY, although actual annual use may be far less (as of 2002, the US Geological Survey estimated total pumped water at about 2,400 AFY). Most of the water rights are for irrigation (NDWR 2008). The State Engineer has designated no groundwater basins in the northwest region.

Groundwater Quality. Existing data are inadequate to characterize conditions in the basins of the Northwest Region that lie within the planning area. Some groundwater in the Pueblo Valley-Continental Lake area is apparently satisfactory for irrigation and domestic use because these uses are present. However, central areas of the basins are likely underlain by saline water (Sinclair 1963). The region includes volcanic rock aquifers in addition to the basin-fill aquifers.

Black Rock Desert Region. The WDO overlies approximately the eastern two-thirds of the Black Rock Desert Region. About one-third of the portion inside the WDO is in the NCA and is therefore not in the planning area. The region includes 13 hydrographic basins.

Groundwater Supply. The State of Nevada estimates the perennial yield of the region at over 150,000 AFY (NDWR 2008). A total of over 200,000 acre-feet of water rights have been committed in the region. Water rights in the San Emidio Desert, Hualapai Flat, Pine Forest Valley, Desert Valley, and Silver State Valley hydrographic basins are overcommitted, and the State Engineer has designated the basins. (Information about the Kings River Valley and the Quinn River Valley, two of the largest basins, was not available at the time of preparation.)

South of Gerlach, the San Emidio Desert area around Empire is a center of geothermal production. The US Geological Survey estimated that losses resulting from operating geothermal production facilities account for a net annual decrease in groundwater storage of more than 4,000 acre-feet (USGS 2004). Currently, water rights for geothermal production in the San Emidio Desert area total 1,303 AFY.

Groundwater Quality. Generally, groundwater of quality suitable for irrigation, domestic, and stock uses is available in all basins of the Black Rock Desert Hydrographic Region (Visher 1957; Sinclair 1962a, 1962b, 1962c, 1963; Malmberg and Worts 1966; Glancy and Rush 1968). In those basins where groundwater flows toward a central basin playa or lakebed, the water quality deteriorates toward the valley center.

Most of the Black Rock Desert and Mud Meadow hydrographic areas are in the NCA and are not part of the study area. The NCA contains many thermal springs or springs affected by geothermal waters, which also adversely affect water quality.

Humboldt River Basin. The Humboldt Basin is the largest hydrologic basin in the state, encompassing approximately 16,840 square miles. The basin can be divided into the Lower, the Middle, and the Upper Basins. The planning area contains nearly all of the lower Humboldt River Basin, including basins underlying the watershed of the Little Humboldt River, and it overlies a portion of the middle Humboldt River Basin west of Battle Mountain.

Groundwater Supply. In the basin overall, the State of Nevada has estimated the perennial yield at 182,100 AFY (NDWR 2008). Water rights totaling 316,153 AFY have been committed. All of the basins except Lovelock Valley are designated basins. The primary use in the Clovers Area is municipal and industrial; mining is the primary use in the Kelly Creek and Imlay Areas and in the White Plains Basin. Elsewhere, the primary use is irrigation.

Since 1995, the USGS has been conducting a regional groundwater study of the Humboldt Basin, including constructing numerical hydrologic models to simulate flow and evaluate the effects of various activities on water quality.

In the Middle Humboldt River Basin, which includes the Clovers Area, Pumpernickel Valley, and the Kelly Creek Area, the US Geological Survey estimated that most of the extracted groundwater was generated by mining operations (mine dewatering). However, mine-relating pumping has decreased recently as mines have shut down, and municipal and industrial use exceeds both mining and irrigation in the Clovers Area. According to the USGS, groundwater extraction in the Clovers Area exceeds the natural recharge rate, but inflow from the adjacent basin to the east more than offsets the difference. In the Kelly Creek Area groundwater recharge approximately balances groundwater pumping, and in the Pumpernickel Valley groundwater pumping greatly exceeds recharge. The net result is a decline in the quantity of groundwater moving from the Middle Humboldt River Basin to the Lower Humboldt River Basin through the narrow gap at the south end of the Osgood Mountains. These basins are designated by the State Engineer

In the basins underlying tributaries of the main stem of the Humboldt River, including the Little Humboldt Valley, Hardscrabble Area, Paradise Valley northeast of Winnemucca, and Grass Valley to the south, the principal water use is irrigation.

In the Winnemucca segment of the basin, underlying the main stem of the Humboldt River near Winnemucca, groundwater use is about evenly distributed between irrigation and municipal and industrial uses, with environmental uses accounting for some of the water rights. As of 2003, the State Engineer found that groundwater withdrawals in the Winnemucca segment totaled 51,000 AFY, greatly in excess of the perennial yield of 17,000 AFY (NDWR 2008). Farther down the Humboldt River in the Imlay Area, which contains the Rye Patch Reservoir, natural recharge and interbasin inflows exceed the total rate of groundwater pumping. Irrigation and mining account for most of the approximately 2,500 AFY of groundwater consumed. In the Lovelock Valley, most of the groundwater use is for irrigation and pumping does not exceed inflows from other basins; however, the amount of groundwater use is small, at only a little more than 1,000 AFY.

Groundwater Quality. A few wells in the south end of Paradise Valley produce waters with high salinity and with sodium concentrations exceeding drinking water standards, which makes them hazardous for irrigation use and marginal for potable use; in general, however, the water quality is adequate (Harrill and Moore 1970). Groundwater samples collected in Grass Valley, in the upper portion of the basin, indicated that the water is generally suitable for irrigation and domestic use, although

about ten percent of samples showed somewhat elevated salinity or trace elements, which would require special handling or would prevent use of the water for irrigation and domestic use (Cohen 1964). Domestic development in the northern end of Grass Valley over the past 30 years has led to increases in the concentrations of dissolved nitrogen-containing compounds in the groundwater.

Groundwater south of Lovelock, at the lower end of the basin, is of poor quality and is unsuitable for agricultural or domestic use (Everett and Rush 1965).

West Central Region. Most of the West Central Region is within the planning area.

Groundwater Supply. The State of Nevada has estimated the total perennial yield of the region at 7,600 AFY (NDWR 1999). Total committed water rights include 3,011 AFY not associated with geothermal water rights, plus an additional 15,862 AFY in geothermal water rights. The geothermal rights are in the Brady's Hot Springs Area, and the State Engineer has designated that basin based on the geothermal rights.

Groundwater Quality. Water quality in the Kumiva and Granite Springs Valleys is suitable for irrigation and domestic use, though the quality tends to deteriorate near the playa. In the Brady Hot Springs area, samples indicate unsuitable quality for domestic use, and high salinity levels would limit use for irrigation (Harrill 1970). The amount of groundwater use in these basins is small and limited to isolated domestic wells with low production (USGS 2004).

Truckee Basin. The planning area overlies most of the Winnemucca Lake Basin, which is in the northeast corner of the Truckee Basin Region. Conditions in the Winnemucca Lake Basin are not representative of the Truckee Basin Region overall, which is dominated by the urban area surrounding Reno and Sparks, extends into California, and includes Lake Tahoe.

Groundwater Supply. The largest groundwater uses in the Truckee Basin are municipal water supply and commercial and industrial uses. However, very little groundwater is used in the Winnemucca Lake Basin. As in the West Central Region, water use is limited to scattered domestic wells with low production (USGS 2004).

Groundwater Quality. Van Denburgh and others (Van Denburgh 1973) describe the quality of groundwater in the Winnemucca Lake Basin as generally poor in quality, especially in the central and eastern parts of the basin. The water is unsuitable for domestic use, and its suitability for agricultural use varies locally.

Carson Desert Region. Only a small part of the north end of the Carson Desert Region lies within the Winnemucca District Office planning area, and it extends to the southwest into California.

Groundwater Supply. Relatively little groundwater is used in the planning area. Committed water rights total 18,688, but most of these rights are outside the WDO. The USGS reports that pumping in the Carson Desert basin is primarily for geothermal energy production. Geothermal operations reinject the geothermal fluids, with losses to evaporation accounting for about 20 percent of the extracted water. According to the USGS (USGS 2004), geothermal plants extract about 36,000 AFY, with consumptive use of about 6,000 AFY, although geothermal water rights currently total only 1,479 AFY in the Carson Desert-Packard Valley Basin. According to the USGS, municipal uses account for about 4,000 AFY, while mining, stock watering, and isolated domestic wells account for another

approximately 6,000 AFY. Most of this use occurs outside the WDO. The net annual decrease in storage for the Carson Desert Region is more than 11,000 AFY.

Groundwater Quality. Water quality information is reported for only one well in the Packard Valley (Glancy and Katzer 1975). This sample would be unsuitable for domestic use due to its high total dissolved solids content, and it would be marginal for irrigation use. Water quality on the upper margins of the basin is sufficiently good to supply some domestic and stock watering uses.

Central Region. The Central Region covers nearly one-third of the area of the state, extending south almost to the Colorado River, west into California, and eastward to near the border with Utah. Only part of the northwest arm of the region is in the planning area, including part of Dixie Valley and all of Jersey Valley, Pleasant Valley, and Buffalo Valley.

Groundwater Supply. The principal groundwater use in the Dixie Valley besides irrigation is geothermal energy production, which consumes about 3,000 AFY of the approximately 18,000 AFY that is extracted (USGS 2004). Perennial yield is estimated at about 35,850 AFY. Committed water rights exceed the perennial yields of all basins except the Buffalo Valley Basin. Buena Vista Valley is a separate terminal basin north of the Carson Desert. The principal water use in the Buena Vista Valley is irrigation, with a small amount used in mining or for scattered domestic wells. Inflows exceed pumping, and the excess inflows are lost to evaporation on the playa floor.

Groundwater Quality. Water quality in the Buena Vista Valley is reported for eight samples (Garcia and Jaconobi 1991). All but two of these well samples appear to have TDS concentrations in excess of drinking water standards.

3.2.5 Vegetation – General

Introduction

The WDO management area includes portions of the Northern Great Basin and Columbia Basin. Within these provinces, precipitation and other climatic factors, availability of water, soils, elevation, and exposure all contribute to the diversity of vegetation. Six primary vegetation types have been described in the management area: desert sink scrub, saltbush scrub, sagebrush scrub, riparian, meadow, and woodland. The BLM acreage of each of these major plant communities is shown below in Table 3-10, subdivided into plant associations within each.

Desert sink scrub covers 270,059 acres of BLM land. Within the planning area, this habitat type is dominated by greasewood (*Sarcobatus vermiculatus*), with other species such as iodine bush (*Allenrolfea occidentalis*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), big sagebrush (*Artemisia tridentata*), and shadscale (*Atriplex confertifolia*).

Saltbush scrub covers 2,537,938 acres of BLM land. Saltbush scrubs occur in soils that are less salty than those of alkali sinks. Dominant species can include shadscale, hop-sage (*Grayia spinosa*), and mixed saltbush (*Atriplex* spp.). This habitat type may be found in valleys, washes, lower slopes, and moderately drained flats.

Sagebrush scrub covers 3,987,492 BLM acres in the WDO planning area, based on the vegetation GIS coverage presented in Table 3-5 (BLM 2005e). The species of sagebrush are generally

Table 3-10
Plant Communities/Associations in the WDO Planning Area

Plant Community/ Association	Acres on BLM Land
A. Sagebrush scrub	3,147,096
B. Desert sink scrub	628,714
C. Invasive	495,079
D. Saltbush scrub	1,861,669
E. Woodland	413,356
F. Grassland and shrubland	151,072
G. Riparian and Wetland	12,975
H. Altered/Disturbed/ Agriculture	100,741
I. Barren	394,198
J. Water	619

Source: USGS National GAP Analysis Program 2004

distributed according to elevation, precipitation, slope, and salinity. Kuchler (Kuchler 1970) divided areas supporting sagebrush into two major vegetation types: sagebrush steppe, where sagebrush can co-dominate with native bunchgrasses, and Great Basin sagebrush, where sagebrush can be the sole dominant. These two major types come into contact with each other in the WDO, with sagebrush steppe predominant in the north and Great Basin sagebrush predominant in the south.

Grasslands, also called dry meadows, are an understory component of several plant communities, such as sagebrush scrub and riparian. Grasslands are wet for a short period of the year and become increasingly drier as the growing season progresses. Species such as Baltic rush (*Juncus balticus*), grasses, asters (*Aster* spp.), groundsel (*Packera* spp.), onions (*Allium* spp.), and hawksbeard (*Crepis* spp.) are commonly found in this community. Rabbitbrush and sagebrush may be at the meadow's edge.

Riparian areas and wet meadows will be discussed in detail in the riparian and wetland resource section of this document. Woodlands will be discussed in detail in the forestry and woodland products resource uses section.

3.2.6 Vegetation – Forest/Woodland Products

Forest and woodland types within the WDO consist of pinyon-juniper woodland (330,491 acres), mountain mahogany woodland and shrubland (50,818 acres), limber and whitebark pine forest (5,060 acres), and aspen forest and woodland (26,987 acres).

Forest and woodland products include firewood, Christmas trees, posts, and pine nuts. Two harvest areas are designated within the WDO: the Stillwater Harvest Area, including approximately 22,000 acres designated in the Sonoma-Gerlach MFP for intense forest products management, and the Yellowstone Harvest Area, including approximately 890 acres, proposed in the Forestry Plan Amendment in 2003. No commercial harvesting of woodland products is allowed.

Access to the resource areas is poor overall, and impacts are currently concentrated in the few areas with easy road access, specifically in the vicinity of Fencemaker Canyon, Fencemaker Pass, and Gamble Basin.

Juniper and pinyon pine woodlands are not as widespread as in other parts of Nevada. Pinyon pine is expanding in some areas into sagebrush and grassland. Approximately 1,000 acres of former sagebrush are growing up to pinyon pine in the Gamble Basin area. This expansion is likely due to fire suppression and climatic change (BLM 2003a). In the Stillwater Range, nearly all of the pinyon pine stands (29,050 acres) are infested with pinyon dwarf mistletoe (*Arceuthobium divarcatum*). Dwarf mistletoe impacts tree health, resulting in decreased growth, decreased seed production, increased susceptibility to bark beetles or other insects or disease, decreased drought tolerance, and in most cases, mortality of the infected tree. Young trees are particularly susceptible, and mortality for these trees is generally very high. Infected older trees continue to infect any regeneration (Messmer 2008).

The trend in harvest of firewood, posts, and Christmas trees increased from 1976 to a peak usage in 1980 (for posts and Christmas trees) and 1981 (for firewood). After their peak years, utilization of all of these resources has declined. Quantitative data on the levels of harvest of pinyon pine nuts are not available, but their availability in some areas, is being affected by issues with forest health, primarily pinyon dwarf mistletoe. There has been increased harvest of wood products adjacent to roads in the area, primarily in Fencemaker Pass, Fencemaker Canyon, and Gamble Basin due to limited access in the majority of the Stillwater Range.

3.2.7 Vegetation – Weeds

Weeds can be native or nonnative, invasive or noninvasive, and noxious or not noxious. Legally, a noxious weed is any plant designated as undesirable by a federal, state, or county government as injurious to public health, agriculture, recreation, wildlife, or property. Noxious weeds are nonnative and invasive, and their control is based on resource or treatment priorities and is governed by budgetary constraints.

Invasive plants and noxious weeds are not the same. Invasive plants not only include noxious weeds, but also include other plants that are not native to the US. Not all nonnative plants are considered invasive, however. The BLM considers plants invasive if they have been introduced into an environment where they did not evolve and, as a result, usually have no natural enemies to limit their reproduction and spread (Westbrooks 1998). Some invasive plants can produce significant changes to vegetation, composition, structure, or ecosystem function (Cronk and Fuller 1995).

Many state and county governments in the west have designated noxious weed lists. The Nevada Department of Agriculture maintains the Nevada State Noxious Weed List (Nevada Department of Agriculture 2007), which includes 47 different species of weeds that are designated noxious by state law.

Weed species affect all resources that depend to some degree on vegetation. Weeds have degraded rangeland health and diversity by changing fire regimes. The primary invasive plant in the planning area, cheatgrass (*Bromus tectorum*), has led to an increase in continuous fine fuel and an earlier fire season than what occurred historically. Approximately 3.3 million acres of public lands in the Great Basin desert are reported to be dominated by cheatgrass, with an additional 76.1 million acres either infested with or susceptible to cheatgrass invasion (Pellant 1996). Management emphasis is directed

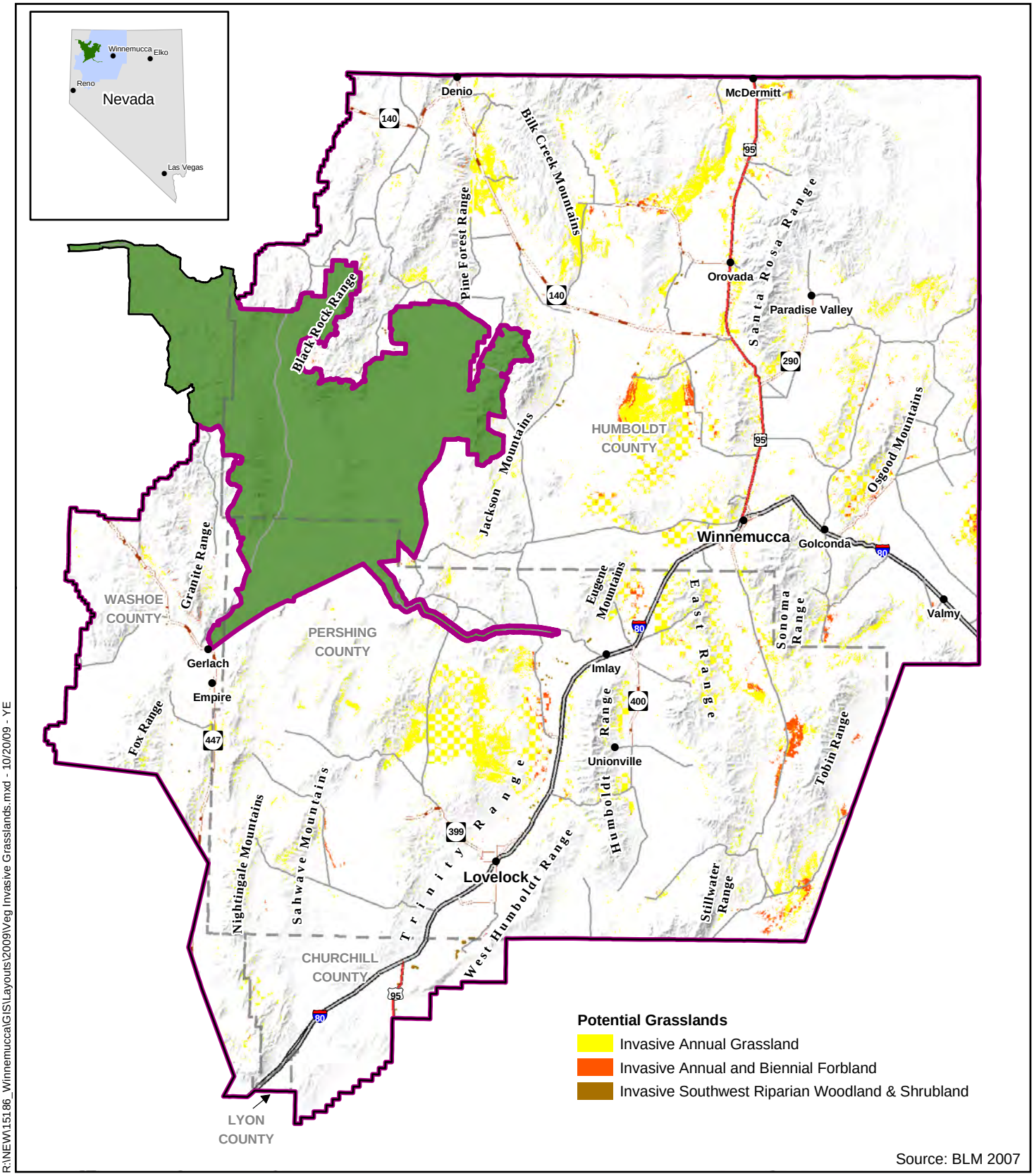
toward areas of the planning area where cooperative management strategies are already in place and for which data exists though studies or GIS compilations. In addition to the species that are well documented in the planning area, new species are appearing there and may be even more disruptive to the native plant community than species that have existed in the planning area for a greater period of time.

Three community types dominated by invasive species have been documented within the planning area (Figure 3-9). These include 446,572 acres of invasive annual grassland (cheatgrass), 364 acres of invasive southwest riparian woodland and shrubland (tamarisk), and 48,143 acres of invasive annual and biennial forb land (tall whitetop, Russian knapweed, and whitetop).

Nevada has listed 47 noxious weed species that require control, in accordance with NRS 555. Of these 47 species, 15 are commonly found on lands administered by the WDO (Table 3-11).

Plants that are considered weeds in other areas and that are actively managed elsewhere, but which do not show up on Nevada's noxious weed list, have been found within the WDO. Weed inventory data have been collected at numerous locations in the decision area and compiled in a database maintained by the Natural Resources Conservation Service (NRCS). Locations of major noxious weed infestations within the planning area in the last ten years are depicted in Figure 3-10. Control efforts have been conducted in the following locations:

- Pine Forest Range, Big, Pass, Granite, and Alta Creeks for Scotch thistle;
- Deer Creek Reservoir and Ranch area for perennial pepperweed and Russian knapweed*;*
- Negro Creek for hoary cress and Russian knapweed;
- Leadville Canyon for perennial pepperweed, hoary cress, and Russian knapweed;
- Flowing Well for perennial pepperweed and Russian knapweed;
- Hycroft Mine vicinity and west side of Jackson Mountains for saltcedar;
- Silver State Valley for saltcedar and hoary cress;
- Coal Canyon for perennial pepperweed and yellow starthistle;
- Crutcher Canyon for medusahead;
- Thomas Canyon for leafy spurge;
- Elbow Canyon for yellow starthistle;
- Asa Moore Canyon for Scotch thistle;
- Buckskin Canyon for perennial pepperweed, hoary cress, and Scotch thistle;
- Lamance, Cottonwood, Mullinix, Solid Silver, and Indian Creek for leafy spurge;
- Little Owyhee BLM system road for Russian knapweed and hoary cress;
- Bartlett Creek for hoary cress;
- Leonard Creek roads (with Humboldt County Roads Department) for perennial pepperweed and hoary cress;



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Winnemucca District Office RMP
Vegetation - Invasive Grasslands

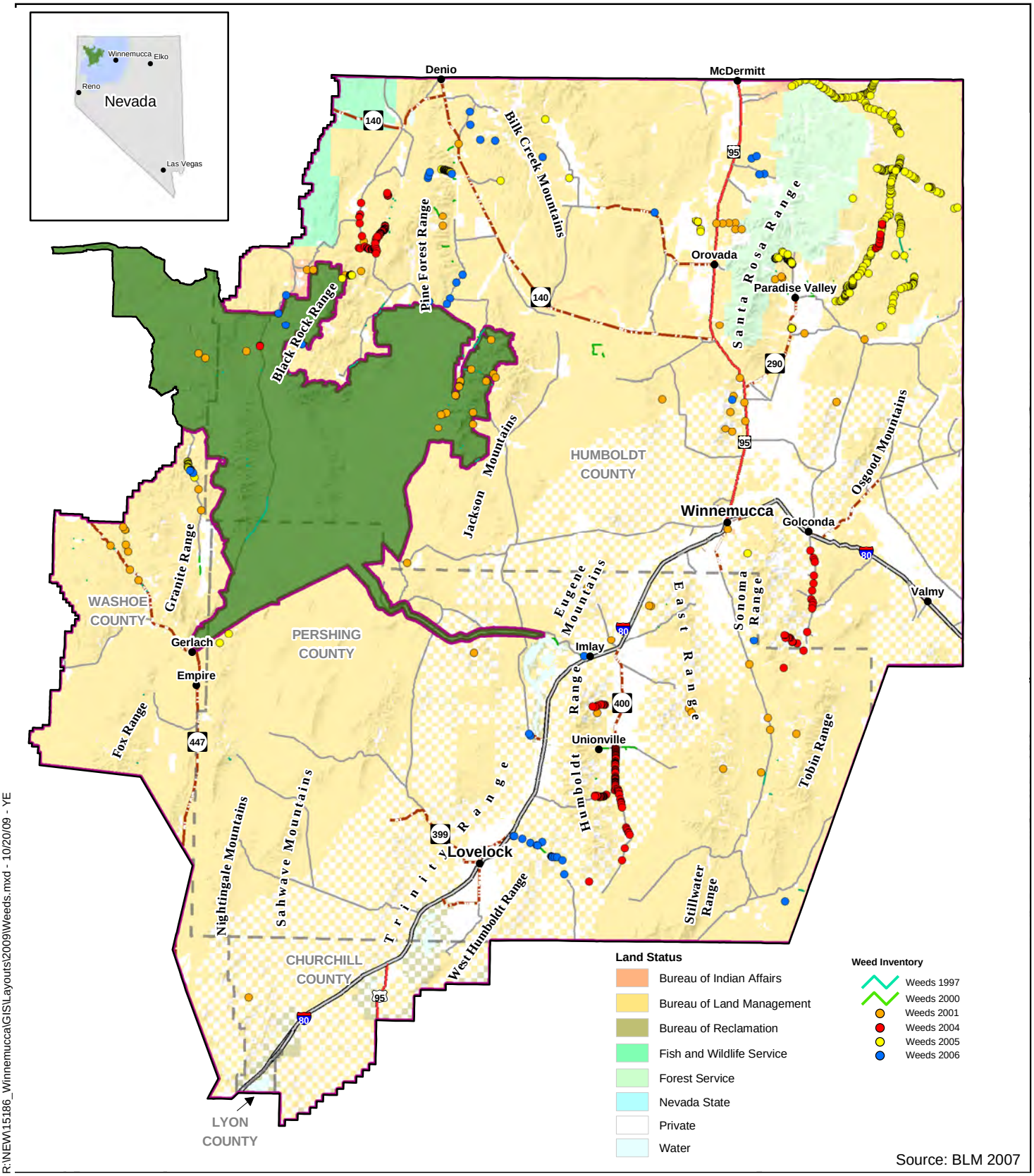
Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-9



Source: BLM 2007

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No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Winnemucca District Office RMP
Areas of Historical Weed Infestations

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-10

Table 3-11
Noxious Weed Species in the WDO Planning Area

Common Name	Scientific Name
Black henbane	*Hysocyamus niger*
Poison hemlock	*Conium maculatum*
Hoary cress	*Cardaria draba*
Houndstongue	*Cynoglossum officinale*
Russian knapweed	*Acroptilon repens*
Spotted knapweed	*Centauria maculosa*
Leafy spurge	*Euphorbia elsua*
Mayweed	*Anthemis cotula*
Medusahead	*Taeniatherum caput-medusae*
Perennial pepperweed	*Lepidium latifolium*
Puncturevine	*Tribulus terrestris*
Purple loosestrife	*Lythrum salicaria*
Salt cedar (tamarisk)	*Tamarix ramosissima*
Canada thistle	*Cirsium avense*
Musk thistle	*Taeniatherum caput-medusae*
Mediterranean sage	*Salvia aethiopis*
Dyer's woad	*Isatis tinctoria*
Yellow starthistle	*Centaurea solstitialis*
Scotch thistle	*Onopordum acanthium*

Source: BLM 2005f.

- Leadville Canyon (with Washoe County Roads Department, Gerlach CWMA, Nevada Department of Agriculture, Cedarville BLM) for Russian knapweed and leafy spurge;
- McDermitt Reservation (with Humboldt County Weed Task Force) for Russian knapweed and leafy spurge;
- Spring Valley and Unionville for Hoary cress, Russian knapweed, and Iberian starthistle;
- Hole-in-the-Wall for Saltcedar;
- East Range for Scotch thistle, Russian knapweed, hoary cress, and perennial pepperweed;
- Soldier Meadows for yellow starthistle and perennial pepperweed;
- Water Canyon for hoary cress; and
- Chimney Reservoir (with Nevada Division of Forestry, University of Nevada Cooperative Extension, Paradise Valley Weed District, US Forest Service, and local landowners) for perennial pepperweed and saltcedar.

The WDO performs a yearly ongoing weed inventory that is based on fund availability. Currently, the most widespread species are perennial pepperweed, hoary cress, saltcedar, Russian knapweed and Scotch thistle (Messmer 2007). Noxious weeds have been found in a variety of locations and habitat types, with transportation systems being a major vector for their spread. Other dissemination vehicles include OHV use, wind, water, wildlife, livestock, and humans.

3.2.8 Vegetation – Riparian Habitat and Wetlands

The term riparian is used here to include both lotic (running water) systems and lentic (standing water) systems. Wetlands may occur in both lotic and lentic systems and typically provide livestock/wildlife with green forage, insects, and drinking water. Green forage is especially important for livestock and many wildlife species during the summer and fall, when upland vegetation has dried out. The structure, food, and water provided by these communities make them the most diverse and productive wildlife habitat in the planning area.

Lotic Systems

Riparian communities occur along the watercourses of the planning area and in association with streams. In the Great Basin, riparian communities are dominated by various mixtures of cottonwood, aspen, and willow species. Although riparian zones account for a very small proportion of the total acreage of the planning area, they play a critical role as habitat for wildlife. More than 75 percent of the wildlife species of the Great Basin are strongly associated with riparian areas (Dobkin 1998, Brussard and Austin 1993). Riparian areas are highly favored by livestock, a feature that has led to disturbance of this habitat type in many areas. Where site potential allows, vegetation may develop multiple canopies, including trees, shrubs, grasses, forbs, sedges, and rushes. This complex vegetation structure is the goal of riparian management, and it can provide exceptionally valuable habitat for a wide array of wildlife species. PFC is a standardized gauge of whether a riparian system has adequate vegetation, landforms, or large woody debris to perform essential flood control, water quality, erosion control, and habitat functions. PFC can be reached at a lower level of vegetation development than the management goal of Desired Future Condition.

Even riparian areas dominated by herbaceous communities and lacking complex structure are important as sources of water and food for livestock/wildlife. As Table 3-5 in the vegetation section indicates, riparian areas are found in approximately 3,928 acres of the WDO. Although this is a small percentage of the land area, the importance of these areas as wildlife habitat far exceeds their size.

Riparian functionality was intensely studied in over thirty watersheds in 1999 (Jensen et al. 1999). The average condition of the evaluated streams was determined to be in only "fair" condition, based on stream potential for riparian and stream habitats. Field data from studies throughout the WDO indicate that approximately 40 percent of the lotic riparian habitats are in PFC, and 18 percent are improving in the direction of PFC. The remaining 42 percent are neither in PFC nor making significant progress toward this condition.

Because the riparian functionality data from the watersheds that were studied in 1999 nearly matched the percentage of streams not in PFC or making significant progress toward that condition, it can be assumed that watersheds within the planning area overall are also in fair condition. However, the intensely studied watersheds were those that had been the location of Lahontan cutthroat trout recovery efforts, and therefore they may have benefited by management efforts. The other watersheds, in the absence of this intense management, may be in only fair to poor condition.

Lentic Systems

Lentic systems include other permanently wet or seasonally wet areas and include lakes, reservoirs, vegetated playas, meadows, and seeps. These areas commonly are found independently of a defined

stream channel and can occur at various elevations and in diverse landscape settings. This is particularly true for meadows, springs, and seeps, which may be present within very arid areas and at low elevations. Lentic systems are typically small, and while they are extremely important ecologically, seeps within the planning area typically average less than 0.2 acre in size. Over 100 of these may occur in a grazing allotment, making management very difficult.

Wet meadow habitats generally have a simple structure, consisting of a layer of herbaceous plants. Shrub or tree layers are usually absent or very sparse; they may, however, be an important feature of the meadow edge. Within the herbaceous plant community a microstructure is frequently present. Some species reach heights of only a few inches, while others may grow greater than three feet tall. Except where broken by boulders, canopy cover is dense (60 to 100 percent). At the substrate surface, distances between individual shoots may vary from 0.04 to 0.08 inches to as much as 0.8 to 1.2 inches, depending on the species present.

Wet meadows occur with a great variety of plant species, so it is not possible to generalize species composition. Species may differ, but several genera are common to wet meadows: *Agrostis*, *Carex*, *Danthonia*, *Juncus*, *Salix*, and *Scirpus*.

Wet meadows are vulnerable to grazing and other surface-disturbing uses that affect soil stability, water-holding capacity, and plant composition. All meadows are important watershed components that may be functionally impaired by gullies, sagebrush encroachment, and dominance by such species as iris (*Iris* sp.), which provides greatly diminished wildlife habitat values and indicates poor habitat health.

Where adequate site potential exists, vegetation associated with reservoirs or lakes commonly provides valuable nesting and brood-rearing habitat for waterfowl and shorebirds. Common vegetation associated with these types of wetlands includes inland saltgrass (*Distichlis spicata* var. *stricta*), Baltic rush (*Juncus balticus*), spikerush (*Eleocharis* spp.), alkali bulrush (*Scirpus robustus*), and cattail (*Typha angustifolia*).

Springs and seeps occur where water from underground aquifers reaches the surface. Many springs flow directly into streams, but others form small isolated ponds or marshy areas. Springs and seeps may also form channels to flowing streams, or they may lose their surface expression and recharge alluvial fill material or permeable strata.

Springs and seeps are also important to lotic habitat because of the perennial base flow they provide to streams. In winter, especially in small streams, this base flow prevents formation of anchor ice, which has been found to be detrimental to the survival of salmonids and other aquatic species. In summer, inflow from springs not only provides volume but also helps to lower maximum daily water temperatures and the magnitude of diurnal temperature change.

Depending on soil and topography, extensive riparian areas may be associated with spring sources. Because of the continuous flow and constant temperature of most springs, riparian communities frequently remain permanently green, providing habitat, thermal and escape cover, and forage for wildlife throughout the year.

Springs can also be a source of unique, often endemic, assemblages of invertebrates. Because these habitats are uncommon and isolated, a particular species may be found only at that site and may

have little opportunity for dispersal or migration to other areas. Several rare snail species are restricted to springs and are vulnerable to impacts on the surrounding riparian vegetation and on the spring system's morphology and substrate composition.

Some springs are warm or hot because their aquifers are near a geothermal heat source. In addition to their high temperatures (above 95°F) hot springs are often characterized by large quantities of dissolved salts, carbon dioxide, carbon sulfide, or sulfur dioxide. Animals are never abundant at hot springs. In general, 77 to 86°F appears to be the dividing line between a diverse fauna at low temperatures and a poor fauna at high temperatures.

Because the thermal death-point of most freshwater invertebrates is between 86 and 104°F, many unique species of beetles, flies, amphipods, and snails are adapted to hot springs. These invertebrate communities generally rely on shallow rills of hot water and algae and cannot survive where dams or barriers form deep pools.

An extensive inventory of springs, their condition, and water yield to streams has not been conducted. It is estimated that 36 percent of the lentic systems are at PFC. The condition of lentic systems is typically linked to its spatial location on the landscape, site characteristics, the surrounding topography, and the type/season of grazing that is occurring.

3.2.9 Fish and Wildlife

The planning area falls within the greater Great Basin ecosystem. The assortment of topography, vegetation, and climate occurring in the planning area provides habitats for a variety of wildlife species. The presence of any species may be seasonal or year-round based on individual species requirements. Fish and wildlife found within this area are representative of those species found within Great Basin ecosystems, including sagebrush scrub, saltbush scrub, riparian and wetlands, and woodland habitats. Community composition and distribution information for these vegetation types are found in Section 3.2.5; their habitat functions are described below.

3.2.9.1 Wildlife Habitat

Wildlife habitat needs vary significantly by species; however, it is generally true that healthy and sustainable wildlife populations can be supported where there is a diverse mix of multi-canopied plant communities to supply structure, forage, cover, and other specific habitat requirements.

Sagebrush steppe/sagebrush includes a number of upland vegetation communities with a shrubland aspect and a variable understory of grass and forbs. Examples of generally short shrub species include varieties of big sagebrush (*Artemisia tridentata*), low sagebrush (*A. arbuscula*), and rabbitbrush (*Chrysothamnus* spp.). Mountain mahogany (*Cercocarpus ledifolius*), snowberry (*Symphoricarpos oreophilus*), and antelope bitterbrush (*Purshia tridentata*) are examples of taller steppe species collectively referred to as mountain shrub in this document. The shrubby plants within sagebrush scrub communities are important to most small and large wildlife because they supply food, hiding cover, and structure. The thermal relief provided by shrub cover helps wildlife to survive the rigors of summer heat and winter cold.

Sagebrush habitats are a dominant type within the planning area, so the welfare of this important western shrub community has great influence on the health of many common and special status

wildlife, such as mule deer, sage-grouse, and pronghorn antelope. Sagebrush provides direct benefits to some species, such as sage-grouse, and for others it provides indirect benefits, as in the case of raptors who depend on prey that inhabit sagebrush rangelands. As already described in the vegetation section, many sagebrush communities have been altered from their natural state by invasions of weedy species, grazing use, and fires.

The presence of a sagebrush overstory is strongly associated with wildlife community diversity. Maser et al. (1984) indicate that significantly more species of wildlife can find suitable breeding and feeding habitat in areas with a big sagebrush shrub overstory than in those with a grassland aspect.

Sagebrush is not the only important plant species valuable to wildlife in sagebrush scrub communities. Grasses and forbs also provide food and cover for wildlife. Habitats providing a predominately native mixture of grasses and forbs meet the needs of a wide range of species. Although there are exceptions to the rule, in most instances, native perennial herbaceous species are preferable as wildlife forage and cover.

Salt desert vegetation communities support a wide range of wildlife species with substantial overlap with the sagebrush communities. However, because salt desert types are substantially drier, the abundance of wildlife and diversity is lower. Notable salt desert wildlife species include kit fox (*Vulpes macrotis*) and antelope ground squirrel (*Ammospermophilus leucurus*). Reptiles are well represented in this type because of the lower elevations and warmer conditions.

Riparian areas consist of plant communities associated with streams and rivers. The structure, food, and water provided in riparian areas makes them the single most diverse and productive habitat for wildlife. Where site potential allows, multi-canopy riparian areas with trees, shrubs, grasses, forbs, sedges, and rushes are exceptionally valuable as habitat for a wide array of wildlife species, including neotropical migrant birds (species that breed in North America and over-winter in Central and South America). Riparian areas dominated by herbaceous communities and with low potential for multi-canopy structure are nevertheless important as water and succulent food sources for wildlife. The presence of multiple-aged classes of woody and herbaceous vegetation is generally indicative of healthy wildlife habitat conditions. Riparian habitats or wetlands in nonfunctioning or functional-at-risk condition due to erosion, lowered water table, or degraded vegetation composition or structure, provide decreased wildlife habitat values.

Wetlands are similar to riparian areas in that the site potential for wildlife habitat can vary markedly. Regardless of the habitat type, wetlands typically provide wildlife with succulent green forage, insects, and drinking water. Green forage is especially important for many wildlife species during the summer and fall when upland vegetation has dried out.

Where the site potential exists, wetlands associated with reservoirs or vegetated playas commonly provide valuable nesting and brood-rearing habitat for waterfowl and shorebirds. Common vegetation associated with these types of wetlands includes inland saltgrass (*Distichlis spicata stricta*), Baltic rush (*Juncus balticus*), spikerush (*Eleocharis* sp.), alkali bulrush (*Scirpus robustus*), and cattail (*Typha angustifolia*).

Depending on soil and topography, extensive riparian or wetland areas may be associated with spring sources. Because of the continuous flow and constant temperature of most springs, riparian

communities frequently remain permanently green, providing habitat and forage for wildlife throughout the year.

Woodlands composed of stands of Utah juniper (*Juniperus osteosperma*) vary greatly in their value as habitat depending on site-specific factors, such as height, stocking density, age of trees, and understory composition. Scattered Utah juniper may be found in other parts of the planning area at midlevel elevations.

Large trees provide cavities for nesting birds like bluebirds (*Sialia* sp.) and northern flickers (*Colaptes auratus*) or features used by bats, and medium-sized trees provide nest sites on limbs for American robins and ruby-crowned kinglets. The Idaho Bureau of Land Management, Technical Bulletin No. 97-12, which contrasted songbird populations in clear-cut, burned, and old growth Utah juniper habitats, revealed a more robust and diverse population of songbirds in old growth compared to the treated areas. Ferruginous hawks rely heavily on junipers for nesting. Mule deer (*Odocoileus hemionus*) use juniper for both thermal and escape cover. During severe winters, Utah juniper cover may be critical to deer survival (Leckenby et al. 1982). Many nongame species like the least chipmunk (*Eutamias minimus*) and scrub jay (*Aphelocoma coerulescens*) use Utah juniper for food and cover. Dead juniper trees and snags are important for wildlife cover and food and even help recycle nutrients back to the soil.

Aspen-mahogany woodlands occur at higher elevations. Cavity-dependent species of forest-dwelling birds and mammals require snags for their reproduction. The size, age classes, and stocking levels of trees influence their values as wildlife habitat for game and nongame species. Dead and downed material supply structure for a variety of purposes and plays and important role in the overall ecology of the forest and its wildlife, such as providing recycled nutrients.

Rock complexes in mountainous areas are used by roosting and nesting swallows, swifts, golden eagles, and prairie falcons, along with many other bird species. These rocks also provide important cover for large mammals, such as bighorn sheep, mountain lions, and bobcats, and for small mammals, such as ground squirrels, wood rats, rabbits, and marmots.

The following are descriptions of priority species, based on regulatory status, population levels, and estimated value to the area.

3.2.9.2 Big Game Species

Mule Deer

Mule deer (*Odocoileus hemionus*) are widespread, typically associated with complex middle to upper elevation landforms that support a variety of sagebrush, mountain shrubs, quaking aspen, juniper, and herbaceous vegetation. Mule deer also use lower elevations when deep snow forces them to move. Mule deer are frequently associated with meadow and riparian habitat and tend to be present yearlong where public land adjoins cultivated farmland.

Based on NDOW survey data, mule deer numbers are currently low, relative to historic numbers and state management objectives. Severe winters, drought, and loss of winter habitat due to wildfire and other biological factors have contributed to these low numbers.

Deer are generally classified as browsers, and forbs and shrubs make up the bulk of their annual diet. However, the diet of mule deer is quite varied, and the importance of various classes of forage plants varies by season. For example, in late fall and early spring, new grass may constitute an important part of their diet in some areas because it is highly palatable, nutritious, and abundant. In winter, especially when grasses and forbs are covered with snow, the entire diet may consist of shrubby species. Tall shrubs and trees are very important for food and cover.

Woodland and rangeland management actions all have the potential to influence mule deer cover and forage. Healthy quaking aspen, juniper, mountain shrub, and sagebrush communities are all important tall cover habitats for mule deer. Meadows and riparian areas provide succulent forage and water, especially during the fall and summer.

NDOW shows six seasonal mule deer habitats within the planning area (Figure 3-11; mule deer habitat classifications and definitions are shown in Table 3-12).

Pronghorn Antelope

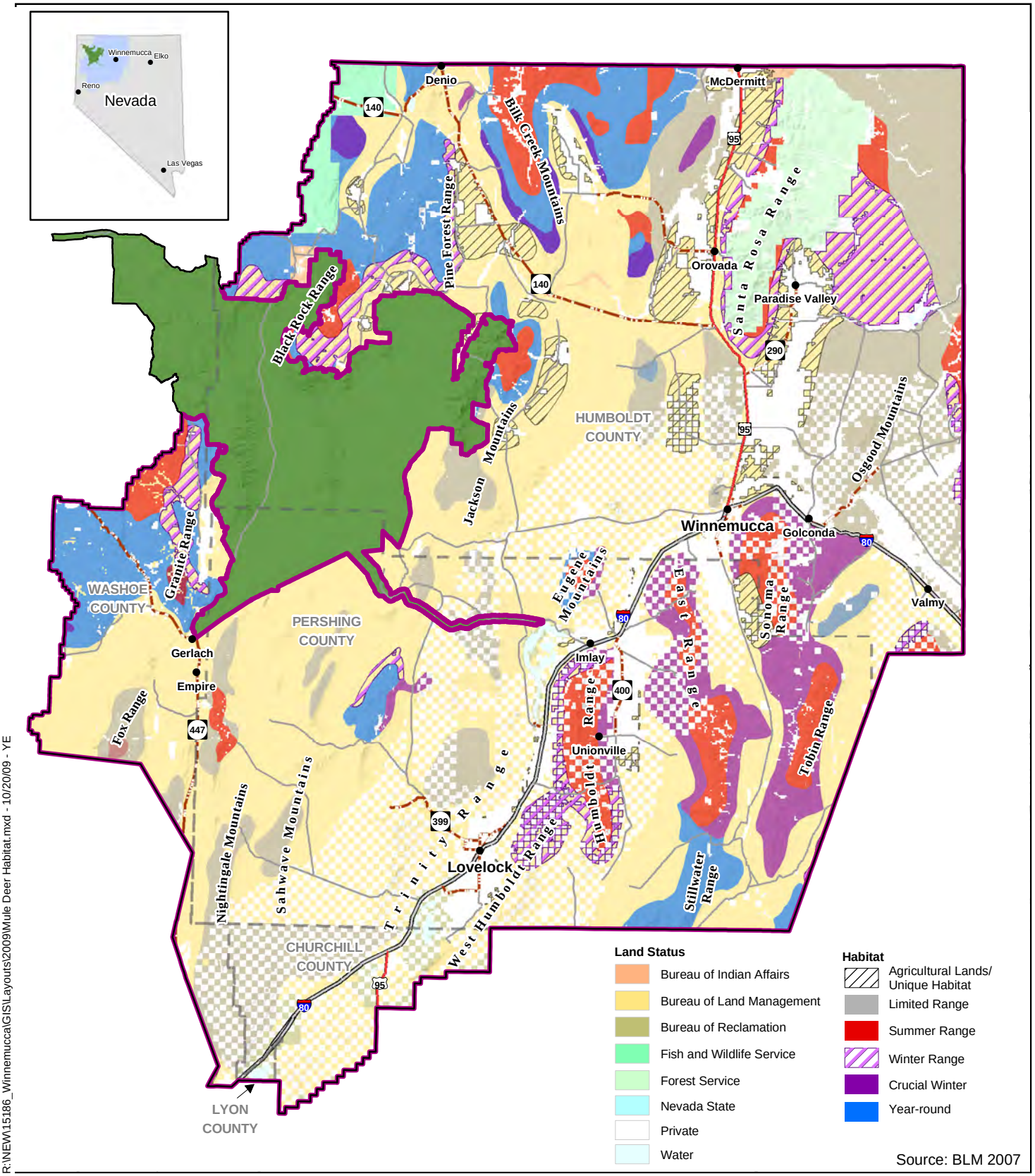
Pronghorn antelope (*Antilocapra americana*) are distributed throughout much of the planning area (Figure 3-12). NDOW has not established population management objectives for pronghorn but does manage for benchmark population characteristics. During the summer, pronghorn antelope are widely distributed throughout valleys, mountain foothills, and mountaintops. This species has been known to pioneer new populations into previously unoccupied habitats, especially previously burned areas. They are associated with low and black sagebrush and shadscale habitats with short vertical structure.

Rangelands with a mixture of grasses, forbs, and shrubs provide the best habitat (Yoakum 1972). The sagebrush community is used for both thermal cover and forage. Competition for forage with cattle and wild horses is variable due to forage preferences. Lack of water at natural or developed sites can be a serious problem during droughts. BLM fence construction specifications allow for freedom of movement for pronghorn by having smooth bottom wires spaced at least 16 inches from the ground.

Elk

There are no known populations of elk (*Cervus canadensis*) within the WDO, but there are established populations in Oregon to the north and the Elko District Office to the east, as well as in southern Nevada. Pioneering elk have been observed within the WDO (Detweiler 2007b) and have the potential to become more abundant in the planning area over the coming years. Potential elk habitat within the planning area is presented in Figure 3-13.

Elk summer in alpine meadows and wooded hillsides and winter in valleys and open grasslands (NatureServe 2005). Calving is not limited to a specific area or habitat (Nature Serve 2005). In spring, male elk known as bulls will form small bachelor herds in the high country, until the rut in late summer (NatureServe 2005). Elk are primarily grazers but are opportunistic consumers of forbs and browsers of willow, aspen, and other tree vegetation (NatureServe 2005).



R:\NEW\15186_WinnemuccaGIS\Layouts\2009\Mule Deer Habitat.mxd - 10/20/09 - YE

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Winnemucca District Office RMP
Mule Deer Habitat

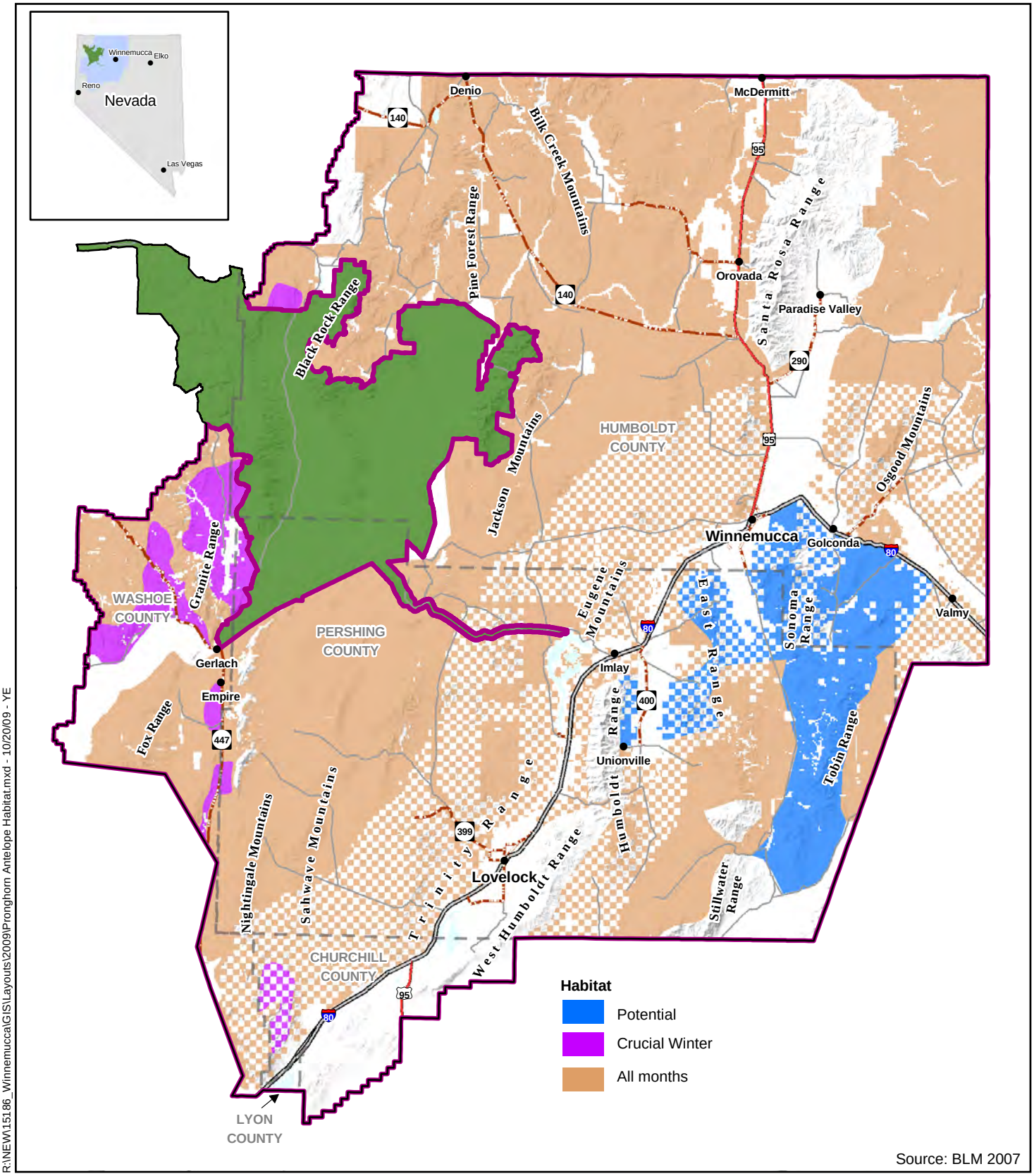
Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-11



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Winnemucca District Office RMP
Pronghorn Antelope Habitat

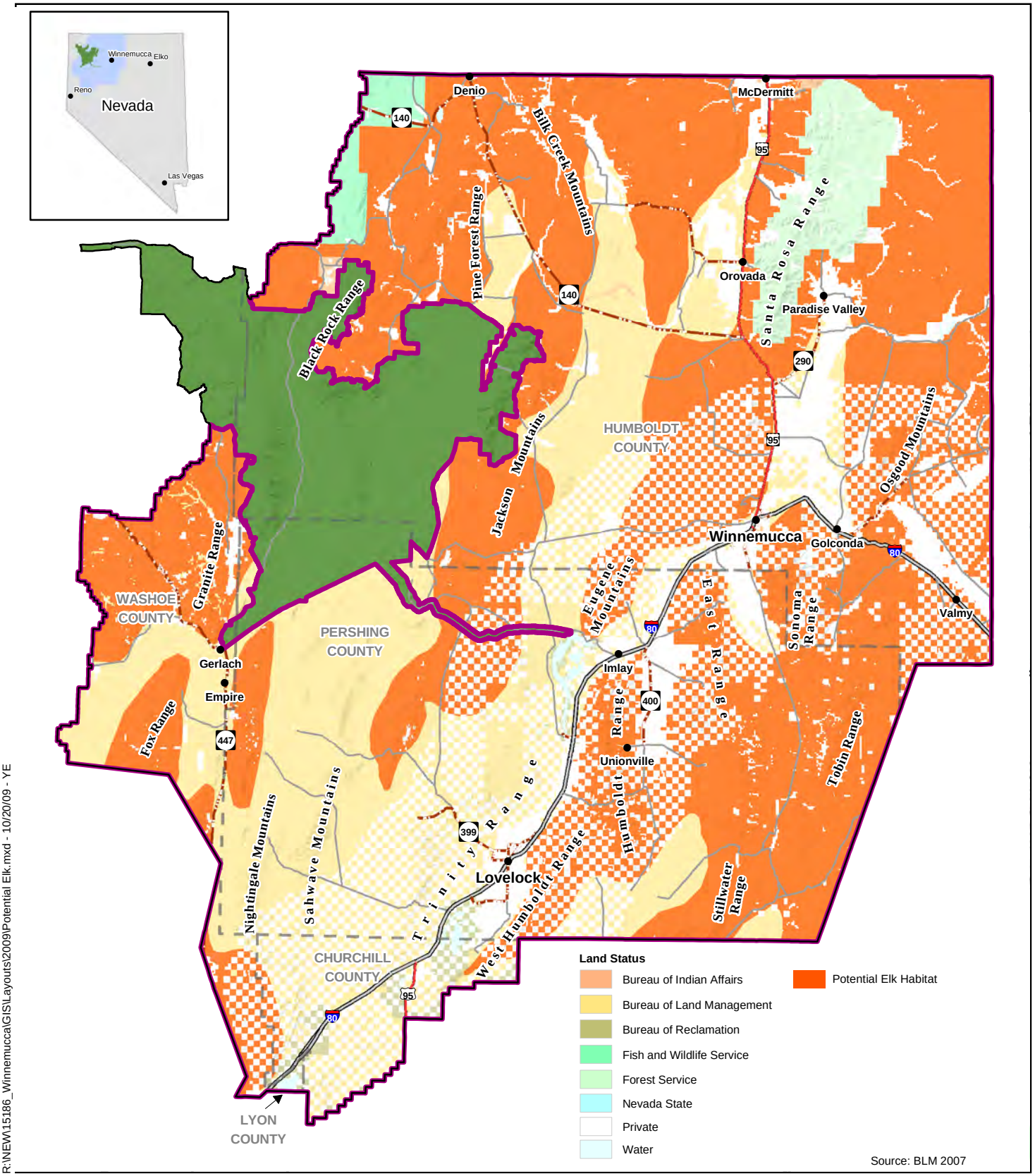
Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-12



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Winnemucca District Office RMP
Potential Elk Habitat

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-13

Table 3-12
Mule Deer Habitat Classifications and Definitions

Classification	Definition
Limited range	Includes habitat that is occasionally inhabited or contains small populations of scattered mule deer.
Summer range	That part of the overall range where 90 percent of the individuals are located between spring green-up and the first heavy snowfall. Summer range is not necessarily exclusive of winter range; in some areas winter range and summer range may overlap.
Agricultural lands/unique habitat/other important habitats	Areas that are part of the overall range where higher quality habitat supports significantly higher densities than surrounding areas. These areas are typically occupied year-round and are not necessarily associated with a specific season. Examples are rough break country, riparian areas, small drainages and large areas of irrigated cropland, migration corridors, highway crossings, and fawning areas.
Winter range	That part of the overall range where 90 percent of the individuals are located during the average five winters out of ten, from the first heavy snowfall to spring green-up or during a site-specific period of winter.
Crucial winter range/winter concentration	That part of the winter range where densities are at least 200% greater than the surrounding winter range density during the same period used to define winter range in the average five winters out of ten.
Year-round population	An area that provides year-round range for a population of mule deer. The resident mule deer use all of the area all year; it cannot be subdivided into seasonal ranges, although it may be included within the overall range of the larger population.

Source: Detweiler 2007c

Bighorn Sheep

Two subspecies of bighorn sheep are found within the planning area: California bighorn (*Ovis canadensis californiana*) and desert bighorn (*O. c. nelsoni*). Potential or occupied habitat for California bighorn has been identified as all lands north of I-80 within the planning area, while lands south of I-80 are classified as desert bighorn habitat (USFWS 2003). More information specific to the desert bighorn sheep is discussed under special status species in Section 3.2.9.

Due to a number of factors, bighorn sheep were eliminated from northern Nevada by 1915. Existing populations within the planning area are the result of numerous NDOW-initiated reintroductions and supplemental releases.

Bighorn sheep typically prefer remote and complex mountainous terrain where adequate water is available. Wildlife water developments have been installed within the planning area.

Because of separation in habitat preferences among deer, pronghorn, wild horses and burros, cattle, and bighorn sheep, forage competition in this planning area is generally limited (Ganskopp 1983). Known areas of overlapping cattle and bighorn sheep use have not presented issues of forage

availability or disease transmission requiring resolution. Domestic sheep grazing/trailing permits occur within occupied bighorn sheep and potential range, so there is a risk of disease transmission between domestic sheep and bighorn sheep.

Wandering bighorn sheep or stray domestic sheep that have been found in unexpected areas occasionally require NDOW action to avoid conflicts. Disease transmission between domestic sheep and bighorn sheep can result in massive bighorn sheep losses and the potential for intense public controversy.

Although populations within the analysis area have recently increased, according to the NDOW's Bighorn Sheep Management Plan (USFWS 2003), the current distribution in Nevada still represents a small percentage of the former historic range (Figure 3-14).

3.2.9.3 Small and Upland Game Species

Upland game bird habitat preferences and general abundances are outlined in Table 3-13.

The quality of upland game bird habitat depends on the availability of mixed shrubby and herbaceous vegetation types for nesting, brood rearing, foraging, and thermal cover. Riparian habitat plays an important role as a source of food, water, and shelter for most species. Further, upland game birds, particularly the chukar partridge, respond well to wildlife water developments (guzzlers) in potential habitat.

3.2.9.4 Nongame Species

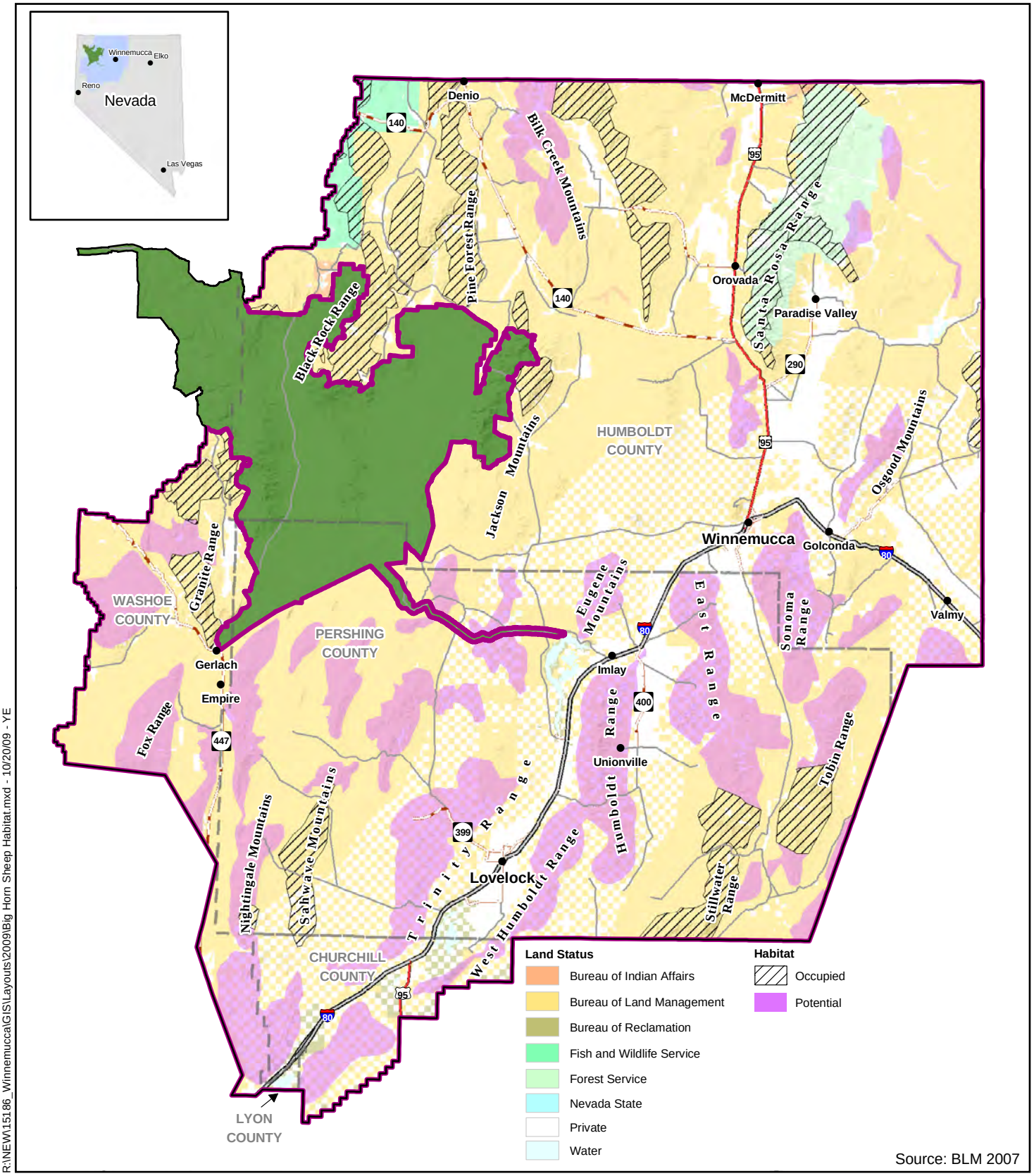
Migratory Birds

Migratory birds are protected and managed under the MBTA of 1918, as amended (16 USC 703 et seq.) and EO 13186. Under the MBTA, nests with eggs or young of migratory birds may not be harmed, nor may migratory birds be killed. EO 13186 directs federal agencies to promote the conservation of migratory bird populations. Migratory birds within the planning area are discussed below.

Raptors

Raptors (predatory birds such as hawks, eagles, owls, and falcons) can be found throughout much of the planning area. Common breeding species include the red-tailed Hawk (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), great horned owl (*Bubo virginianus*), and long-eared owl (*Asio otus*). Other less common breeders that may be found locally include the ferruginous hawk (*Buteo regalis*), northern goshawk (*Accipter gentiles*) and burrowing owl (*Speotyto cunicularia*). Nesting habitats are found in Utah juniper, quaking aspen, and volcanic ledges and buttes. Prey species are more likely to be available for a wide range of raptors when plant communities are structurally diverse and support mixtures of grasses, forbs, and shrubs.

Most of the breeding species also winter within the planning area; however, the rough-legged hawk (*Buteo lagopus*) only uses the planning area for its wintering grounds.



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Winnemucca District Office RMP
Distribution of Bighorn Sheep

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

N W E S

0 10 20 Miles

Northwest Nevada

Figure 3-14

Table 3-13
Upland Game Bird Species and Habitat Preferences

Species	Notes and Habitat Preference
Chukar partridge (*Alectoris graeca*)	Associated with rocky canyons in mountainous terrain; widespread throughout the planning area.
Gray partridge (*Perdix perdix*)	Primarily found in grass-dominated areas, such as old burns. Uncommon within the planning area; found in scattered localized areas.
California quail (*Lophortyx californicus*)	Associated with riparian areas; moderately abundant on public land.
Mourning dove (*Zenaida macroura*)	Occupy a wide variety of habitats in the planning area, where they are widespread.
Sage-grouse (*Centrocercus urophasianus*)	Associated with foothills, plains, and mountain slopes where sagebrush is present in a mixture of sagebrush and meadows, in a variety of sagebrush mosaic habitats.

Source: NatureServe 2005

Waterfowl, Shorebirds, and Wading Birds

Approximately 70 species of birds use the area's few wetlands during migration and as breeding habitat when surface water is present. Vegetation cover for nest concealment from predators and for protection from other disturbances is important during the breeding season. Representative species associated with wetlands within the planning area are presented in Table 3-14.

Neotropical Migrant Birds

The planning area supports a wide variety of neotropical migrant bird species (more than 240 species). Populations of some of these species are declining as a consequence of land use practices, an increase in cowbirds (*Molothrus ater*) (which as brood parasites [species that lay eggs in nests of other species] lower the reproductive success of other passerines), as well as other factors. Neotropical migrants exhibit quite variable habitat requirements and are found in most habitat types.

Table 3-14
Common Bird Species Associated with Wetlands in the WDO Planning Area

Common Name	Scientific Name
American avocet	*Recurvirostra americana*
Canada goose	*Branta canadensis*
Cinnamon teal	*Anas crecca*
Gadwall	*A. strepera*
Killdeer	*Charadrius vociferus*
Mallard	*Anas platyrhynchos*
Spotted sandpiper	*Actitis macularia*
Wilson's phalarope	*Steganopus tricolor*

Sources: NatureServe 2007; Neel 1999

Most birds found in the planning area are neotropical migrant birds[1]. Riparian and wetland areas represent less than one percent of the planning area, but provide habitat for most of the neotropical migrant species due to the presence of water and the structural and species diversity of the vegetation.

Mammals

Cougar

Cougar (*Felis concolor*) are found throughout the planning area, in those areas where NDOW data indicate their presence.

3.2.9.5 Fish and Aquatic Habitat

Aquatic habitat includes perennial and intermittent streams that have the capability to support fish. There are approximately 891 miles of perennial streams on lands administered by the WDO. Further, aquatic habitats, such as streams, rivers, and creeks, contain a range of aquatic mollusk, fish, and insect species.

Also found within the planning area are springs, where deep or shallow groundwater flows naturally from bedrock or natural fill onto the land surface and forms a body of water (NDOW 2002). These springs are isolated from other surface waters and as a result commonly support a diversity of endemic species (NDOW 2002).

Springs can be a habitat for unique native groups of invertebrates that are adapted to the constant temperatures and distinctive geothermal environments that some springs provide. Because these habitats are uncommon and isolated, a particular species may be found only at that site and may have little opportunity for dispersal or migration to other areas. The invertebrate communities generally rely on shallow areas of flowing hot water and algae and cannot survive where dams or barriers form deep pools.

Thermal springs, because of their high temperatures and concentrations of dissolved minerals, subject invertebrates to a rigorous environment that precludes high diversity or abundance. Nevertheless, some species of nematodes, mites, beetles, flies, amphipods, fish, and snails are adapted to hot springs. Several rare snail species are restricted to springs and are vulnerable to development that eliminates shallow pools and surrounding riparian vegetation. Two species of rare snails, Dixie Valley springsnail (*Pyrgulopsis dixensis*) and Fly Ranch pyrg (*P. bruesi*), have been collected from thermal springs in the planning area. Other, non-sensitive springsnail species collected in the planning area include northern Soldier Meadows springsnail (*P. militaris*), southern Soldier Meadows springsnail (*P. umbilicata*), elongate Mud Meadows springsnail (*P. notidicola*), squat Mud Meadows springsnail (*P. limaria*), two undescribed *Pyrgulopsis* species, and one undescribed *Fluminicola* species.

Table 3-15 lists the sport fish found within streams and reservoirs in the planning area, most of which were and continue to be introduced into the system for recreational purposes.

[1]For additional information on bird species common to the WDO, see *Atlas of the Breeding Birds of Nevada*, Floyd et al., University of Nevada Press 2007.

Table 3-15
Sport Fish in the Planning Area

Common Name	Scientific Name
Common carp	*Cyprinus carpio*
Rainbow trout	*Oncorhynchus mykiss*
Brook trout	*Salvelinus confluentus*
Brown trout	*Salmo trutta*
Brown bullhead	*Ictalurus nebulous*
Black bullhead	*I. melas*
Channel catfish	*I. punctatus*
White catfish	*Ictalurus catus*
Largemouth bass	*Micropterus salmoides*
Smallmouth bass	*M. dolomieui*
Black crappie	*Pomoxis nigromaculatus*
Green sunfish	*Lepomis cynellus*
Bluegill	*L. macrochirus*
Red-ear sunfish	*L. microlophus*
White crappie	*Pomoxis annularis*
Sacramento perch	*Archoplites interruptus*
Walleye	*Stizostedion vitreum*
Yellow perch	*Perca flavescens*

Source: BLM 2008

The condition of fisheries habitat is intrinsically linked to the condition of the adjacent riparian habitat and also the stream channel characteristics. Riparian vegetation moderates water temperatures, adds structure to the banks to reduce erosion, and provides overhead cover for fish.

Intact vegetated floodplains dissipate stream energy, store water for later release, and provide rearing areas for juvenile fish. Water quality, especially in regard to factors such as temperature, sediment, and dissolved oxygen, also greatly affects fisheries habitat.

Public land within the planning area provides habitat for at least one federally listed native fish species, Lahontan cutthroat trout (*Oncorhyncus clarkii henshawi*). Amphibians and aquatic invertebrates are integral components of the fish community. Several springsnail species are known to occur within the planning area and are generally associated with springs and spring brooks, as stated above; however, they are also found within perennial stream reaches that are strongly influenced by groundwater. At least two of these species are on the BLM's sensitive species list for Nevada, including Dixie Valley springsnail and Fly Ranch pyrg.

3.2.10 Special Status Species

The BLM's manual defines special status species, collectively, as federally listed or proposed and Bureau sensitive species, which include federal candidate species and species that have been delisted in the last five years.

3.2.10.1 Federally Listed Species

The USFWS provided the BLM with a species list of federally listed species that may occur in the vicinity of the Winnemucca Resource Management Plan Area. These include Lahontan cutthroat

trout (LCT) and bald eagle (USFWS 2005). Lahontan cutthroat trout is the only species listed as threatened under the ESA that occurs in the planning area (USFWS 2005); the bald eagle was listed as threatened in 2005 when the USFWS provided the BLM with its species list, but the USFWS delisted the bald eagle on August 8, 2007. No species listed as endangered are known to occur in the planning area.

Lahontan Cutthroat Trout (Federal Threatened)

Lahontan cutthroat trout is a threatened fish species native to lakes and streams throughout the physiographic Lahontan Basin of northern Nevada, eastern California, and southern Oregon.

Current populations exist in approximately 155 streams and six lakes in the Lahontan Basin. However, the current populations within the WDO exist in approximately 17 streams and one lake (Table 3-16). Potential LCT habitat has been identified within the LCT Recovery Plan (USFWS 1995) (Table 3-17), and more potential LCT habitat may be identified in the future. The principal threats to the subspecies include livestock grazing, urban and mining development, water diversions, poor water quality, hybridization with nonnative trout, and competition with other species of nonnative trout.

Table 3-16
Occupied LCT Habitat within the WDO

Lakes	**Occupied Habitat (surface acres)**
Summit Lake	600
Streams	**Occupied Habitat (miles)**
Crowley Creek	12
Little Humboldt River (South fork)	10
Riser Creek	9
Colman Creek	7
Washburn Creek	6
Pole Creek	4
Mahogany Creek	3.5
Rock Creek	3
Summer Camp Creek	2
Battle Creek (North fork)	2
Indian Creek	2
Abel Creek	2
Snow Creek	1.5
Denio Creek	1.5
First Creek	1
Winters Creek	1
Andorno Creek	0.5
Total	68

Source: Lynch 2008

Table 3-17
Potential LCT Habitat within the WDO

Streams
Black Rock Basin
Leonard Creek
Chicken Creek
Big Creek
Happy Creek
Mary Sloan Creek
Rodeo Creek
Granite Creek
House Creek
Cold Springs Creek
Red Mountain Creek
Raster Creek
Bartlett Creek
Paiute Creek
Jackson Creek
Donnelly Creek
Cottonwood Creek
Log Cabin Creek
Quinn River Basin
Rock Creek
McDermitt Creek
Little Humboldt River Subbasin
Mullinex Creek
Singas Creek
Stonehouse Creek

Source: USFWS 1995

Historically, LCT populations occurred in a wide variety of cold water habitats, such as alpine lakes, low and moderate gradient rivers, and small headwater tributary streams. Stream-dwelling LCT are generally less than five years old, while in lakes, LCT may live as long as nine years. LCT feed on a variety of terrestrial and aquatic insects, and larger LCT may feed on fish. LCT populations in the planning area have been reduced by lessening and altering stream discharge, altering stream channels and morphology, degrading water quality and riparian habitats, drought, increasing chemical concentrations, and introducing nonnative fish. These changes are largely due to human activity.

The population recovery strategy for LCT includes managing populations for genetic variation, establishing metapopulations, and increasing distribution and abundance through reproduction and reintroductions.

The strategy also includes habitat management that involves many BLM land uses and management strategies. Habitat provision strategies include providing adequate water, water quality, and cover for spawning and rearing through streamside management, monitoring, and research.

Bald Eagle (Delisted)

The species requires tall trees near a water source, such as coastal areas, bays, rivers, or lakes, and feeds on fish, waterfowl, and seabirds (NatureServe 2007). Bald eagles may occur incidentally for short periods as a rare migrant in the WDO. However, no foraging, nesting, wintering, or roosting areas have been identified.

Although no longer afforded protection under the ESA, the bald eagle is still protected by the MBTA and the Bald and Golden Eagle Protection Act. On a statewide level, the Nevada Partners in Flight Bird Conservation Plan (Neel 1999) concluded that, since Nevada plays such a small role in the overall world population health of bald eagles, this species is not considered a candidate for conservation priority within the state.

3.2.10.2 State of Nevada

The State of Nevada maintains various lists of rare and protected plant and animal species. The Nevada Administrative Code 503 defines endangered species as "a species or subspecies that is in danger of extinction throughout all or a significant portion of its range." Nevada state threatened species are defined as "a species or subspecies that is likely to become an endangered species in the near future throughout all or a significant portion of its range." A list of state special status species is presented in Appendix D, Table D-1.

3.2.10.3 BLM Sensitive Species

The BLM defines sensitive species as taxa that are not already included as BLM Special Status Species under federally listed, proposed, or candidate species or State of Nevada listed species. BLM policy is to provide these species with the same level of protection as provided for candidate species in BLM Manual 6840.06C, that is to "ensure that actions authorized, funded, or carried out do not contribute to the need for the species to become listed." The BLM sensitive species lists include mammals, birds, reptiles, mollusks, insects, and plants that may be found in the planning area (BLM 2003b; NNHP 2007). These are presented in Appendix D, Table D-1. Changes in special status species lists will be incorporated into the WDO RMP as they are amended. Additional detail is provided below for key special status species for management within the planning area.

3.2.10.4 Key Special Status Species for Management

In addition to desert bighorn, western burrowing owl, and pygmy rabbit, the greater sage-grouse is a key special status species for management and is discussed below under federal candidate species.

Desert Bighorn Sheep

Desert bighorn historically occupied the central and southern portions of Nevada (NDOW 2002). Hunting the animals was prohibited from 1901 to 1952, and transplanting programs have been successful; between 1968 and 1988 more than 800 desert bighorn were transplanted (McCutchen 1995). Since 1960, bighorn have increased in numbers, but their population levels are still low when compared with the estimates of pre-European numbers and the amount of available unoccupied habitat (McCutchen 1995).

Western Burrowing Owl

Western burrowing owls have been observed in the planning area, but a survey of the area has not been completed. These owls require open terrain, with low vegetation, burrows created by mammals, and an adequate prey base.

Pygmy Rabbit

The pygmy rabbit is the smallest North American rabbit. In the Great Basin, the species is typically restricted to the sagebrush-grass complex. A dietary study of pygmy rabbits showed that they depend on sagebrush year-round, and it supplies 51 percent of their diet in summer and 99 percent in the winter. Pygmy rabbits showed a preference for grasses and, to a lesser extent, forbs, in the summer (Green and Flinders 1980). These data seem to indicate that pygmy rabbits require sagebrush stands with an understory of perennial grasses to meet their seasonal dietary requirements. The pygmy rabbit mates in early spring and summer. No inventories for pygmy rabbits have been completed within the WDO, but it appears that the species may be much more widespread than previously thought (Detweiler 2007).

3.2.10.5 Federal Candidate Species

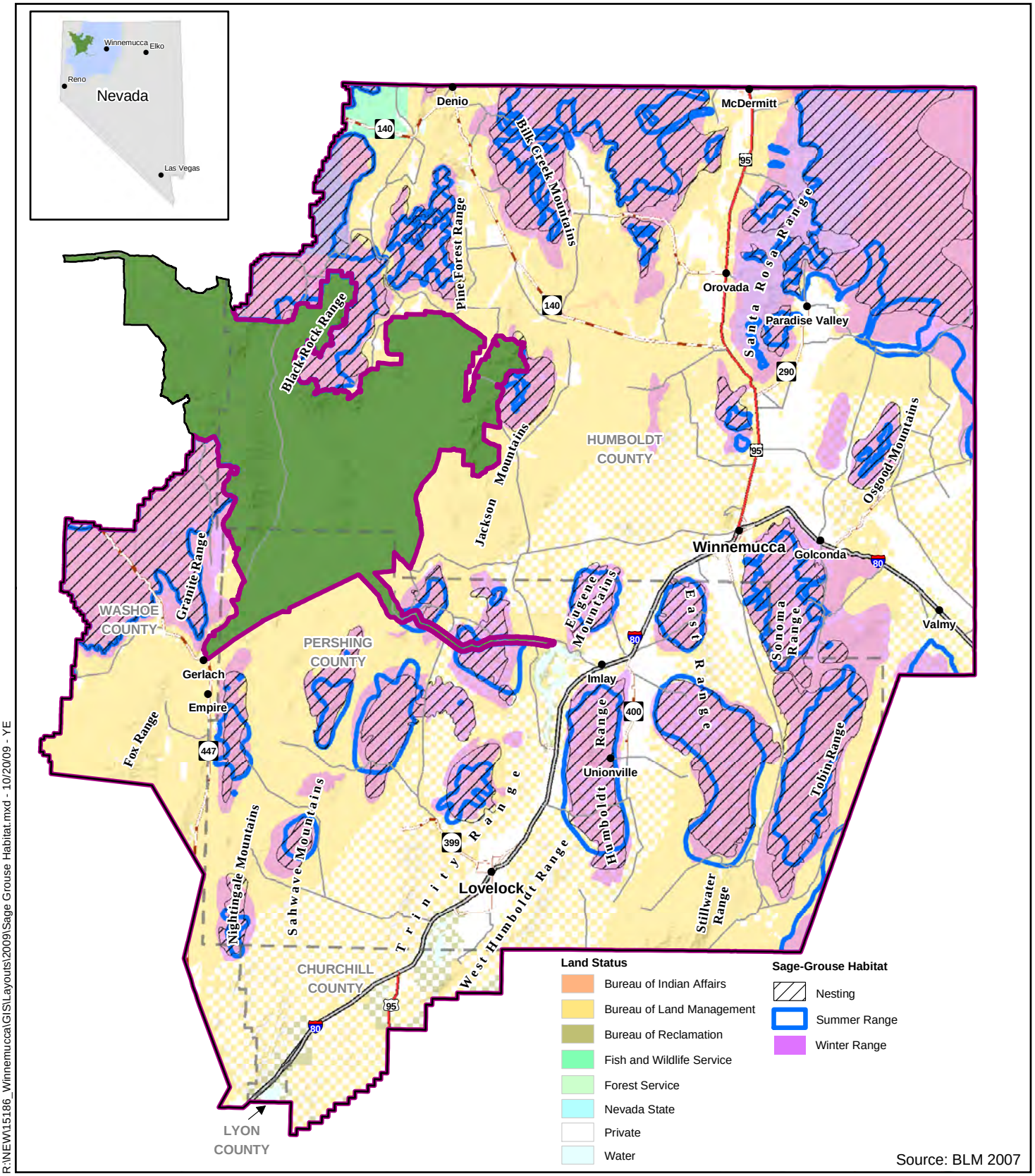
The USFWS provided the BLM with a species list of federal candidate species for listing that may occur in the vicinity of the Winnemucca Resource Management Plan Area. These include western yellow-billed cuckoo and Columbia spotted frog (USFWS 2005). No species proposed for listing as endangered are known to occur in the planning area.

Greater Sage-Grouse

Historic records, which are mostly anecdotal and lack systematic survey data, indicate that greater sage-grouse populations have fluctuated widely in Nevada. NDOW has indicated that although the current population is relatively moderate, it is considered to be declining (Willis et al. 1993).

In much of the popular and scientific literature, sage-grouse are considered an indicator species, or "icon" of the sagebrush steppe. The Partners in Flight Western Working Group (Altman and Holmes 2000) consider sage-grouse a species of focus. This document highlights sage-grouse as a species that occupies habitats that have declined substantially within the interior Great Basin since historic times. Sage-grouse are wide ranging and occupy upland, meadows, and riparian habitats. It is for this reason that sage-grouse are identified as the primary indicator or umbrella species for sagebrush habitats in this plan.

This species is highly dependent on the presence of several species and subspecies of shrubs, notably Wyoming, mountain, and great basin sagebrush. Low sagebrush is also important. Greater sage-grouse nest at mid-elevation habitats that support adequate shrubby and herbaceous plant cover (Connelly et al. 2000). Nesting habitats (Figure 3-15) are typically associated with big sage/low sagebrush habitat complexes. Spring, summer, and fall ranges with a good complement of native grasses and forbs are associated with productive sage-grouse habitat. During the winter, sage-grouse forage almost exclusively on either big sagebrush or low sagebrush, depending on severity of snowfall and on the migratory habits of populations.



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Winnemucca District Office RMP Sage-Grouse Habitat

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-15

Mountain meadows, riparian areas, and moist upland range sites all provide succulent green forage and insects that are important food for grouse during the spring, summer, and fall. Sage-grouse habitat and breeding complex monitoring is an ongoing effort that NDOW and BLM have participated in jointly for several years.

Because leks (areas of display and courtship) are typically positioned within proximity of nesting and brood-rearing habitat, they are often considered an excellent reference point for monitoring and habitat protection measures.

Currently, sage-grouse and their habitats are managed in discreet areas called population management units (PMUs) (Figure 3-16). Three seasonal habitats, described as nesting, summer, and winter, are delineated within the PMUs. Management/implementation plans are completed for these PMUs by local area planning groups. The two planning groups identified within the planning area are the Washoe-Modoc and North-Central.

Western Yellow-Billed Cuckoo

The western yellow-billed cuckoo is a riparian obligate species that requires dense cottonwood-willow forested tracts (Neel 1999). There are no riparian habitats with those characteristics within the planning area; therefore, the cuckoo might transit the planning area, but they are unlikely to nest or be present in the planning area for any period of time.

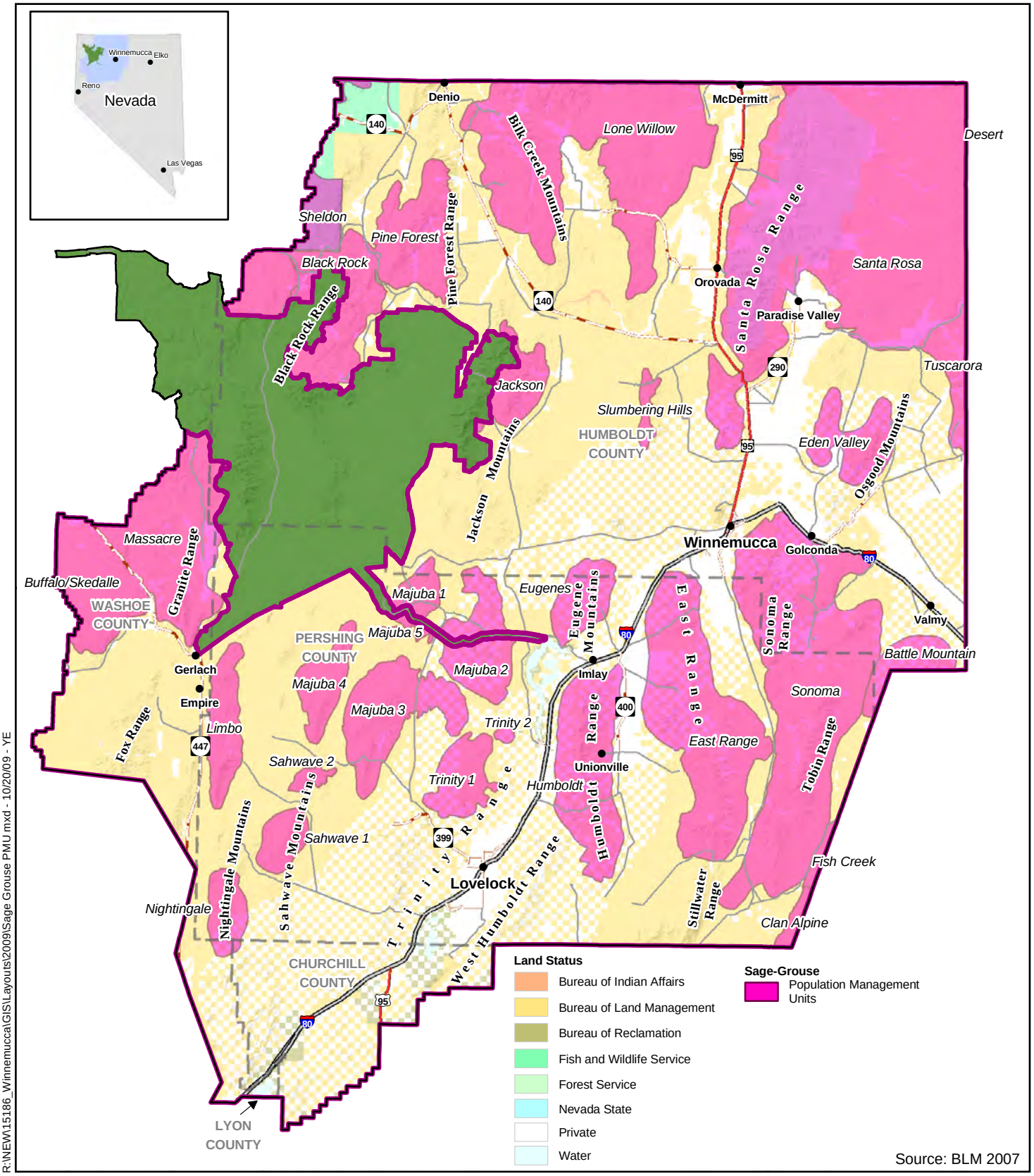
Columbia Spotted Frog

Although the species has not been documented within the planning area, the Columbia spotted frog has potential habitat within the planning area, including streams and springs.

3.2.11 Wild Horse and Burro

The Bureau of Land Management protects, manages, and controls wild horses and burros under the authority of the Wild Free-Roaming Horses and Burros Act of 1971 (as amended by Congress in 1976, 1978, 1996, and 2004) to ensure that healthy herds thrive on healthy rangelands. The BLM manages these living symbols of the Western spirit as part of its multiple-use mission under the 1976 Federal Land Policy and Management Act. In addition, the BLM must meet or ensure progress is being made toward meeting the Sierra Front-Northwestern Great Basin RAC Standards and Guidelines for Wild Horse and Management (Appendix K).

Wild horse and burro populations are managed within herd management areas (HMAs). Following passage of the Wild Free-Roaming Horses and Burros Act of 1971 (PL 92-195, as amended), thirty-five herd areas (HAs) were originally delineated on the Winnemucca District (Figure 3-18). Subsequent land management plan decisions identified the removal of wild horses and burros from checkerboard HAs (alternating sections of privately owned lands and BLM lands) unless affected private landowners executed a cooperative agreement providing for their retention and protection. No cooperative agreements were obtained. Wild horses and burros were gathered and removed from 15 checkerboard HAs in the early 1990s. HAs are not managed for wild horse or burro populations, but animals that migrate from HMAs are occasionally removed from these areas. Appropriate management levels (AMLs) for wild horses and burros are established through multiple



R:\NEW\15186_Winnemucca\GIS\Layouts\2009\Sage Grouse PMU mxd - 10/20/09 - YE

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Winnemucca District Office RMP Sage-Grouse PMUs

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-16

use decisions. AML is the population range of wild horses and burros to be managed within an HMA. AMLs are established based on "an intensive monitoring program involving studies of grazing utilization, trend in range condition, actual use, and climatic factors" (109 IBLA 120) (Interior Board of Land Appeals, no date). Annual monitoring data are collected to evaluate progress toward meeting management objectives established in multiple use decisions. Wild horses and burros that establish home ranges outside the boundaries of an HMA are removed. Wild horses and burros are removed from private lands at the request of the landowner. The WDO manages approximately 3,233 wild horses and 155 burros on 20 HMAs (Figure 3-17). Table 3-18 lists HMAs and HAs that may include portions of other BLM District Office lands, but they are administered by the WDO and are included in their entirety here.

3.2.12 Wildland Fire Management

History

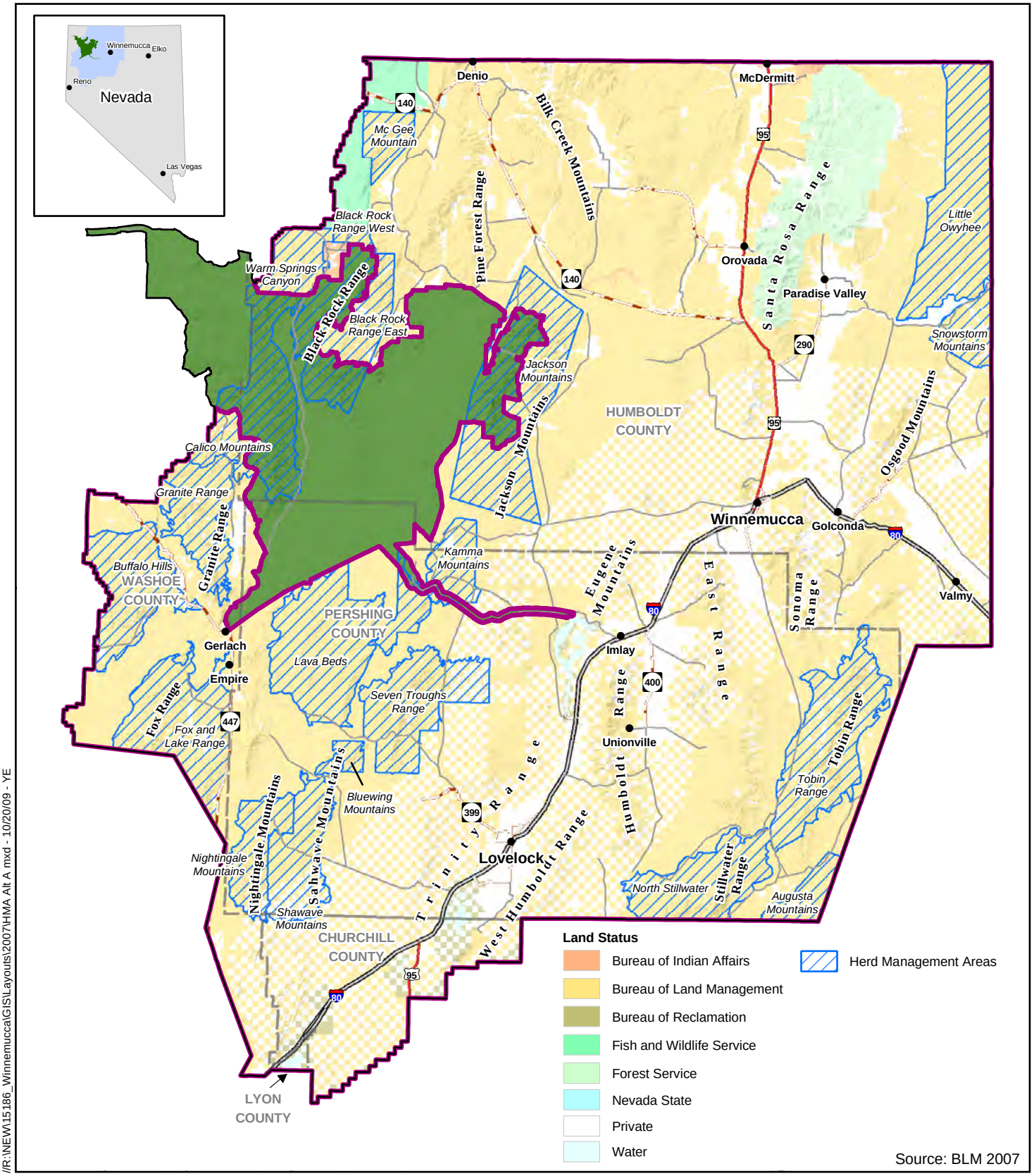
From 1987 through 2006 the WDO has experienced a total of 1,024 fires that have burned a total of 1,549,076 acres. Of the total acres burned, 1,114,047 acres have burned within the period from 1997 to 2006, representing a majority of the acres burned due to continued drought cycles and the continual spread of invasive grass species, such as cheatgrass. The largest fire years were 1999 and 2000, where a total of 805,117 acres burned. Figure 3-19, WDO Planning Area and Fire Occurrence, identifies areas burned and fire history since 1973.

Average yearly occurrence of fires within the WDO amounts to 51 fires for 77,454 acres during the period 1987-2006. This reflects changes that may vary radically during periods of high fire occurrence and large loss of acres. Over 100,000 acres were burned in each of the following years: 1996, 1999, 2000, and 2001. More than 200,000 acres burned in 1996, 1999, and 2000 (see Table 3-19).

Fire Ecology

The WDO has seen an increase in acres lost due to the significant increase of cheatgrass, as well as an accelerated fire return interval and frequency in cheatgrass infested areas below 6,500 feet. As a result, it is estimated that 2 percent of desert sink scrub, 12 percent of the saltbush scrub, 23 percent of sagebrush scrub, 2 percent of the riparian habitat, 4 percent of meadows, and 6 percent of the woodland was impacted by fire. Fires that historically would occur in sage-perennial grass at a return interval of 50 to 85 years, and in the salt desert shrub at a return interval of 100 to 125 years have shown a trend downward to the five- to eight-year range. This has resulted in more aggressive suppression efforts by the WDO in an attempt to keep the remaining intact communities from burning. Fire size and fire intensity on the WDO correlate directly to conditions occurring during dry thunderstorms that produce most of the WDO wildfires. Strong gusty winds will carry fire through cheatgrass monotypes that have spread onto past burned areas, shadscale-cheatgrass, Wyoming big sage-cheatgrass, or Great Basin big sage-cheatgrass.

A natural fire regime is a general classification of the role fire would play across a landscape in absence of modern human mechanical intervention but including the influence of aboriginal burning. The five natural (historical) fire regimes within the WDO planning area are classified based on average number of years between fires (fire frequency) combined with the severity (amount of



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Winnemucca District Office RMP
Herd Management Areas

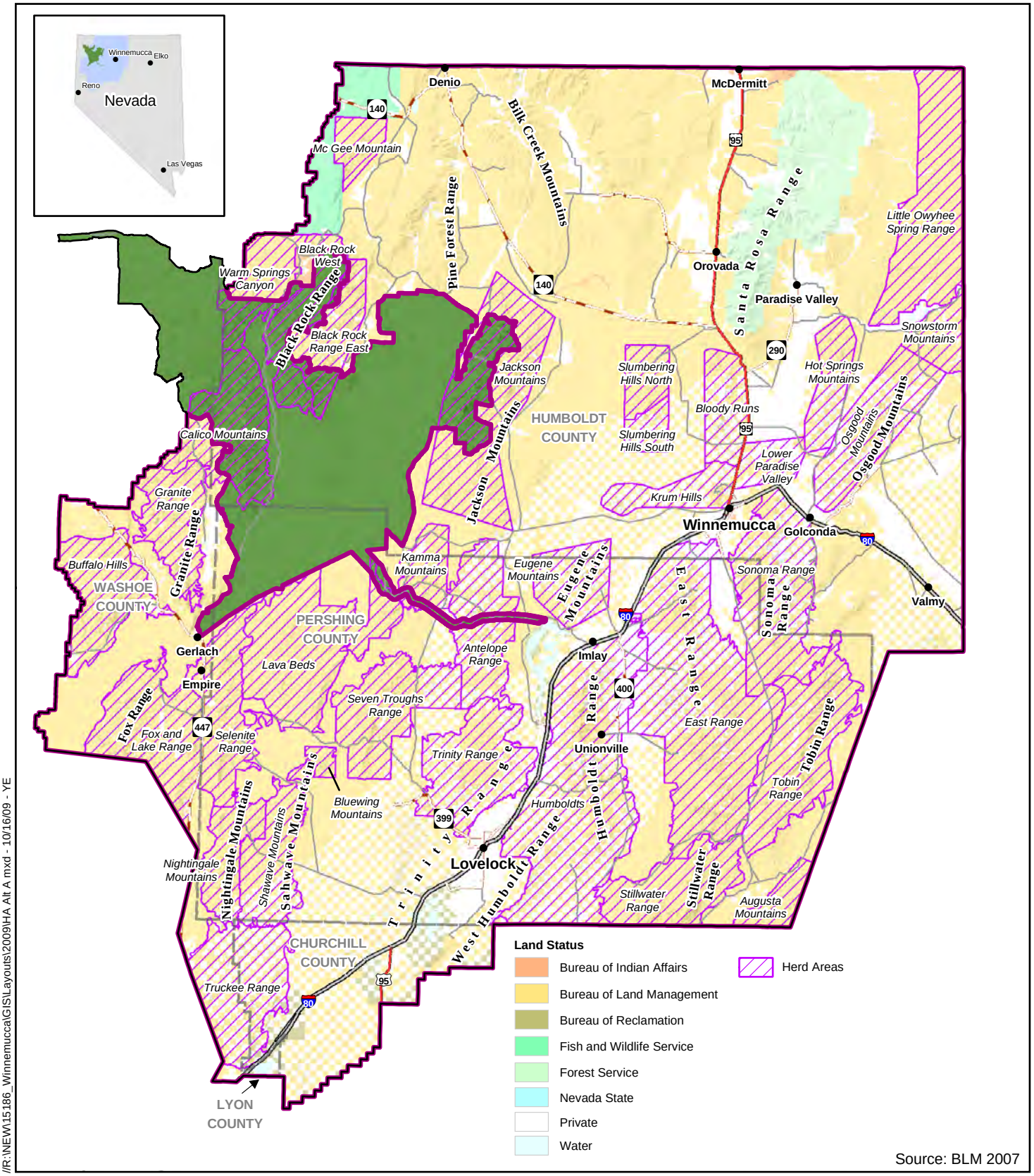
Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-17



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Winnemucca District Office RMP Herd Areas

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

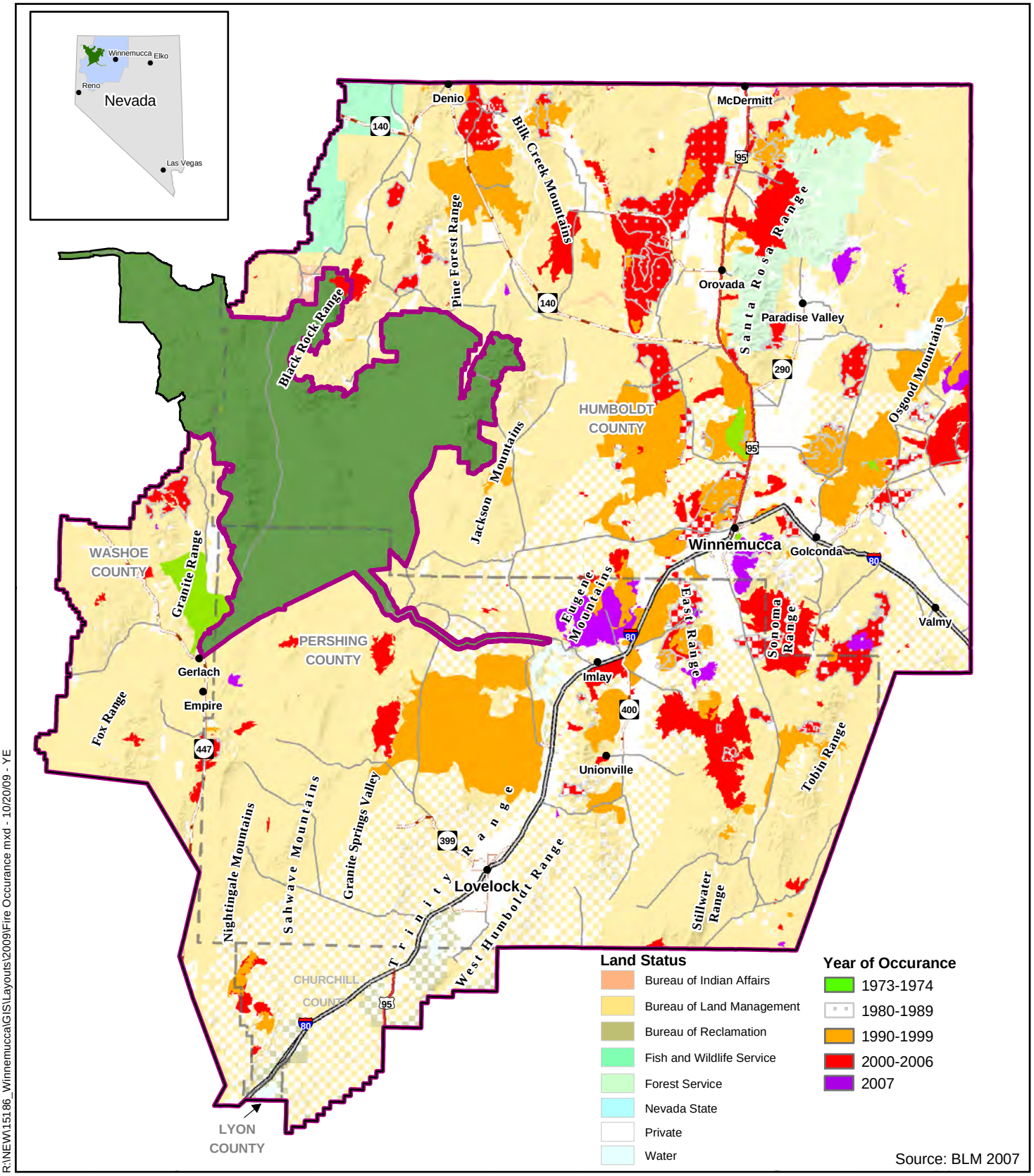
Figure 3-18

Table 3-18
Characteristics of HMAs and HAs

HMA or HA	Total BLM Acres	Population Estimate FY 2010	Appropriate Management Level
Antelope Range HA (NV211)	131,600	7 H	0
Augusta Mountains HMA (NV311)	182,900	305 H	185-308 H
Black Rock Range East HMA (NV209)	93,400	56 H	56-93 H
Black Rock Range West HMA (NV227)	93,200	56 H	56-93 H
Bloody Runs HA (NV204)	74,100	0	0
Bluewing Mountains HMA (NV217)	17,900	48 H & 29 B	22-36 H & 17-28 B
Buffalo Hills HMA (NV220)	132,400	477 H	188-314 H
Calico Mountains HMA (NV222)	157,200	200H	200-333 H
East Range HA (NV225)	451,900	37 H	0
Eugene Mountains HA (NV207)	86,100	0	0
Fox & Lake Range HMA (NV228)	177,300	236 H	122-204 H
Granite Range HMA (NV221)	101,700	155 H	155-258 H
Hot Springs Mountains HA (NV203)	68,200	0	0
Humboldt HA (NV224)	431,600	56 H	0
Jackson Mountains HMA (NV208)	283,000	472 H	130-217 H
Kamma Mountains HMA (NV214)	57,400	112 H	46-77 H
Krum Hills HA (NV206)	64,200	0	0
Lava Beds HMA (NV215)	233,000	213 H & 27 B	89-148 H; 10-16 B
Little Owyhee HMA (NV200)	460,100	773 H	194-298 H
Lower Paradise Valley HA (NV233)	44,900	0	0
Mc Gee Mountain HMA (NV210)	41,100	107 B	25-41 B
Nightingale Mountains HMA (NV219)	76,000	97 H & 4 B	38-63 H& 0B
North Stillwater HMA (NV229)	178,900	207 H & 1 B	138-205 H& 0B
Osgood Mountains HA (NV202)	142,100	0	0
Selenite Range HA (NV212)	125,300	0 H& 1 B	0 H& 0B
Seven Troughs Range HMA (NV216)	147,900	227 H & 79 B	94-156 H & 28-46 B
Shawave Mountains HMA (NV218)	107,100	107 H	44-73 H
Slumbering Hills North HA (NV205)	46,500	0	0
Snowstorm Mountains HMA (NV201)	117,100	309 H	90-140 H
Sonoma Range HA (NV223)	212,600	30	0
Slumbering Hills South HA (NV230)	30,100	0	0
Tobin Range HMA (NV231)	195,100	22 H	22-42 H
Trinity Range HA (NV232)	161,500	7 H	0
Truckee Range HA (NV213)	171,200	0	0
Warm Springs Canyon HMA (NV226)	91,700	105 H & 29 B	105-175 H & 14-24 B
TOTALS	5,186,300	4,314H & 248 B	1,974-3,233 H & 94-155 B

Notes: H = Horse; B = Burro

Source: Bryan, 2010.



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Winnemucca District Office Fire Occurrence

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca District Office Administrative Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-19

Table 3-19
Summary of 20-Year Wildland Fire History (1987 to 2006)

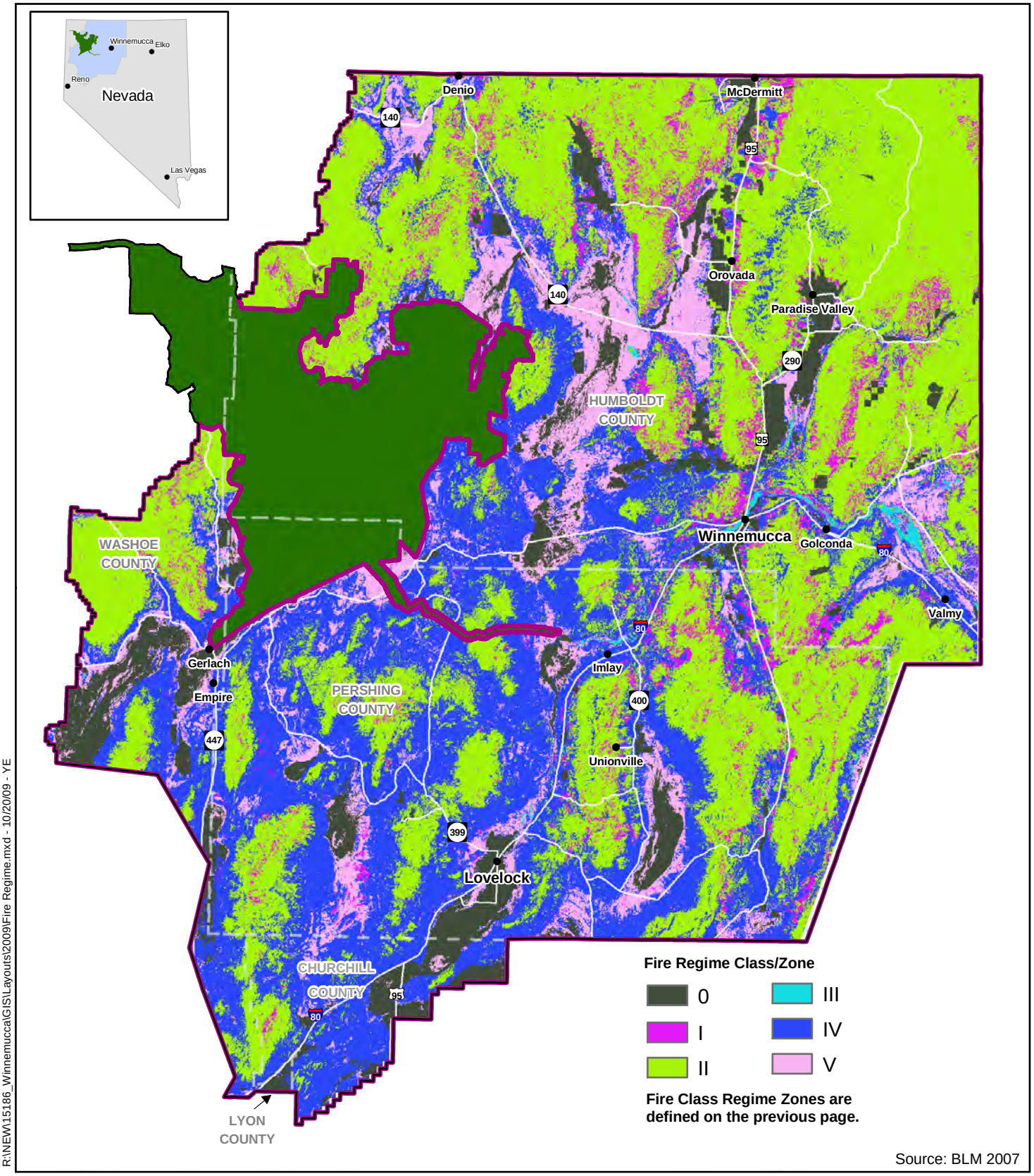
Year	Number of Fires*	Acres Burned
1987	67	32,986
1988	55	25,865
1989	14	12,165
1990	37	5,167
1991	39	7,720
1992	33	11,412
1993	28	2,676
1994	36	27,469
1995	75	38,609
1996	105	270,960
1997	61	21,915
1998	41	25,910
1999	82	599,492
2000	57	205,625
2001	92	172,511
2002	38	13,573
2003	31	1,462
2004	29	651
2005	29	7,586
2006	75	65,322
Grand Total	1,024	1,549,076

*Fires originating on BLM WDO may have burned more than just BLM lands.
Source: WFMI data base (8/13/2007)

replacement) of the fire on the dominant overstory vegetation. Natural fire regimes within the WDO planning area are identified in Figure 3-20 WDO RMP Fire Regimes and are described in Table 3-20.

Altered wildfire regimes are believed to be the single most important influence on loss of sagebrush scrub and habitat available to fish and wildlife and special status species (e.g., sage-grouse) in the WDO planning area. Most species of sagebrush are killed by fire. Repeated wildfires, fueled by the encroachment of other vegetation communities (e.g., juniper) and exotic annual cheatgrass and other exotic species, alter vast acres of sagebrush scrub in the planning area. Cheatgrass alters fire frequency from historic intervals of 35 to 100 years to shorter cycles of five years or fewer (Fire Regime II-0).

A fire regime condition class (FRCC) is a classification of the amount of departure from the natural fire regime (Hann and Bunnell 2001).Condition classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2002). There are three condition classes for each fire regime, based on a relative measure describing the degree of departure from the natural (historical) fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (e.g., species composition, structural stages); fuel composition; fire frequency, severity, and pattern; and other associated disturbance (e.g., insect-induced and diseased mortality, grazing, and drought).



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N
W E
S

0 10 20
Miles

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca District Office Administra ive Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns

Winnemucca District Office RMP
Fire Regime

Northwest Nevada

Figure 3-20

Table 3-20
Natural Fire Regime in the WDO Planning Area

Fire Regime	Frequency (years)	Severity	Number of Acres
0	N/A	N/A	1,294,809
I	0-35	Low and Mixed	608,962
II	0-35	Replacement	4,694,532
III	35-100	Mixed	29,990
IV	35-100	Replacement	3,421,542
V	200+	All	1,055,230

Source: BLM 2005e.

The FRCCs within the WDO planning area are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historical) regime. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside. FRCC within the WDO planning area is identified in Figure 3-21, WDO FRCC Acreages on Public Lands. Currently, approximately 7.4 million acres, or 79 percent of the WDO planning area, is moderately to highly outside of the historical range of variability (FRCC 2 and 3).

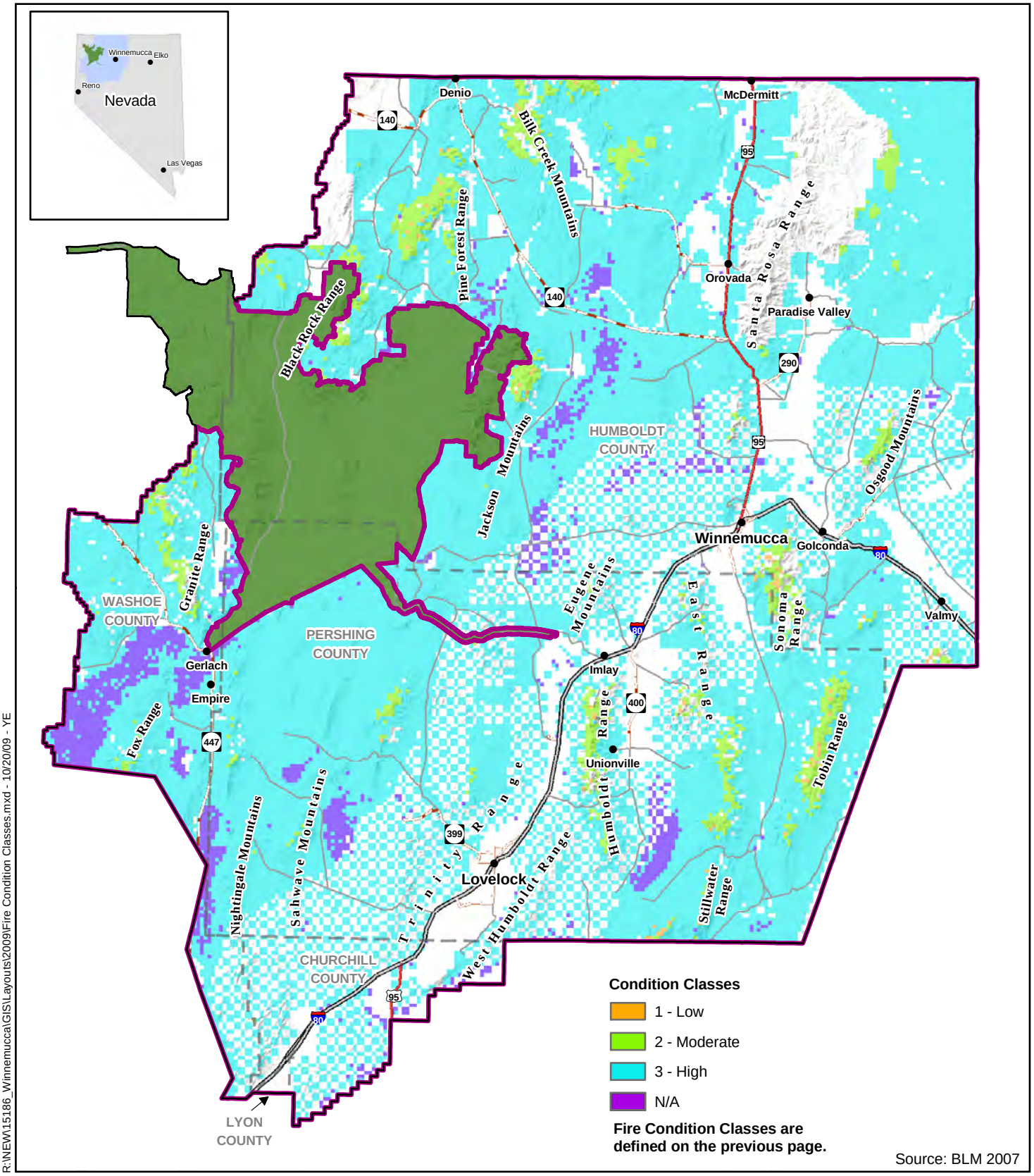
FRCC Fire Management Units (FMU) are specific land management areas defined by fire management objectives, management constraints, topographic features, access, values to be protected, political boundaries, and fuel types. A general classification of FMU category types within the WDO planning area are listed as follows:

- High value habitat (HVH);
- Special management areas, cultural;
- Special management areas, National Conservation Areas;
- Vegetation, cheatgrass;
- Vegetation, salt shrub desert sink; and
- WUI.

Figure 3-22 shows the location of FMUs in the WDO planning area by category types and management considerations. Table 3-21 gives a summary of all FMUs within the WDO planning area.

Twenty-seven FMUs were developed by an interdisciplinary team within the WDO and serve to define fire management objectives, physical characteristics, resource values, and treatment actions necessary to achieve resource management objectives, as identified in the WDO current land use plans. Management proposed for each of the individual FMUs is unique, as evidenced by strategies, objectives, and value attributes that set it apart from the management characteristics of an adjacent FMU.

These FMUs have dominant management objectives and pre-selected fire suppression strategies assigned to accomplish these objectives. The WDO FMUs will also be used in the fire program



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Winnemucca District Office RMP
Condition Class Acreages on BLM Lands

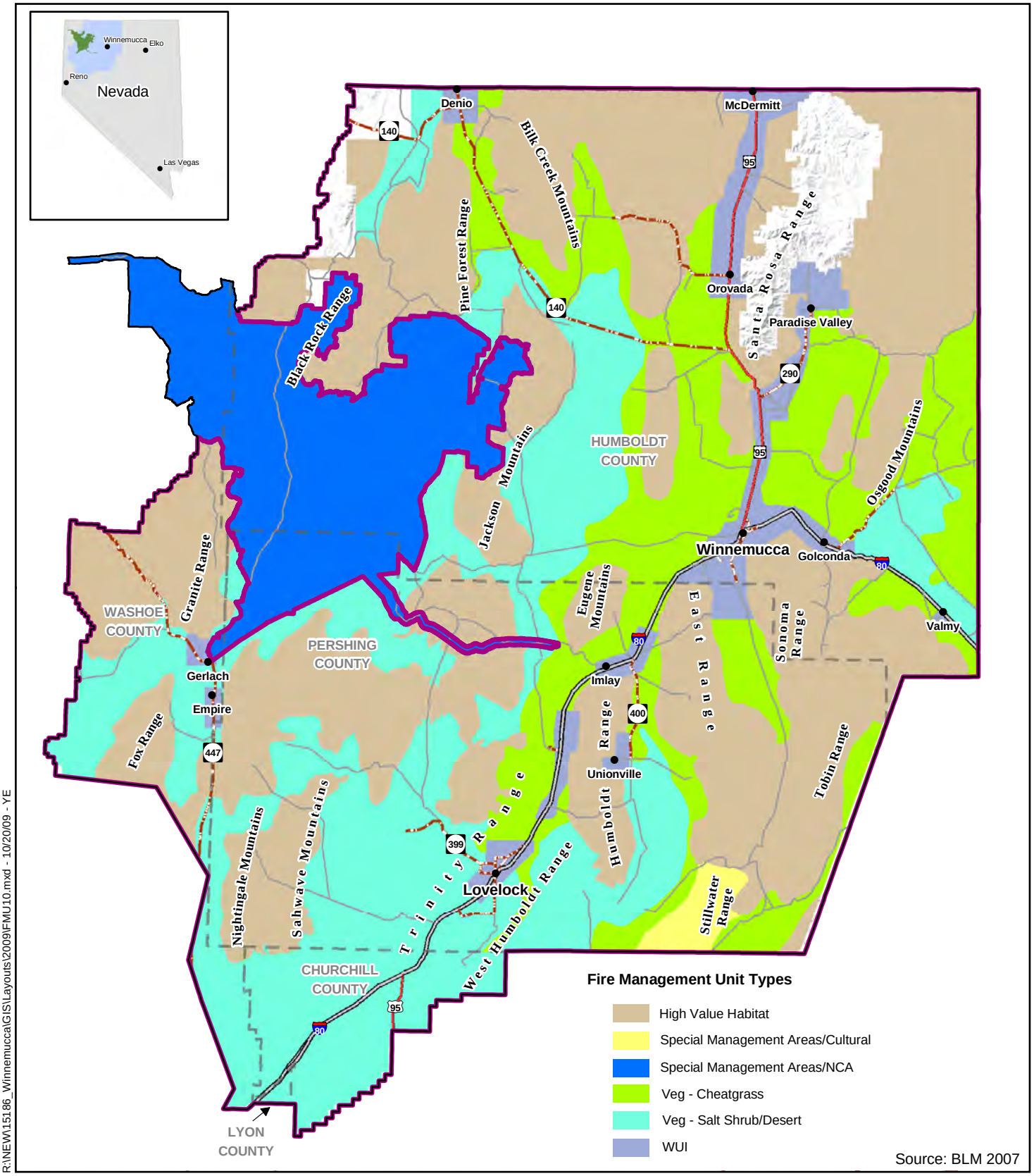
Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-21



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Winnemucca District Office RMP
Fire Management Units

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-22

Table 3-21
Summary of FMUs within the WDO Planning Area

FMU Number	FMU Name	FMU Type	Fire Regime	FRCC
NV 020-01	Hot Springs	Veg—Cheatgrass	II	FRCC 2 for the higher elevation sagebrush-perennial grass sites. The valley floors and foothills are in3 due to extensive cheatgrass establishment.
NV 020-02	Silver State	Veg—Cheatgrass	II	FRCC 2 (25%) and 3 (75%). Nearly all the valley floors are FRCC 3.
NV 020-03	Rye Patch	Veg—Cheatgrass	I-V	75% in Fire Regime IV. The entire FMU is in FRCC 3
NV 020-04	Valley	Veg—Cheatgrass	II	FRCC 3
NV 020-05	Iron Point	Veg—Salt Shrub/Desert Sink	I-V	75.5% in Fire Regimes IV and V. The FMU is all in FRCC 3.
NV 020-06	Trinity	Veg—Salt Shrub/Desert Sink	II	FRCC 3
NV 020-07	Desert Valley	Veg—Salt Shrub/Desert Sink	II	FRCC 3
NV 020-08	Continental Lake	Veg—Salt Shrub/Desert Sink	II	FRCC 3
NV 020-09	Black Rock Desert/ High Rock Canyon Emigrant Trails NCA	SMA/National Conservation Area	II	Most of the FMU is FRCC 3. The exception is an area of FRCC 2 in the Black Rock Range around Red Mountain and Pahute Peak
NV 020-10	I-80 Corridor Communities	WUI	I-V	Most (58.6%) in Fire Regime IV. The FMU is in FRCC 3, with a very small area in CC 2 (0.6%).
NV 020-11	Winnemucca/ Golconda	WUI	II	FRCC 3
NV 020-12	Paradise Valley	WUI	II	FRCC 3
NV 020-13	Orovada/ McDermitt	WUI	II	FRCC 3
NV 020-14	Denio	WUI	II	FRCC 3
NV 020-15	Santa Rosa	HVH	II	FRCC 3
NV 020-16	Montana Mountains	HVH	II	FRCC 3
NV 020-17	Pine Forest/ McGee Mtn.	HVH	II	FRCC 3 for most of the FMU, with the north end of the Pine Forest Range proper being an FRCC 2.
NV 020-18	Blue Wing/ Seven Troughs	HVH	II	FRCC 3, except for small areas on the Selenite Range and the northwest side of the Seven Troughs Range that are FRCC 2.

FMU Number	FMU Name	FMU Type	Fire Regime	FRCC
NV 020-19	Jackson	HVH	II	FRCC 2 on much of the FMU (60 percent), with approximately 30 percent in FRCC 3. Ten percent of the FMU is in FRCC 1.
NV 020-20	Humboldt	HVH	II	FRCC is 3 on approximately 60 percent of the FMU, with the remaining 40 percent at FRCC 2.
NV 020-21	East Range	HVH	II	Approximately 75 percent of the FMU is in FRCC 3. The remaining 25 percent is in FRCC 2, at the tops of the ridgelines on the East Range.
NV 020-22	Sonoma	HVH	II	The southern portion of the FMU is in FRCC 3. The northernmost third of the FMU is FRCC 2.
NV 020-23	Stillwater	SMA/CHP	II	FRCC 3
NV 020-24	Gerlach/ Empire	WUI	II	FRCC 3
NV 020-25	Valmy	WUI	II	FRCC 3
NV 020-26	Granite	HVH	II	FRCC 3 in approximately two-thirds of the FMU. The remainder (the bulk of the Granite Range itself) is in FRCC 2.
NV 020-27	Eugene Mtns./ Slumbering Hills	HVH	II	FRCC 3 for 80 percent of the FMU (all of the Slumbering Hills and the bulk of the Eugene Mountains). A small portion of the higher elevation of the Eugene Mountains is in FRCC 2.

Source: BLM 2005e.

analysis (FPA) planning process to define and develop the WDO fire management program requirements, budgets, and program organization.

The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources is based on the values to be protected, human health and safety, and the costs of protection (BLM). Once people have been committed to an incident, these human resources become the highest value to be protected. Wildfire management priorities are identified for each FMU

Fire Management

The 2001 Federal Wildland Fire Management Policy has established guiding principles for managing wildland fires on public lands. Ensuring firefighter safety and public safety is the first priority. Others include protecting human communities, infrastructure, and natural and cultural resources. These principles also recognize the role of wildland fire as an ecological process and natural change agent.

Fire Suppression

The WDO, in compliance with the 1982 Paradise-Denio and Sonoma-Gerlach Management Framework Plans (BLM 1982a, b), has an aggressive wildland fire suppression policy, with strategies to respond to wildfires based on social, legal, and ecological consequences of the fire in place. The circumstances under which a fire occurs, the consequences on firefighter and public safety, and natural and cultural resources to be protected dictate the response for each fire.

Allow Fire for Resource Benefit

Allowing fire for resource benefit recognizes the role of fire to protect, maintain, and enhance resources to improve ecological conditions. Wildland fires may be managed for resource benefit only if an approved fire management plan and wildland fire implementation plan are in place. These plans identify specific resource and fire management objectives, a defined geographic area, and prescriptive criteria that must be met. Currently there are no approved fire-for-resource-benefit areas within the WDO, with the exception of the Black Rock Desert-High Rock Canyon National Conservation Area.

Emergency Stabilization and Rehabilitation (ES&R)

Emergency stabilizations are planned actions taken to stabilize and prevent degradation of natural and cultural resources and to minimize threats to life and property resulting from the effects of fire. The WDO has established an aggressive emergency stabilization program to mitigate the adverse effects of wildfire. The emergency stabilization objectives are to:

- Minimize the threats to life or property;
- Promptly stabilize and prevent unacceptable degradation of natural and cultural resources;
- Repair damages caused by wildland fire in accordance with approved land use plans, regulations, policies, and all relevant federal, state, and local laws;
- Prescribe cost-effective post-fire stabilization measures necessary to protect human life, property, and cultural and natural resources;
- Repair or stabilize lands damaged directly by wildland fire that is unlikely to recover naturally from fire damage;
- Restore or establish healthy stable ecosystems in the burned areas, even if these ecosystems cannot fully emulate historic or pre-fire conditions; and
- Deter the establishment and spread of noxious weeds.

Fire rehabilitation includes efforts undertaken within three years of containment of a wildland fire to repair or improve fire-damaged land. The four objectives of fire rehabilitation are to:

1) Evaluate actual and potential long-term post-fire impacts on critical cultural and natural resources and identify those areas unlikely to recover naturally from severe wildland fire damage;
2) Develop and implement cost-effective plans to emulate historical or potential natural plant community with structure, function, diversity, and dynamics consistent with approved land

use plans, of if that is infeasible, then to restore or establish a healthy stable ecosystem in which native species are well represented;

3) Repair or replace minor facilities damaged by wildland fire; and

4) Deter the establishment and spread of noxious weeds.

Hazardous Fuels Reduction

Prescribed fire and nonfire fuel treatments (mechanical, chemical, and biological fuel breaks) are strategically situated to protect human communities and resource values, to aid in suppression operations, and to restore ecosystem health by reducing fire intensity or providing "anchor points" for fire suppression tactical operations. Fuel treatments may be seeded wherever residual vegetation is not adequately abundant to revegetate the sites to prevent establishment and spread of invasive weed species or to meet ecosystem health restoration objectives. The WDO is guided by the Cohesive Fuels Treatment Strategy, as defined in the National Fire Plan, with respect to fuel treatments.

Fire Mitigation, Education, and Prevention

The primary goal of the prevention program is to educate the public about wildland fire and to further reduce unwanted human-caused fire occurrence. Annually human-caused fires amount to 35 to 40 starts.

Community education efforts are held in conjunction with local and regional community service organizations and during special events, such as fairs, parades, ethnic festivals, and school programs. For example, in Winnemucca, a defensible space demonstration project is ongoing as part of the community garden (a nonprofit corporation operating an organic garden and arboretum providing valuable community space for small agriculture, education, and recreation). This demonstration includes information on how to landscape and maintain a residence with defensible space to prevent wildfire damage or reduce human-caused fires.

With the implementation of the BLM Rural Fire Assistance and Community Assistance programs and input from the Nevada Fire Safe Council, emphasis has been placed on providing suppression assistance to local fire departments and defensible space programs within local communities and counties where fire protection needs are higher than normal. In 2003, the WDO used Student Conservation Association teams to do community and neighborhood risk assessments. In addition, the WDO provides information to all communities about joining the Nevada Fire Safe Council and developing Community Wildfire Protection Plans. These plans have been developed in three communities to date: Unionville, McDermitt, and Rye Patch.

3.2.13 Cultural Resources

Cultural resources are past and present expressions of human culture and history in the physical environment and include prehistoric and historic archaeological sites, structures, natural features, and biota which are considered important to a culture, subculture, or community. Cultural resources also include aspects of the physical environment that are a part of traditional lifeways and practices, and are associated with community values and institutions. Historic properties are a subset of

cultural resources that meet specific eligibility criteria found at 36 CFR 60.4 for listing on the National Register of Historic Places (NRHP).

Cultural resources have been organized into prehistoric resources, historic resources, and ethnographic resources. Prehistoric resources refer to any material remains, structures, and items used or modified by people before Euro-Americans established a presence in northern Nevada. Historic resources include material remains and the landscape alterations that have occurred since the arrival of Euro-Americans. Ethnographic resources are places associated with the cultural practices or beliefs of a living community. These sites are rooted in the community's history and are important in maintaining cultural identity.

The vast majority of the recorded cultural resources on the land in the WDO area are archaeological sites. Approximately 500,000 acres, or about five percent of the land administered by the WDO, have been surveyed for cultural resources, documenting approximately 6,000 prehistoric and historic archaeological sites. Many sites have been determined to be eligible for the NRHP, but few have been formally nominated for listing on the NRHP, and many others have not been evaluated. The BLM is organizing and automating all cultural resource records and reports.

The area administered by the WDO was included in an ethnographic overview of lands in northern Nevada which provides the contextual basis for ongoing consultations between the BLM and contemporary tribes in northern Nevada on traditional cultural properties (TCPs), sacred sites, traditional use areas, and other culturally important places. The overview is a review, an analysis, and a synthesis of the ethnographic and ethnohistoric literature and archival materials (Bengston 2003). The BLM has recently prepared an ethnographic assessment focusing specifically on the WDO and is actively consulting with tribal groups to support this RMP/EIS (Bengston 2006). There may be places within the WDO that are important to other contemporary communities, such as those associated with ranching or sheepherding traditions and lifeways.

Prehistoric Period Resources

The planning area contains archaeological evidence of habitation and use that may date to 10,000 or 12,000 years ago, corresponding to the final high stand of prehistoric Lake Lahonton. The subsistence pattern of these earliest inhabitants is unclear, but there is substantial evidence for use of the grasslands and marshes that developed as the lake receded. In time, the drying became extreme, and those occupants who remained adapted to environmental conditions by using mountain, lake, and desert resources. The marshes and lakes of the valleys were used intensively when environmental conditions became more favorable and with the adoption of bow and arrow technology. At the time Euro-Americans arrived, small family groups continued to seasonally exploit widely scattered resources from upland, lake, river, and desert locations, coming together for communal game drives and cultural activities (Smith et al. 1983).

Prehistoric archaeological sites in the planning area range widely in complexity, environmental setting, location, and type. Sites include rock shelters, residential sites (with probable buried deposits), temporary camps, petroglyphs, pictographs, hunting blinds, quarry sites, and surficial lithic scatters. The WDO administers some of the most important archaeological sites in the development of Great Basin archaeology. For example, Lovelock Cave is listed on the NRHP. In addition to the length of time represented by these resources, a variety of behaviors is also indicated, including hunting and gathering, tool manufacture, trade and exchange, and spirituality.

In support of this RMP/EIS, the BLM has prepared a quantitative sensitivity model for prehistoric cultural resources on private and public lands in the WDO (King and Young 2006). The model estimates the densities and types of prehistoric cultural resources on lands that have not yet been inventoried. The completed sensitivity model is a geographic information systems (GIS) dataset that can be overlain with other land use and project planning GIS datasets. The model is a useful tool for assisting with land use planning decisions and prioritizing future inventory efforts. However, this sensitivity model is statistical and cannot predict the location of archaeological sites. The model is not a substitute for an archaeological survey and it cannot be used for archaeological clearance.

For prehistoric sites overall, predicted densities range from 2.2 sites per square kilometer (5.8 per square mile) in the low sensitivity rank, to 34.2 sites per square kilometer (88.7 sites per square mile) in the very high rank. Of the lands modeled, 40.9 percent were considered of moderate sensitivity rank (3.0 sites per square kilometer, 5.8 per square mile). High sensitivity was predicted for 28.5 percent of the lands (7.6 sites per square kilometer, 19.6 per square mile). Low sensitivity was predicted for 27.9 percent of the lands, and 2.5 percent were assigned the very high sensitivity rank. The BLM manages 1.2 percent of all lands in the WDO planning area that are in the very high sensitivity zone for prehistoric cultural resources (King and Young 2006).

Historic Period Resources

Similarly, historic period sites indicate a considerable amount of variation in the activities that attracted people to the region. Represented within the area managed by the WDO are mining and mining-related sites, transportation features (including historic trails and freight and stage roads), ranches and ranching-related features, homesteads, military sites, arbor glyphs and towns are all represented within the area managed by the WDO.

Mining

The earliest known prospecting by nonnatives in the area occurred in the mid-1800s. By the mid-1860s, the first mining districts were organized in the planning area. These historic mining districts still contain remnants of past activities, including prospects, shafts, adits, mining equipment, small structures, and foundations. Some of the better known historic mining districts include the Buckskin National District, Potosi District, Gold Run (Adelaide) District, Winnemucca District, Awakening District, Bottle Creek District, Sulphur (Rabbit Hole) District, Varyville, Rosebud, Scossa Districts, and the Warm Springs District.

Included in these districts are ghost towns and camps associated with the various "boom and bust" cycles characteristic of mining activity in the planning area. Some of the more prominent locations include Unionville, Star City, Dutch Flat, National, Red Butte, Humboldt City, Seven Troughs, Kennedy, and Dun Glen. The remains of these towns vary from multiple standing wooden structures and partial current occupancy to little more than a few stone foundations and scattered occupational debris.

Transportation

National events helped to mold the nature of historic resources within the planning area. The California Trail, initially established in 1841, became a key transportation route along the Humboldt River for emigrants traveling to California and western Oregon. With the discovery of gold at

Sutter's Mill in 1848, travel along the trail exploded. Between 1849 and 1852, approximately 175,000 emigrants bound for the California goldfields traveled along the trail.

Using maps from the earlier Fremont Expedition, the Applegate brothers blazed the Applegate Trail from Oregon through the area in 1846. Peter Lassen, in turn, incorporated the Applegate Trail into his 1848 Applegate-Lassen cutoff from the California Trail. Between 1859 and 1860, F. W. Landers developed the 1856 Nobles Route as part of the Honey Lake Wagon Road.

In 1992, Congress designated the California Trail as a National Historic Trail. The Applegate-Lassen Trail and Nobles Route are cutoffs from the main California Trail and are included in this designation. The Applegate-Lassen Trail segments in the planning area are formally listed on the NRHP. The National Park Service has prepared a Comprehensive Management and Use Plan/Final Environmental Impact Statement for the Oregon, California, Mormon Pioneer, and Pony Express National Historic Trails (USDI/NPS 1999).

In addition to these trails, there are remnants of numerous stage and freight roads dating from the mid-1860s in the planning area. Among the most important of these is the Idaho Stage Route, which was a transportation link between the Comstock and Humboldt mines and mining operations in southern Idaho in the early Territorial Period.

The Central Pacific Railroad began laying track eastward from Sacramento in 1863, and the first transcontinental rail line was completed through the planning area by late 1868. Remnants of the original grade of the transcontinental railroad can still be seen at many points along present-day Interstate 80. A second transcontinental line constructed by the Western Pacific Railroad was completed through the planning area from 1907 to 1909, spawning the development of several depot towns, including Jungo, Sulphur, and Gerlach.

Ranching/Homesteading

By the 1870s, huge numbers of cattle and later sheep were driven throughout the region, and large ranches were established within the WDO planning area. Among these large cattle operations were the well-known Miller and Lux Company. Remnants of these and smaller operations are numerous in the planning area and include abandoned wells, corrals, fencing, line shacks, and foundations.

Homesteaders followed the development of these ranches. Some tried to farm low lands, and others were agents for large ranching operations. Their traces remain as wood and stone houses, dugouts, foundations, irrigation systems, and fences scattered throughout the planning area. Some of these are still in use by modern ranching operations.

Ethnographic Resources

The planning area lies within the traditional territory of Northern Paiute, and to a lesser extent, Western Shoshone peoples. Historically, the Northern Paiute and Western Shoshone were organized in hunting-gathering bands that generally traveled great distances in seasonal rounds, subsisting on a variety of plants, insects, small game, and fish. Game animals available to Native Americans in the planning area included antelope, rabbits, bighorn sheep, mule deer, and a variety of small mammals, reptiles, and birds. Antelope and rabbits were often hunted communally.

Seeds and roots were the primary plant foods gathered. Plant and animal products were also used for clothing, shelter, and other functional and ceremonial articles. Some plants were used for medicinal purposes. Lithic sources provided materials for tool manufacture. Some minerals were also used medicinally or ceremonially.

Several contemporary Northern Paiute and Western Shoshone groups are within the WDO planning area: the Battle Mountain Band, Fallon Paiute-Shoshone Tribe, Fort McDermitt Tribe, Lovelock Paiute Tribe, Pyramid Lake Paiute, Winnemucca Tribe, and the Summit Lake Paiute Tribe. The Summit Lake Paiute Reservation was established in 1913 and includes the historic site of Fort McGarry. The Pyramid Lake Reservation, in the western portion of the planning area, was established in 1874. The Fort McDermitt Reservation, near the Oregon border, was a former US Army cavalry post that was converted to a reservation in 1889. Other Paiute and Western Shoshone groups outside of the planning area also retain cultural ties and interest in the WDO.

The BLM is required to consult with Native American tribes concerning the identification of cultural values, religious beliefs and traditional practices of Native American people which may be affected by federal actions. This includes the identification of physical locations that may be of traditional, cultural, or historical importance to Native American tribes. Executive Order 13175 requires federal agencies to coordinate and consult on a government-to-government basis with sovereign Native American tribal governments whose interests may be directly and substantially affected by activities on federally administered lands. Other laws, regulations, DOI guidance, and executive orders, require consultation to identify the cultural values, the religious beliefs, the traditional practices, and the legal rights of Native American people that could be affected by BLM actions on federal lands. These are the National Historic Preservation Act (NHPA) of 1966 (as amended), American Indian Religious Freedom Act of 1978, the Native American Graves Protection and Repatriation Act, DOI Secretarial Order No. 3215 (DOI 2000), 512 Department Manual Chapter 2 (DOI 1995), BLM Manual H-8160-1 (DOI 1994), and Executive Order 13007 Indian Sacred sites.

With the assistance of a contractor, BLM conducted an ethnographic assessment of the WDO planning area. The primary objectives of this study were 1) to conduct a thorough archival and literature review to identify and document Native American traditional occupancy and use of lands and resources, as well as previously recorded Native American places of cultural and religious importance, within the study area; 2) elicit contemporary concerns and recommendations for management of traditional resources and cultural and religious values from tribal leaders, elders, or representatives; 3) document the WDO's Native American consultation efforts; and 4) to elicit tribal recommendations for management of the lands administered by the WDO.

Representatives of 21 Native American tribes and one tribal organization that claim ancestral ties to, or traditional cultural use of these lands were contacted. The table below lists the tribes and organization that were contacted.

All of these tribal entities, except the Winnemucca Indian Colony and Inter-Tribal Council of Nevada, are federally recognized as defined in the Code of Federal Regulations Title 25 Part 83.7 (25 CFR Part 83.7). Consultation with tribes is ongoing.

Places that may be of traditional, cultural, or historical importance to Native American people include locations associated with the traditional beliefs concerning tribal origins, cultural history, or

Table 3-22
Tribes and Tribal Organizations Contacted for the Winnemucca District Office RMP/EIS

Nevada	California	Oregon	Idaho
• Inter-Tribal Council of Nevada (Organization) • Battle Mountain Band • Shoshone-Paiute Tribes of the Duck Valley Reservation • Fallon Paiute-Shoshone Tribe • Fort McDermitt Tribe • Lovelock Paiute Tribe • Pyramid Lake Paiute Tribe • Reno-Sparks Indian Colony • Summit Lake Paiute Tribe • Walker River Tribe • Washoe Tribe • Winnemucca Indian Colony • Yomba Shoshone Tribe	• Alturas Indian Rancheria • Cedarville Rancheria • Fort Bidwell Indian Community • Pit River Tribe • Susanville Indian Rancheria	• Burns Paiute Tribe • Klamath Indian Tribe • Confederated Tribes of the Warm Springs Reservation	• Shoshone-Bannock Tribes

the nature of the world; locations where religious practitioners go, either in the past or the present, to perform ceremonial activities based on traditional cultural rules of practice; ethnohistoric habitation sites; trails; burial sites; and places from which plants, animals, minerals, and waters possessing healing powers or used for other subsistence purposes, may be taken. Additionally, some of these locations may be considered sacred to particular Native American individuals or tribes.

The specific concerns expressed by Northern Paiutes and Western Shoshones are as follows:

- Disturbance of burials through mining development and rock sales;
- Disturbance of archaeological sites, regardless of National Register eligibility; some tribes oppose removing artifacts from sites for data recovery purposes;
- Disturbance of hot springs and other culturally sensitive places by energy development, mining, and motorized recreation;
- Disturbance of mountain peaks, considered to be sacred areas, by wind energy development and construction of communication sites;
- Disturbance of unique rock formations through rock sales and other activities;
- Disturbance of sage hen strutting areas;
- Disturbance of culturally important plant species in areas of mining development;
- Destruction of pine nutting areas due to Christmas wood cutting, commercial pine nut gathering, mining, fluid minerals development, and other factors;

- Destruction of medicinal and other plants, particularly in riparian zones and recreationists mechanically removing water and mud from hot springs to use in healing;
- Due to water development in and around springs, destruction of plants used for basketmaking and duck decoy manufacture; and
- Loss of access to lands traditionally used for plant gathering and hunting.

Additional tribal concerns regarding environmental management and socioeconomic issues are identified in Section 3.5.1 (Tribal Interests).

Approximately 110 locations or areas located within the administrative boundaries of the WDO have been identified or were previously documented as culturally significant to the Northern Paiutes or Western Shoshones (Bengston 2006). This does not preclude the possibility that there are other areas that have not been identified or that the boundaries or impact areas have been precisely defined. In some situations Indian participants may decline to provide specific information about sensitive areas for a variety of reasons. The BLM maintains strict confidentiality about certain types of information about traditional, cultural or religious properties. Location and content of traditional resources, religious sites, or burials are confidential within the confines of the law.

3.2.14 Paleontological Resources

No systematic field survey has been conducted for paleontological resources in the planning area. However, numerous paleontological localities have been identified by independent researchers. To prepare for a Unit Resource Analysis, BLM contracted paleontologist David Lawler (Lawler 1978; Lawler and Roney 1978) to review the literature, summarize previously known paleontological resources, and analyze the potential for unknown resources. Since then, paleontologists have identified numerous additional paleontological localities within the planning area. Many sedimentary units that lie within the assessment area are potential sites for fossils.

Some of the most important paleontological resources in the planning area include Mesozoic icthyosaurian fossils and Triassic hybodont shark remains. The former represent some of the earliest North American members of the reptilian group, while the latter are some of the few known occurrences in North America.

Fossil mammal and fish remains in the planning area include early horse, beaver, rhinoceros, two distinct species of fossil camels, mastodon, mammoths, a variety of fossil forms of rodents, and representatives of several other distinct families of mammals. The planning unit also includes a wealth of invertebrate paleontological resources, including ammonites, pelecypods, and brachiopods. Flora fossil types include rushes, willows, an abundance of fossilized wood of early conifers, and a variety of grasses, ferns, and other plant types.

The Lund Petrified Forest is a petrified wood paleoflora in Washoe County between Gerlach and Vya that includes a large variety of conifer species with affinities to *Calocedrus*, *Chamaecyparis*, *Abies*, *Picea*, *Pinus*, *Taxodium*, *Sequoia*, and *Sequoiadendron* and hardwood trees such as *Quercus*, *Fagus*, *Acer*, *Platanus*, and *Ulmus*. Lands surrounding the Lund Petrified Forest have been withdrawn from mineral entry and also from use for disposal sites.

The planning area also includes several sources of paleo-environmental information. These include fossil pollen sites, ancient woodrat middens, and quaternary sedimentary shoreline features and deposits related to Lake Lahontan history. Areas that have been continuously wet through time (e.g., springs and meadows) or, conversely, areas that have been continuously dry (e.g., dry caves or woodrat middens) are most likely to preserve fossil pollen records. Woodrat middens are found in dry caves and on cliff faces. Volcanic ashes are also important stratigraphic and chronological markers. The Trego Hot Springs area contains an important ash layer. Streams also have the potential to yield valuable information on changing stream flow and erosion through time. Information on fluctuations of Pleistocene Lake Lahontan is provided in wave-cut terraces, gravel bars, beaches, and tufa deposits

The BLM Potential Fossil Yield Classification system will be used to classify paleontological resource potential to assess possible resource impacts and mitigation needs for actions involving surface disturbance, land tenure adjustments, and land-use planning. This system replaces the Condition Classification in the Handbook (H-8270-1) for Paleontological Resource Management and uses geologic units as base data, which is more readily available to all users.

3.2.15 Visual Resources

Visual resources are the visible physical features on a landscape, such as land, water, vegetation, animals, and structures (BLM 2007b). The region of influence for visual resources is the 7.3 million acres of public land in the planning area of northwestern Nevada.

Visual Resource Management System

The BLM's policy is that visual resource values and management of values on public lands must be considered in all land use planning efforts and surface-disturbing activities. The goal is to accommodate resource management activities while protecting the visual environment, in accordance with the prescribed VRM objectives. Visual values must be considered and those considerations must be documented in the decision making process.

The proposed plan for development should demonstrate how the visual management objectives will be achieved and the visual impacts will be mitigated before approval will be granted for resource development/extraction. A reasonable attempt must be made to meet the VRM objectives for the area in question and to minimize the visual impacts of the proposal, in accordance with the policies and procedures described in the VRM Manual and Handbooks M-8400, H-8410-1, and H-8431-1.

The objective of the visual resource management (VRM) system is to manage public lands in a manner that will protect the quality of the scenic values of these lands. The BLM's VRM system provides a way to identify and evaluate scenic values to determine the appropriate levels of management. It also provides a way to analyze potential visual impacts and apply visual design techniques to ensure that surface-disturbing activities are in harmony with their surroundings. The BLM's VRM system consists of three stages: inventory (visual resource inventory), project planning, and analysis (visual resource contrast rating).

Inventory

The visual resource inventory process provides BLM managers with a means for determining visual values. The inventory consists of a scenic quality evaluation, sensitivity level analysis, and a

delineation of distance zones. Based on these three factors, BLM-administered lands are placed into one of four visual resource inventory classes, representing the relative value of the visual resources. Classes I and II being the most valued, Class III representing a moderate value, and Class IV being of least value. The inventory classes provide the basis for considering visual values in the resource management planning process. Visual resource management classes are established through the RMP process for all BLM-administered lands (see also Manual 1625.3). During the RMP process, the class boundaries are adjusted as necessary to reflect the resource allocation decisions made in RMPs. Visual management objectives are established for each class.

In 2009, the WDO conducted a visual resource inventory to characterize the visual resources on the lands it manages (BLM 2009a). Within the region of influence, WDO public land is characterized as follows:

- Visual resource inventory Class II: 316,310 acres;
- Visual resource inventory Class III: 1,731,788 acres; and
- Visual resource inventory Class IV: 5,158,845 acres.

It is important to note that Classes II, III, and IV are assigned based on combinations of scenic quality, sensitivity levels, and distance zones identified during the inventory process. Class I is assigned to all special areas where the current management situation requires maintaining a natural environment essentially unaltered by humans. Within the region of influence, these special areas are the WSAs (Figure 3-23). If a WSA is released from consideration as a wilderness area, the area would be managed according to its original inventory class listed above. By designating WSAs as Class I, however, the visual resource inventory is as follows:

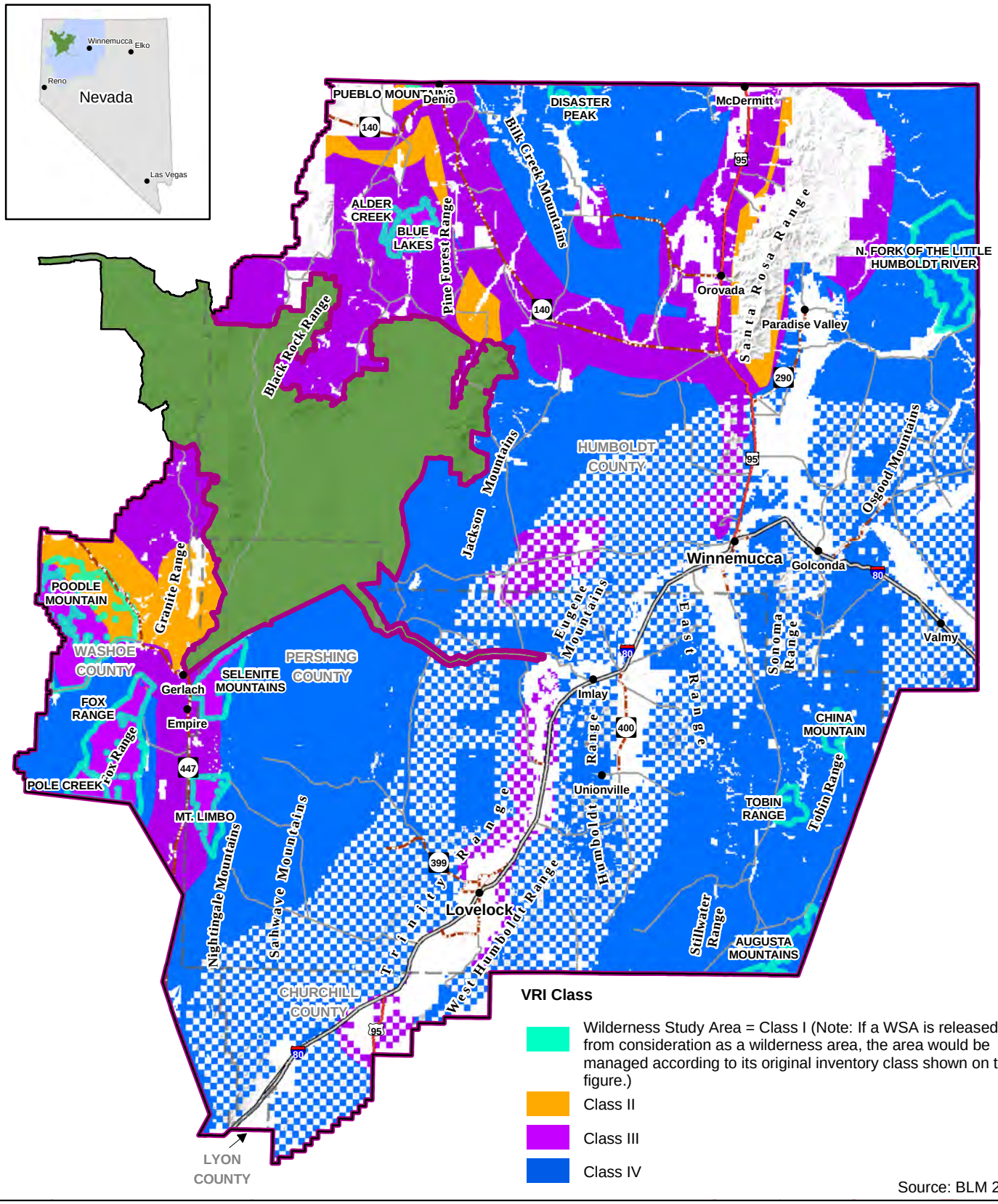
- Visual resource inventory Class I: 416,652 acres;
- Visual resource inventory Class II: 273,642 acres;
- Visual resource inventory Class III: 1,517,278 acres; and
- Visual resource inventory Class IV: 4,999,372 acres.

Project Planning

The project planning process involves an interdisciplinary team that provides general site design guidelines and typical design/mitigation procedures and examples. The systematic Visual Resource Contrast Rating Process (H-8431-1) is to analyze potential visual impacts of proposed projects and activities.

Analysis

The analysis stage involves determining whether the potential visual impacts from proposed surface-disturbing activities or developments will meet the management objectives established for the area, or whether design adjustments will be required. A visual contrast rating process is used for this



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Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Winnemucca District Office RMP
Visual Resource Inventory Class Areas

Northwest Nevada

Figure 3-23

Table 3-23
Bureau of Land Management Visual Resource Class Descriptions

BLM Visual Resource Class	BLM Visual Resource Class Description
I	Objective: Preserve landscape character. This class provides for natural ecological changes but does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	Objective: Retain existing landscape character. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract a casual observer's attention. Any changes must repeat the basic elements of line, form, color, and texture found in the predominant natural features of the characteristic landscape.
III	Objective: Partially retain existing landscape character. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate a casual observer's view. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	Objective: Provide for management activities that require major modification of the landscape character. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic landscape elements.

Source: BLM 1986

analysis, which involves comparing the project features with the major features in the existing landscape using the basic design elements of form, line, color, and texture. This process is described in BLM Handbook H-8431-1, Visual Resource Contrast Rating. Visual contrast ratings are performed for projects proposed within areas designated as VRM Class I, II, and III, and visual simulations would be prepared as a means for disclosing visual impacts and the effectiveness of the mitigation plan. A visual contrast rating is not required for areas designated as VRM Class IV; however, minimizing visual impacts is still required and is to be reflected in the proposed development plan.

The analysis can then be used as a guide for resolving visual impacts. Once potential impacts on visual resources have been identified for each location, visual design considerations would be incorporated into proposed surface-disturbing projects on a case-by-case basis. Mitigation measures, using the following design techniques, would be developed for each site to minimize adverse impacts on visual resources and to maintain visual resource class objectives:

- Choose site locations to minimize adverse effects;
- Minimize disturbance during construction;
- Repeat form, line, texture, and color in the design elements;
- Select color for exterior building materials;
- Be sensitive when grading to minimize variations in natural topography;

- Use appropriate reclamation and restoration during project closure; and
- Incorporate linear alignment in design.

Once every attempt is made to reduce visual impacts, BLM managers can decide whether to accept or deny project proposals. Managers also have the option of attaching additional mitigation stipulations to bring the proposal into compliance.

General Visual Setting

The current condition of visual resource management is stable. For example, reclamation management strategies required by permits for mining and mitigation measures to design structures on BLM land to blend in with the natural background are used to minimize disturbances to the visual landscape.

Class I, the most protective class, is found in Wilderness Areas and Wilderness Study Areas. Class II and III areas are generally the scenic mountain ranges near communities and along Interstate 80, State Highway 95, and State Highway 140, and the other well-traveled corridors in the planning area. Also, the NCA in the northwest portion of the WDO area is Class II. Current Nevada policy is to manage the setting of historic trails to Class II. The remainder of the area is Class IV.

The scenic features of the management area are characteristic of the Great Basin area of the western United States. Gold and brown hills diffuse into steep rugged mountains (US Navy 1997). Alkali flats and low desert brush dominate the valley lowlands, allowing expansive views from the valleys to the surrounding mountains. The higher elevations support sagebrush, juniper, and pinyon pine, which provide visual diversity and contrasting darker color along ridgelines in the distant background. Vegetation grows low and evenly on the valley floor and primarily consists of monochromatic desert brush.

The planning area is within the northern Basin and Range physiographic province. Basin and Range landscapes in northern Nevada are characterized by elongated, generally north-south trending mountain ranges separated by broad open basins. This type of landscape allows for long viewing distances. The dominant natural features within the planning area includes steep rugged mountains, volcanic highlands and table lands, expansive valleys, dune fields, springs (hot and cold), streams, the Humboldt River, Little Humboldt River, Kings River, and Quinn River and associated floodplains and marshes. Human-made features include the emigrant trails, ranches, fences, irrigated and cultivated fields, power plants (two geothermal and one coal), I-80, other main and secondary roads, OHV trails, railroads, power lines, utility corridors, large open-pit mines, gravel pits, small dams along the river, one large dam at Rye Patch Reservoir, communication towers and repeaters, satellite dishes, and radio towers. Additionally there are several towns and communities within the planning area.

Noticeable valleys in the planning area are Granite Springs Valley, Desert Valley, Buena Vista Valley, Grass Valley, Dixie Valley, Jersey Valley, Quinn River Valley, Smoke Creek Desert, Pleasant Valley, Pumpernickel Valley, Buffalo Valley, Paradise Valley, and Kings River Valley. The visible ranges in the planning area are the Jackson Mountains, Trinity Range, East Range, Tobin Range, Sahwave Mountains, Humboldt Range, West Humboldt Range, Bilk Creek Mountains, Double H Mountains, Montana Mountains, Pine Forest Range, Black Rock Range, Granite Range, Fox Range, Seven

Troughs Range, Augusta Mountains, Sonoma Range, Tobin Range, Stillwater Range, Osgood Mountains, Buffalo Mountain, Lone Tree Hill, Majuba Mountain, Eugene Mountains, and Selenite Range. The planning area is drained by the Humboldt River. Rye Patch Reservoir in north-central Pershing County is another water feature visible in the planning area. Smaller water features in the planning area include Quinn River and Kings River in the northern planning area and Humboldt Sink in the southern portion of the planning area.

Public perception of and concern for visual resources is critical in land use planning. The visual character of the planning area is valuable to a spectrum of recreation users and sightseeing travelers. Receptors sensitive to visual resources on BLM land include people recreating and areas of human settlement. Recreation on BLM land includes the Labor Day weekend Burning Man festival, picnicking, wildlife watching, camping, biking, fishing, hunting, and photography. A large portion of the planning area is located along the Humboldt River and I-80 corridors, which contains the highest concentration of human-made features. Several communities are situated along this corridor, including Valmy, Golconda, Winnemucca, Mill City, Imlay, Rye Patch, Oreana, and Lovelock. Other areas are in more remote areas along major secondary routes and include the towns of Denio, McDermitt, Orovada, Empire, and Gerlach. These areas contain typical small community developments and facilities. The remaining parts of the planning area are in very remote locations where human-made features are predominantly ranch settings and access roads.

Ranch settings typically include small dwellings, outbuildings, barns, fences, trees, corrals, and fields. They are all on private lands, and only the larger features are visible from a distance. Newer buildings painted with light colors contrast with background landscapes. The ranches have been there for many years, and the structures tend to be weathered, blending in with the surroundings.

The mines in the area vary from highly visible to slightly visible depending on viewing distance and location. Large open pit, waste rock dumps, heap leach pads, and access and haul roads to the pits are the most visible distance features of mines.

Private residences on private lands are visible from a distance when traveling along local roads. Color contrasts between the private structures and the surrounding landscapes account for the high visibility.

3.2.16 Cave and Karst

Caves and rock areas provide day and night roosting habitat for bat species and are important elements needed to support the sensitive species in the planning area. They also provide opportunities for recreation. Lovelock Cave is listed on the National Register of Historic Places.

Karst features can occur in carbonate rock formations; however, no significant karst features have been identified in the WDO.

3.3 RESOURCE USES

3.3.1 Livestock Grazing

The primary laws that govern grazing on public lands are the Taylor Grazing Act of 1934, the Federal Land Policy and Management Act of 1976, and the Public Rangelands Improvement Act of 1978. The BLM manages grazing lands under 43 CFR Part 4100 and BLM Handbooks 4100-4180,

and it conducts grazing management practices through BLM Manual H-4120-1 (BLM 1984). In addition, the BLM must meet or ensure progress is being made toward meeting the Sierra Front-Northwestern Great Basin RAC Standards and Guidelines for Rangeland Health (Appendix E) for each allotment.

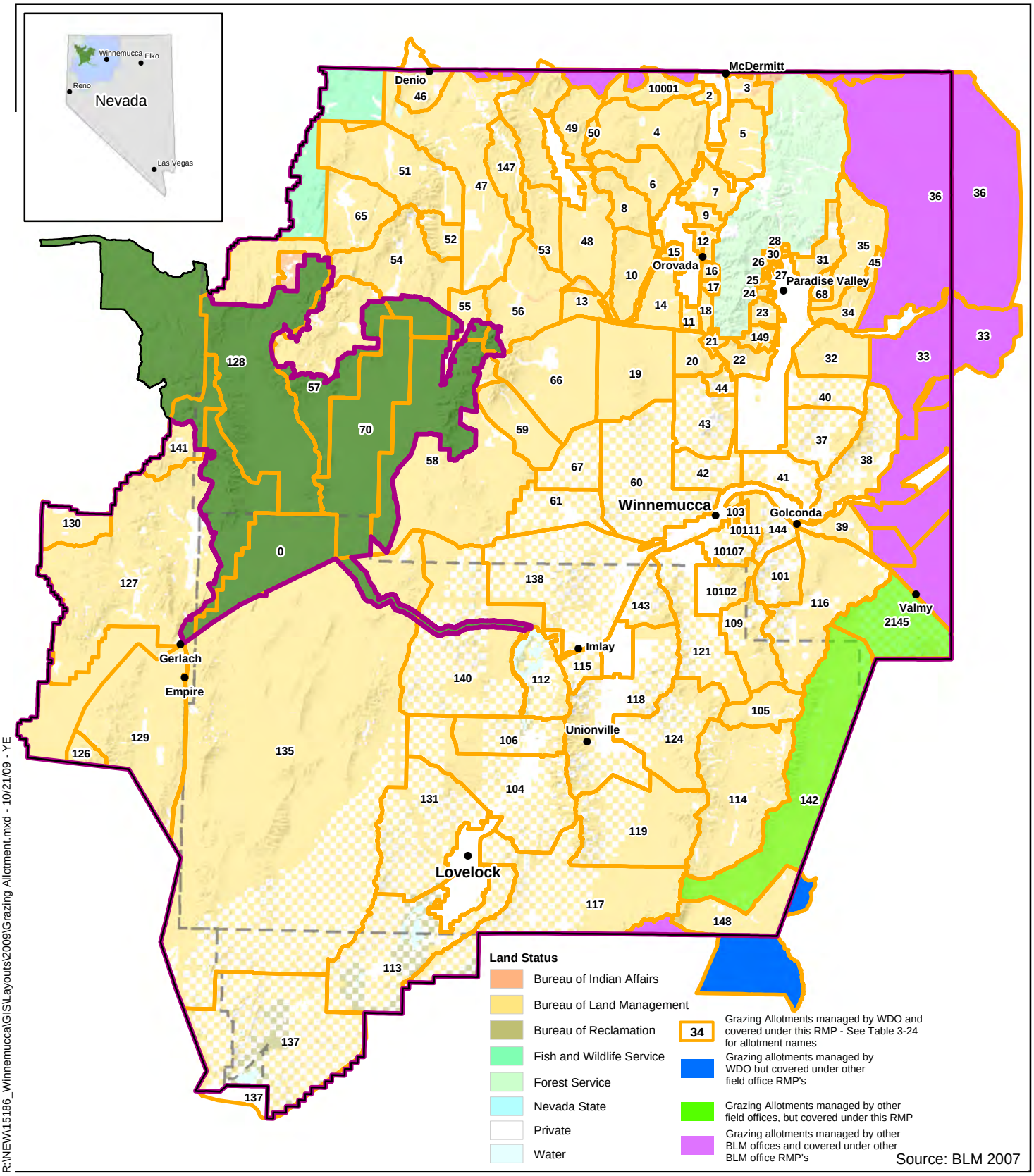
The WDO manages the livestock grazing on public lands administered by the BLM in Churchill, Storey, Washoe, Pershing, and Humboldt Counties. The WDO encompasses approximately 7.3 million acres of public land. There are 102 allotments (Figure 3-24), consisting of over 7,221,769 acres of BLM land, with the largest allotment averaging over 1,000,000 acres and the smallest allotments averaging 1,500 acres. BLM District Office boundaries were established after grazing allotments and they did not coincide with grazing allotment boundary lines. Therefore, the WDO administers a few allotments outside of the WDO administrative boundary, and, conversely, there are a few allotments within the WDO administrative boundary that are administered by other district offices under an MOU with the parent district office. A few examples are:

- The WDO administers the Bullhead and Little Owyhee Allotments, whose largest portions lie within the WDO boundary and the smaller portions are within the Elko District Office boundary;
- The WDO administers the Hole in the Wall Allotment within the Carson City District Office boundary; and
- The North Buffalo and South Buffalo Allotments are within the WDO but are managed by the Battle Mountain District Office; however they are covered under this RMP.

Most of the permittees are licensed to graze cattle with a few authorized to graze sheep and horses. Some grazing allotments are considered to be "common" allotments, meaning that there is more than one permittee authorized to run livestock. The grazing year begins March 1 and runs through February 28, with an average of 339,195 animal unit months (AUMs) harvested annually. Grazing usually begins in spring in the valleys and lower foothills and progresses to higher elevations in early summer. About half the permittees are authorized to graze livestock during the winter. Hay and private pasture provide forage for the remaining livestock through the winter. Most permittees adjacent to the Forest Service lands graze BLM lands in the spring and summer on the National Forest, and then return to BLM or private lands in the fall.

Two large land areas within the WDO, Smoke Creek Desert and the Old Gunnery Range, are not allocated to grazing. These two areas are not allocated because the range suitability criteria applied in the Sonoma-Gerlach and Paradise-Denio Grazing EIS, considered land not suitable for grazing because of inadequate vegetation production if the land was not able to produce one AUM of usable perennial vegetation per 32 acres. In order for land to be considered available, it must produce 25 pounds of usable vegetation per acre annually, to provide one AUM on 32 acres. Since these areas are playas and do not produce 25 pounds of useable vegetation per acre annually, they were not allocated for livestock grazing.

Temporary exclosure areas may exist within individual allotments to protect other resources. For example, newly developed spring sources and wetland-riparian areas may be fenced to exclude livestock These exclosures are closed to livestock grazing unless specific resource prescriptions or objectives are approved by the authorized officer.



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Winnemucca District Office RMP Grazing Allotments

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns

0 10 20 Miles

Northwest Nevada

Figure 3-24

The WDO issues grazing permits for a period of ten years and reviews them before reissuance. Table 3-24 provides detailed information on livestock grazing by allotment. Final multiple use decisions (FMUDs), which guide livestock grazing, have been issued for 53 allotments.

Table 3-24
WDO Grazing Allotment Information

Allotment Name	RAS Number[1]	Acreages of BLM Land	Active AUMs	Season of Use	Livestock Type
Abel Creek	23	11,607	1,954	2/1-4/10	c
Alder Creek	51	123,362	5,913	4/1-8/15, 10/1-2/28	c
Andorno	18	9,578	873	4/1-10/31	c
Antelope	16	4,746	563	4/15-8/15	c
Asa Moore	44	7,074	685	4/1-9/15	c
Bilk Creek	147	40,999	3,030	4/1-10/31	c, s, h
Bloody Run	43	37,482	2,193	3/1-6/30, 7/1-8/11, 11/1-2/28	c
Blue Mountain	61	32,255	2,315	9/1-4/30	c
Blue Wing/Seven Troughs	135	1,192,775	20,114	3/1-2/28,11/1-5/31	s
Bottle Creek	66	132,485	3,434	4/1-1/31	c
Buffalo	17	3,650	338	4/1-5/31	c
Buffalo Hills	127	440,981	4,114	4/1-10/15	c
Bullhead	33	142,603	11,003	3/1-8/31, 11/1-2/28	c
Buttermilk	31	23,512	2,525	4/1-5/23	c
Chimney Creek	21	3,091	460	4/15-12/31	c
Clear Creek	109	48,370	2,931	3/1-2/28	c
Coal Canyon-Poker	104	97,828	3,144	3/1-2/28	c, s
Cordero	2	5,374	189	4/1-10/31	h
Coyote	130	34,337	3,051	4/1-10/30	c, s
Coyote Hills	53	38,315	2,633	1/15-11/28	c, h
Crowley Creek	6	49,983	3,303	4/1-12/23	c
Daveytown	19	107,305	5,165	11/1-2/28	c, h
Deer Creek	55	30,340	754	3/1-7/31, 10/01-12/31	c
Desert Queen	137	122,215	3,355	11/30 - 4/15	c
Desert Valley	59	56,965	1,596	4/1-9/30, 10/16-12/27	c
Diamond S	144	19,070	1,158	4/1-9/15	c
Dolly Hayden	121	53,154	1,067	12/1-1/31	c
Double H	10	47,275	1,687	4/1-10/31	c, h
Dyke Hot	52	23,346	1,636	3/1-2/28	c, h
Eden Valley	37	32,621	2,629	3/1-8/15, 10/15-2/28	c
Flat Creek	7	24,378	3,168	4/1-1/31	c
Ft. Mcdermitt	3	12,843	1,553	4/1-6/30	c
Fort Scott	26	2,702	361	5/4-8/3	c
Gallager Flat	14	34,707	1,720	10/1-4/15	c, h

Allotment Name	RAS Number[1]	Acreages of BLM Land	Active AUMs	Season of Use	Livestock Type
Golconda Butte	41	17,597	1,089	8/15-2/28	c
Goldbanks	105	37,526	2,350	12/1-4/19, 5/1-02/28	c, s
Granite	27	1,966	216	4/15-5/20	c
Hanson Creek	25	1,664	151	4/23-5/20	c
Happy Creek	56	95,126	3,724	4/1-8/30, 10/15-2/28	c, s
Harmony	10111	6,786	348	4/8-9/15	c
Horse Creek	49	39,165	4,449	4/15-9/14	c, h
Hot Springs Peak	32	53,198	2,536	3/1-7/10, 11/1-2/28	c
Humboldt House	112	22,550	728	10/15-4/15, 7/16-8/5	c, s
Humboldt Sink	113	60,666	1,582	4/1-11/30	c
Humboldt Valley	138	105,189	2,900	10/22-7/31	c
Indian Creek	29	960	250	4/15-5/31	c
Iron Point	39	20,221	1,240	3/1-3/31,11/1-2/28	c, h
Jackson Mountain	58	364,990	8,857	3/1-2/28	c
Jersey Valley	148	66,740	917	5/1-7/31, 8/1-11/30	c
Jordan Meadow	4	106,494	11,720	3/1-9/30, 11/1-12/31	c
Kings River	48	146,040	12,192	3/15-11/30	c
Klondike	124	83,451	4,610	3/15-11/30	c
Knott Creek	65	64,062	5,813	3/1-4/30	c
Leadville	141	54,013	1,291	5/1-10/15	c
Little Horse Creek	50	3,843	524	4/1-9/30	c, h
Little Owyhee	36	560,806	27,800	3/1-2/28	c
Long Canyon	20	27,025	1,697	4/1-9/13, 11/1-2/28	c
Lower Quinn	11	6,787	464	11/1-12/31	c
Majuba	140	186,083	3,325	10/15-6/30	c, s
Martin Creek	68	6,160	300	4/15-6/19	c
Melody	103	4,048	1,020	4/10-8/10	c
Mormon Dan	67	27,822	1,998	9/1-4/30	c
Mullinix	30	1,485	133	4/16-5/20	c
North Buffalo[2]	2145	55,390	3447	3/1-2/28	c, s
Old Gunnery Range	70	0	Not allocated	Not allocated	0
Osgood	38	48,535	3,387	3/1-8/31, 11/1-2/28	c
Paiute Meadows	57	168,538	4,299	3/1-10/6, 11/01-1/15	c
Paradise Hill	22	21,711	2,191	3/1-6/25, 11/1-2/28	c
Pine Forest	54	136,199	9,700	4/1-2/28	c, h
Pleasant Valley	114	173,405	10,553	3/01-12/31	c
Pole Canyon	126	13,863	540	6/1-9/30	c
Pole Creek	8	34,348	2,988	4/1-10/31	c

Allotment Name	RAS Number[1]	Acreages of BLM Land	Active AUMs	Season of Use	Livestock Type
Prince Royal	115	9,961	153	11/1-4/15, 6/5-6/14	c, s
Provo	149	9,878	1,120	3/1-5/20, 9/15-12/15	c
Pueblo Mountain	46	34,318	2,137	4/1-8/30,10/1-1/8	c
Pumpernickel	116	126,142	9,417	3/1-2/28	c, s
Ragged Top	131	85,920	Exchange of Use Only	12/1-4/24	s
Rawhide	119	126,645	2,740	1/01-10/31	c
Rebel Creek	12	8,376	1,000	4/1-5/30, 8/20-12/15	c
Rock Creek	101	23,275	2,392	4/1-10/31	c
Rodeo Creek	129	193,224	5,542	3/1-2/28	c
Rose Creek	NA	Part of Dolly Hayden	213	5/1-7/21	c
Ryepatch	106	40,019	1,981	11/1-4/15, 8/6-8/31	c, s
Sand Dunes	60	87,634	3,865	3/1-8/31	c
Sand Pass	42	20,985	887	3/1-7/31	c
Scott Springs	40	22,764	419	3/1-6/30, 11/1-2/28	c
Singus	24	2,774	350	4/5-5/20, 9/20-10/20	c
Sod House	13	21,012	382	4/1-6/15, 9/15-12/31	c
Soldier Meadows	128	329,129	12,168	7/15-4/30, 1/16-12/15	c
Solid Silver	28	1,901	246	4/20-5/20, 10/1-10/31	C
Sonoma	10102	20,089	1,485	4/22-8/20	c
South Buffalo[2]	142	233,446	122*	4/1-11/30	c
South Rochester	117	170,180	3,186 (WDO)/ 777(CCFO)**	1/1-10/31	c
Spring Creek	34	22,791	2,488	4/1-8/10, 12/1-2/1	c
Star Peak	118	81,356	3,075	4/1-10/31	c, s
Sugar Loaf	45	5,567	602	4/1-5/31, 7/25-7/31	c
Thomas Creek	10107	11,780	532	4/16-8/15	c
U C	5	45,248	12,902	3/1-8/31, 10/1-2/28	c
Upper Quinn River	15	6,291	436	11/1-2/28	c
Washburn	10001	32,213	1,464	1/1-8/31	c, h
White Horse	143	21,973	1,970	11/1-8/31	c
Wilder-Quinn	47	188,283	14,379	3/1-9/15, 11/1-2/28	c, s
William Stock	35	63,989	5,905	3/28-7/20	c
Willow Creek	9	8,127	1,536	3/1-5/31, 8/16-1/30	c

Notes: c=cattle; h=horses; s=sheep
[1]The Range Administration System (RAS) number also corresponds to the numbers identified on Figure 3-24.
[2]The North Buffalo and South Buffalo Allotments are managed by the Battle Mountain District Office; however they are covered under this RMP.
*Although the Battle Mountain District Office administers livestock grazing on the South Buffalo Allotment, the WDO administers a small grazing permit, consisting of 122 AUMs.
**The WDO administers livestock grazing on the South Rochester Allotment, with Carson City District Office administering a 777-AUM permit on the allotment, in conjunction with its Copper Kettle Allotment.

3.3.2 Minerals – Leasable, Locatable, and Salable

Leasable

Leasable minerals defined by the Mineral Leasing Act (February 1920; and 43 CFR 3000-3599, 1990) include the subsets leasable solid and leasable fluid minerals (BLM 2006a). Leasable solid minerals include coal, oil shale, native asphalt, phosphate, sodium, potash, potassium, and sulfur. Leasable fluid minerals include oil, gas, and geothermal resources. The rights to explore for and produce these minerals on public land may only be acquired through leasing.

While solid leasable minerals are present within the planning area, no significant production of these minerals is underway or anticipated. Leasable mineral areas exhibiting a priority for use include the oil and gas lease area at Kyle Hot Springs, areas formerly designated as Known Geothermal Resource Areas (KGRAs), hot springs, existing geothermal leases, and lease application areas. KGRAs were areas that the BLM determined, based on geologic and technical evidence, that a person with geothermal knowledge would spend money to develop the geothermal resource, areas that were located near wells capable of commercial production of geothermal fluids, or areas where there was a competitive interest in geothermal resource development (not a singular criterion existed). The BLM geothermal leasing regulation of July 2007 replaced the term KGRA with "lease areas" to identify potential lease areas. The most likely geothermal development sites are expected to be in areas adjoining or reasonably near power transmission facilities that have excess capacity.

Oil and Gas

Bedrock geologic mapping, gravity geophysical data, and 47 oil and gas test wells provide information on the geology of the WDO as it relates to oil and gas deposits (BLM 2006a). Detailed bedrock geologic maps of 1:250,000 quadrangles were compiled by the US Geological Survey by county and are available as electronic files from the Nevada Bureau of Mines and Geology.

The occurrence of oil and gas in the planning area is believed to be primarily restricted to geologically young basins. Almost all of the historical drilling activity in northwest Nevada, particularly within the WDO, has been focused in tertiary basins (BLM 2006a). Any fields discovered in the tertiary basins of the WDO are likely to be small, as high regional heat flow and faulting have worked together to destroy any large stratigraphic or structural traps that may have formed prior to basin and range faulting. The discovery of an oil and water mix in the Triassic-age Favret Formation indicates the potential for local occurrence of oil in rocks of an older age in the southern portion of the planning area (BLM 1993).

Although there has been considerable exploration drilling (47 wells) within the WDO, there are no producing oil or gas wells (BLM 2006a). Nine oil and gas exploration wells have been drilled since 1992 (one as recently as 2004), and three new wells were permitted for drilling in 2005 on existing oil

and gas leases in the Kyle Hot Spring area in Buena Vista Valley. Table 3-25 is a listing of wells drilled within the Planning Area showing operator, lease name, hole name, field name, county, permit number, permit date, drilled depth, spud date, completion date, and last activity date. Although this amount of drilling may seem like an adequate test of the area for oil and gas, even 46 dry holes are not unusual in areas without developed producing fields (Frontier Areas), particularly where the targets may be "blind" (not obvious from the surface) and buried beneath imbricate thrust sheets or deep sediment-filled basins.

There are three active leases in the WDO that encompass approximately 3,799 acres (Figure 3-25) (BLM 2006a). These leases are in the Neogene Basin playa area of the Buena Vista Valley (west of the Stillwater and East Ranges and east of Unionville) in the southeastern-most portion of the planning area. A number of oil and gas parcels, totaling approximately 244,000 acres of public land in Buena Vista Valley, the northern Stillwater Range and the Double H Mountains were offered for lease sales during March of 2006. There were no bids on any of these lands, which was likely due to very strict resource protection Lease Stipulations attached to the parcels. None of these parcels were offered for lease sales in either the June or September 2006 offerings.

Geothermal

The Winnemucca Planning Area is in the Great Basin, where there are two types of recognized geothermal systems: (1) magmatically induced systems; and (2) extensional fault systems associated with regionally high heat flow and active faulting (BLM 2006a). Groundwater circulating at depth in rocks heated by either of these systems can be used as a medium to transfer heat to the surface to be used either directly for heating buildings or by converting it into electricity. Geothermal energy resources are considered to be renewable.

Geothermal resources occur most often in areas where there is anomalously high heat flow caused by volcanism or near-surface magma or by some other exceptionally hot subsurface body. They often occur along fault or fracture zones, where fracturing allows groundwater to circulate to depths for warming prior to being circulated back toward the surface. The planning area has abundant geothermal resources, including thermal springs, where warm or hot water comes to the surface naturally, and thermal wells, which must be drilled, developed, and sometimes pumped.

The BLM issues permits for actions associated with developing geothermal resources on BLM-administered public lands, including exploration that creates surface disturbances (geophysical exploration is an exception), field development and operation, and close-out phases (BLM 2006a) (Figure 3-26). All lands within the WDO are open to geothermal resources leasing and development, with the exception of the BRD-HRC NCA, wilderness areas, wilderness study areas, community watersheds, the Mahogany Creek Natural Area, Pine Forest Closure Area, and critical wildlife habitat areas.

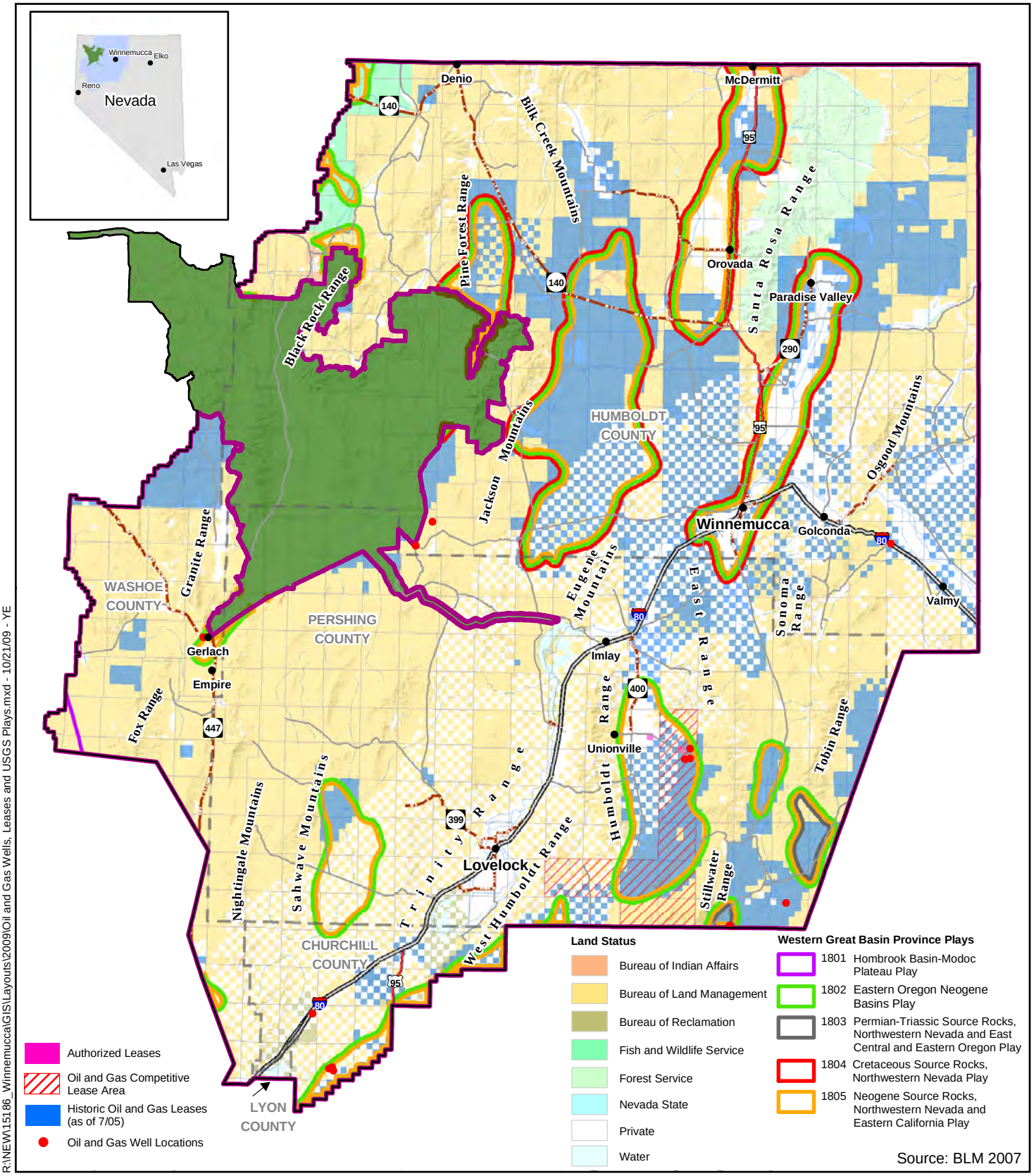
The BLM WDO prepared the *Geothermal Resources Leasing Programmatic Environmental Assessment* in 2002 (BLM 2002a) to expedite processing pending lease applications and to update the Winnemucca District Regional Geothermal EA for public lands within the assessment area. The *Geothermal Resources Leasing Programmatic Environmental Assessment,* completed in 2002, analyzed only those lands that were within areas outlined as potentially valuable for geothermal resource areas, the known geothermal resource areas, and the areas that had existing lease applications. These areas comprise

1 **Table 3-25**
2 **Oil and Gas Wells in the Winnemucca District Office Planning Area, Nevada**

Operator Current Name	Lease Name	Name	Field Name	County Name	Permit #	Permit Date	Total Drilled	Date Spud	Date Completion	Date Last Activity
BLACK ROCK O&G CO	GOVT	1	WILDCAT	HUMBOLDT		11/23/1921	800	12/3/1921	12/30/1921	12/1/1998
EARTH POWER PROD	N17278	45-14	WILDCAT	HUMBOLDT		9/20/1982	3703	9/30/1982	1/19/1983	12/1/1998
HUMBOLDT ASSOC	ELLISON	2	WILDCAT	HUMBOLDT	383	6/16/1984	1020	6/26/1984	7/4/1984	12/1/1998
HUMBOLDT ASSOC	ELLISON	1	WILDCAT	HUMBOLDT	268	11/4/1979	986	11/14/1979	7/3/1984	12/1/1998
SUN EXPL & PROD CO	KING LEAR-FEDERAL	1-17	WILDCAT	HUMBOLDT	347	4/7/1983	7931	4/17/1983	6/4/1983	12/1/1998
W PACIFIC RR CO	SULPHUR M P	474 67		HUMBOLDT		1909	970			
ARCO OIL & GAS CORP	ARCO TOBIN UNIT	1	WILDCAT	PERSHING	408	10/28/1984	2065	11/7/1984	12/6/1984	12/1/1998
CHEVRON U S A INC	KYLE-FEDERAL	84-2	WILDCAT	PERSHING		9/7/1980	2104	9/17/1980	10/11/1980	12/1/1998
EVANS BARTON LTD	KYLE SPRING	11-42A	WILDCAT	PERSHING	838	7/10/2001	607	7/24/2001		8/10/2004
EVANS BARTON LTD	KYLE SPRING	12-13D	WILDCAT	PERSHING	759	9/21/1995	1000	10/1/1995	6/1/1997	1/14/2004
EVANS BARTON LTD	KYLE SPRING	12-13	WILDCAT	PERSHING	730	8/2/1994	1162	8/12/1994	8/25/1994	1/23/2003
EVANS BARTON LTD	KYLE SPRING FED	11-14	WILDCAT	PERSHING	791	10/27/1996	2633	11/6/1996	6/1/1997	1/14/2004
EVANS DAVID M	KYLE SPRING	12-13	UNNAMED	PERSHING		10/27/1996	230	11/6/1996	11/6/1996	8/20/2003
EVANS DAVID M	KYLE SPRING FED	11-43	WILDCAT	PERSHING	821	7/13/1998	868	9/23/1998	12/20/2002	9/24/2004
EVANS DAVID M	KYLE SPRING FED	11-23	WILDCAT	PERSHING		5/12/1998	2020	8/1/2000	8/9/2000	5/30/2003
GETTY OIL COMPANY	FEDERAL	44-10	WILDCAT	PERSHING		3/3/1981	7964	3/13/1981	6/27/1982	12/1/1998
GETTY OIL COMPANY	FEE	14-22		PERSHING		3/3/1979	500	3/13/1979	3/14/1979	11/2/2001
GETTY OIL COMPANY	FEE	18-24		PERSHING		3/1/1979	500	3/10/1979	3/12/1979	11/2/2001
GETTY OIL COMPANY	FEE	17-24		PERSHING		2/28/1979	500	3/9/1979	3/10/1979	11/2/2001
GETTY OIL COMPANY	FEE	13-26		PERSHING		2/14/1979	500	2/24/1979	3/8/1979	11/2/2001
GETTY OIL COMPANY	FEE	6-6	WILDCAT	PERSHING		3/5/1979	500	3/15/1979	3/15/1979	12/1/1998
GETTY OIL COMPANY	FEE	15-21	WILDCAT	PERSHING		3/4/1979	500	3/14/1979	3/15/1979	12/1/1998
GETTY OIL COMPANY	FEE	16-22	WILDCAT	PERSHING		3/2/1979	500	3/12/1979	3/13/1979	12/1/1998
GETTY OIL COMPANY	FEE	10-34	WILDCAT	PERSHING		2/16/1979	500	2/26/1979	2/26/1979	12/1/1998
GETTY OIL COMPANY	FEE	11-36	WILDCAT	PERSHING		2/4/1979	500	2/14/1979	2/16/1979	12/1/1998
GETTY OIL COMPANY	FEE	5-8	WILDCAT	PERSHING		2/3/1979	500	2/13/1979	2/13/1979	12/1/1998
GETTY OIL COMPANY	FEE	4-16	WILDCAT	PERSHING		2/2/1979	500	2/12/1979	2/12/1979	12/1/1998
GETTY OIL COMPANY	FEE	7-4	WILDCAT	PERSHING		2/2/1979	500	2/12/1979	2/13/1979	12/1/1998
GETTY OIL COMPANY	FEE	3-10	WILDCAT	PERSHING		2/1/1979	500	2/11/1979	2/11/1979	12/1/1998
GETTY OIL COMPANY	FEE	1-12	WILDCAT	PERSHING		1/28/1979	500	2/7/1979	2/10/1979	12/1/1998
GETTY OIL COMPANY	FEE	2-2	WILDCAT	PERSHING		1/18/1979	500	1/28/1979	2/2/1979	12/1/1998
GETTY OIL COMPANY	FEE	8-34	WILDCAT	PERSHING		1/16/1979	500	1/26/1979	1/29/1979	12/1/1998
GETTY OIL COMPANY	FEE	9-34	WILDCAT	PERSHING		1/15/1979	500	1/25/1979	1/26/1979	12/1/1998
GETTY OIL COMPANY	FEE	12-26	WILDCAT	PERSHING		1/6/1979	400	1/16/1979	2/23/1979	12/1/1998
GETTY OIL COMPANY	IGH	2	COLADO	PERSHING		10/20/1979	1165	10/30/1979	11/18/1979	12/1/1998
OESI POWER		46-28M	HUMBOLDT	PERSHING	284	9/23/1991	260	10/3/1991	10/15/1991	12/1/1998
OUIDA OIL CO	DIXIE	1	WILDCAT	PERSHING	743	2/17/1995	4536	2/27/1995	5/24/1995	12/1/1998
PHILLIPS PETRLM CO	CAMPBELL	E-2	HUMBOLDT	PERSHING		12/27/1978	8061	1/6/1979	10/1/1979	12/1/1998
PHILLIPS PETRLM CO	CAMPBELL	E-1	WILDCAT	PERSHING		10/23/1977	1848	11/2/1977	12/10/1977	12/1/1998
TREGO WELL BLACK R DES	TREGO WELL			PERSHING			1500			
AMOR IV CORPORATION		32A-21	SAN EMIDIO DESERT	WASHOE		10/9/1988	1000	10/19/1988	10/26/1988	12/1/1998

Operator Current Name	Lease Name	Name	Field Name	County Name	Permit #	Permit Date	Total Drilled	Date Spud	Date Completion	Date Last Activity
CAITHNESS POWER		32-5	STEAMBOAT SPR	WASHOE	79	10/8/1987	3000	10/18/1987	11/8/1987	12/1/1998
CHEVRON GEOTHERMAL		28-32		WASHOE	67	3/11/1986	3031	3/21/1986	5/12/1986	12/1/1998
PHILLIPS PET-GULF	STEAMBOAT	1	WILDCAT	WASHOE		5/26/1979	3075	6/5/1979	7/16/1979	12/1/1998
PHILLIPS PETRLM CO	COX	I-1	WILDCAT	WASHOE		3/22/1981	3471	4/1/1981	7/1/1981	8/20/2003
SUNOCO ENRGY DEV CO	HOLLAND LIVESTOCK	1-2-FR		WASHOE		2/6/1979	5210	2/16/1979	4/26/1979	2/26/2002
SUNOCO ENRGY DEV CO	HOLLAND LIVESTOCK	1-15G	WILDCAT	WASHOE		12/7/1978	5871	12/17/1978	2/20/1979	12/1/1998

1 Source: BLM 2006a



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No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Winnemucca District Office RMP
Oil and Gas Wells, Leases and USGS Playas

Legend

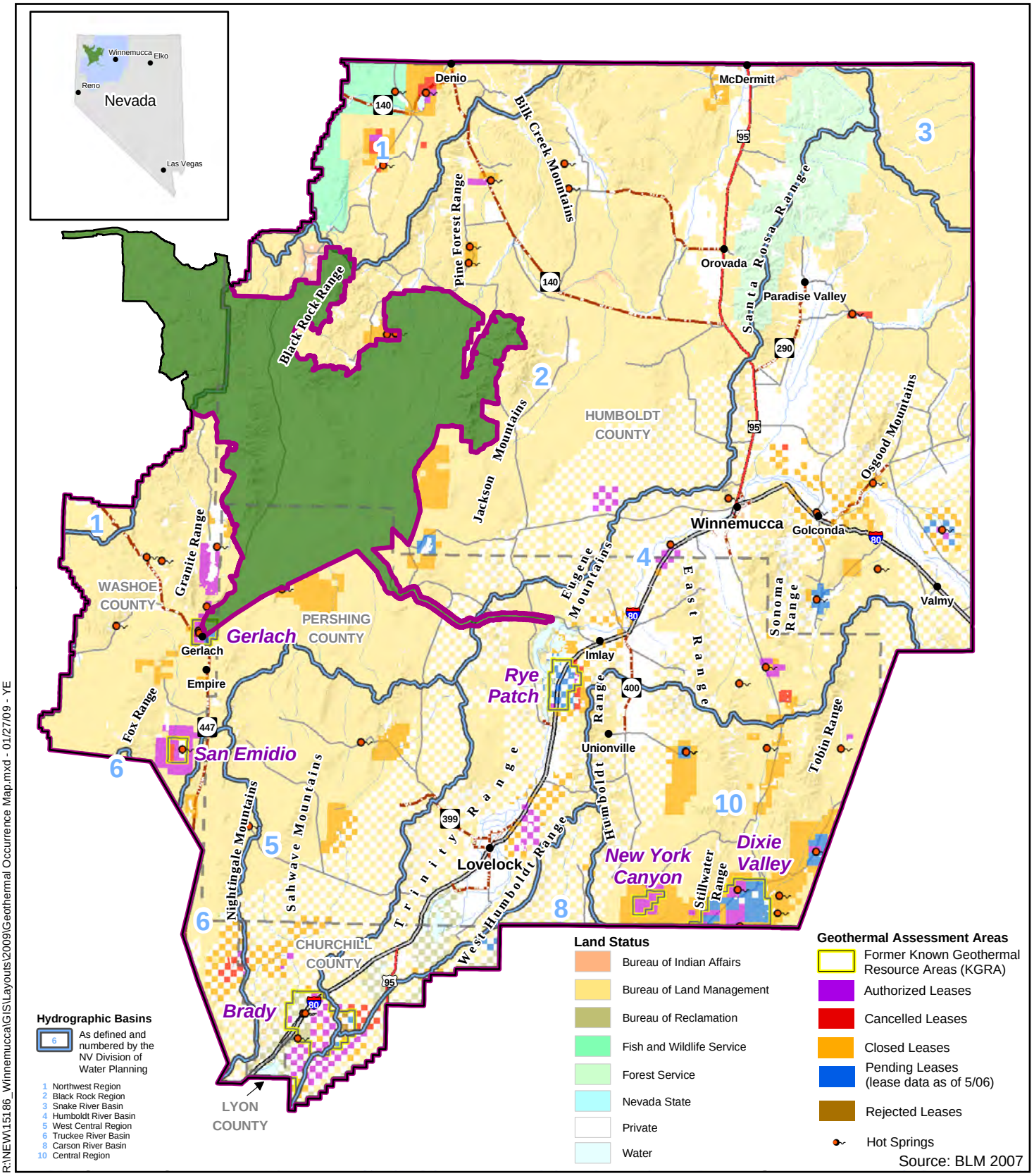
- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

N W E S

0 10 20 Miles

Northwest Nevada

Figure 3-25



Land Status

- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Fish and Wildlife Service
- Forest Service
- Nevada State
- Private
- Water

Geothermal Assessment Areas

- Former Known Geothermal Resource Areas (KGRA)
- Authorized Leases
- Cancelled Leases
- Closed Leases
- Pending Leases (lease data as of 5/06)
- Rejected Leases
- Hot Springs

Source: BLM 2007

Hydrographic Basins

6 — As defined and numbered by the NV Division of Water Planning

1 Northwest Region
2 Black Rock Region
3 Snake River Basin
4 Humboldt River Basin
5 West Central Region
6 Truckee River Basin
8 Carson River Basin
10 Central Region

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Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Winnemucca District Office RMP Geothermal Occurrence

Northwest Nevada

Figure 3-26

about 28 percent of the land within the WDO and are mainly in the southern half of the planning area.

There are six former KGRAs within the WDO (BLM 2006a). The former KGRAs in WDO were Brady, located in the southwest corner of the planning area in Churchill County; San Emidio, located north of Pyramid Lake on the western edge of the planning area in Washoe County; Gerlach, located just north of San Emidio, also in Washoe County; Rye Patch, located off of US Interstate 80 near Rye Patch Reservoir about 40 miles west of Winnemucca in Pershing County; New York Canyon, located near the southeast corner of the planning area, also in Pershing County; and Dixie Valley, which straddled the planning area boundary and was located in both Pershing and Churchill Counties. The 2003 BLM/National Renewable Energy Laboratory study identified the WDO as one of the BLM planning areas with the highest potential for geothermal resources. The top sites for geothermal development were the Brady, Rye Patch, San Emidio, and Dixie Valley KGRAs.

Geothermal energy resource exploration and development has increased dramatically in the past four years, with 109 geothermal leases, five pending geothermal applications, and six KGRAs within the planning area (BLM 2006a). Two large and one small geothermal exploration projects were permitted in 2006 and 2007. The Blue Mountain Drilling Plan of Operations was approved in February of 2006 for seven production wells and five temperature gradient holes. A 30- to 40-megawatt power plant is anticipated to come on line at the Blue Mountain project area in 2009. The Gerlach Green Energy production well was approved in July of 2006 but was never completed. The Jersey Valley Drilling Plan of Operations was approved in June of 2007 for three observation wells and three production wells. In addition, there are three power plants and two vegetable dehydration plants in operation within the planning area administrative boundary. The power plants are located at Brady Hot Springs, Desert Peak, and in the San Emidio Desert and range in generation capacity from 5.8 to 30 megawatts. A 12-megawatt power plant is anticipated to be in production in the near future at the former Rye Patch KGRA. There is also one power plant in the former Dixie Valley KGRA, but it is south of the planning area**.** The dehydration plants are located at Brady Hot Springs and San Emidio Desert.

In June 2007, the BLM Geothermal Leasing Regulations were updated based on the 2005 Energy Policy Act. The new regulations have disbanded KGRA areas, and all leases are now considered competitive. In August 2007, all parcels offered were leased. The geothermal industry continues to place a high emphasis on public lands being offered for lease. Two lease sales will be offered each year.

Currently the BLM and the USFS are preparing the Programmatic EIS for Geothermal Leasing in the Western United States. This EIS addresses what lands should be open or closed to geothermal leasing and presents standardized stipulations, restrictions, and mitigations for geothermal exploration, development, and production.

Locatable

Locatable minerals are minerals for which the right to explore, develop, and extract mineral resources on federal lands open to mineral entry is established by the location (or staking) of lode or placer mining claims as authorized under the General Mining Law of 1872, as amended (BLM 2006a). Mining is also regulated under 40 CFR 3802, Exploration and Mining, Wilderness Review

Program, 40 CFR 3809, Surface Management, and 43 CFR 6304, Uses Addressed in Special Provisions of the Wilderness Act, and other applicable federal regulations.

Lands within the jurisdiction of the WDO have a long history of minerals development dating back to the 1860s. Some of the locatable minerals that have been developed and mined include gold, silver, mercury, tungsten, manganese, molybdenum, copper, barite, sulfur, gypsum, limestone, iron, diatomite, and clay, as well as precious and semiprecious gemstones. In addition, uranium, lithium, and vanadium resources have been identified.

Gold and silver are by far the most important metallic minerals mined in the planning area and are produced from ten active mines (BLM 2006a). Most of these gold and silver mines have been in operation for a number of years and include Getchell Underground and Turquoise Ridge Mines, Hycroft Mine, Lone Tree Mine, Marigold Mine, Twin Creeks Mine, Coeur Rochester Mine, and Florida Canyon Mine. Table 3-26 lists the gold and silver deposits within the Planning Area by name, using the same identification number as that originally used by Davis and Tingley (1999). In addition to the metal mines, there are six active industrial mineral mines within the planning area, including two diatomite mines, two dolomite mines, a gypsum mine, and one opal deposit being mined in the Virgin Valley area in the northwestern portion of the planning area on land administered by the US Fish and Wildlife Service. Table 3-27 lists the industrial mineral mines, prospects, and deposits within the Planning Area. Major mines within the planning area are shown in Figure 3-27; some of these mines are inactive due to market conditions or are undergoing reclamation and closure. Most active mining is occurring between the Osgood Mountains and Battle Mountain, but there is significant activity in other locations within the planning area .

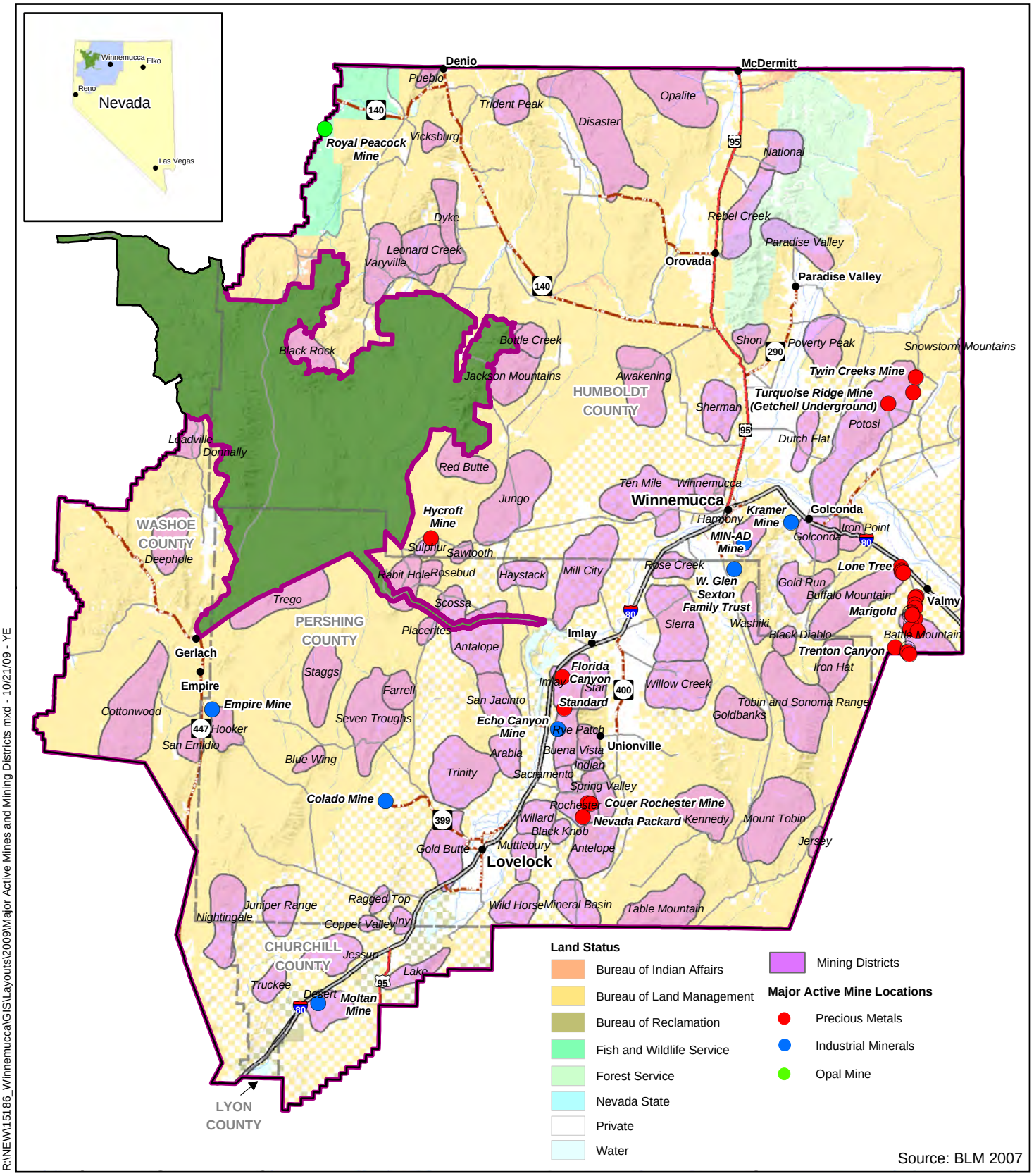
Mine sites administered by the WDO are summarized in Table 3-28. As indicated by the number of mines, gold is the primary mineral of interest in the planning area. Approximately 1.2 million ounces of gold were produced in 1995 in the WDO-administered boundaries; gold production in 2003 was 1.52 million ounces.

Intense exploration and associated claimstaking has occurred since 1982 in response to the discovery of large gold deposits. The amount of exploration and development has fluctuated with the price of gold. There are 23,334 active mining claims of various types, covering approximately 563,045 acres, on the federal surface estate within the planning area (BLM 2006a). The number of active claims for gold and other locatable mineral deposits in the planning area are presented in Table 3-29.

New development of mineral resources within existing claims and outside of current permitted mine boundaries at idle and active mine sites is possible as new ore deposits and extensions of existing ones are discovered. The development of these ore deposits will be influenced largely by the price of minerals in the marketplace and technological advances that lower the price to mine and process ore. Locatable mineral areas identified as exhibiting a priority for use include existing metal and industrial mineral mines and exploration projects and development of existing mining claims.

Salable

Salable minerals associated with the planning area include aggregate, sand, gravel, clay, pumice, cinder, petrified wood, boulders, and building, ornamental or specialty stone. The WDO has an active mineral materials sales program (BLM 2006a). The primary commodities produced in the



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Winnemucca District Office RMP
Major Active Mines and Mining Districts

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway
- Perennial Stream
- Intermittent Stream

0 10 20 Miles

Northwest Nevada

Figure 3-27

Table 3-26
Gold and Silver Mines and Prospects Mineral Assessment Report Winnemucca District Office EIS/RMP Planning Area

Mine #	County	Mine Name	Mine #	County	Mine Name
4	Churchill	Fireball Ridge	214	Humboldt	Kramer Hill
	Churchill	Jessup (7-10)		Humboldt	Lone tree (215-218)
7	Churchill	Central Jessup	215	Humboldt	Wayne Zone (Lone tree)
8	Churchill	North Jessup	216	Humboldt	East Zone
9	Churchill	San Jacinto Zone	217	Humboldt	NW-1
10	Churchill	So. San Jacinto Zone	218	Humboldt	Southeast Zone
	Humboldt	Adelaide Crown (191-192)		Humboldt	Marigold (219-232)
191	Humboldt	North Pit	219	Humboldt	5 North
192	Humboldt	South Pit	220	Humboldt	5 Northeast
193	Humboldt	Ashdown	221	Humboldt	8 North
194	Humboldt	Buckskin National	222	Humboldt	8 South
195	Humboldt	Elder Creek	223	Humboldt	30
	Humboldt	Getchell (197-200)	224	Humboldt	31 North
196	Humboldt	Bud Hill	225	Humboldt	31 South
	Humboldt	Getchell 1978-200)	226	Humboldt	East Hill
197	Humboldt	Central Pit	227	Humboldt	East Hill South
198	Humboldt	Hansen Creek Pit	228	Humboldt	Old Marigold
199	Humboldt	North Pit	229	Humboldt	Pond
200	Humboldt	South Pit	230	Humboldt	Red Rock
201	Humboldt	Powder Hill	231	Humboldt	Ridge
202	Humboldt	Summer Camp	232	Humboldt	Top
203	Humboldt	Turquoise Ridge	233	Humboldt	Pansy Lee
204	Humboldt	Turquoise Ridge shaft		Humboldt	Pinson (234-239)
205	Humboldt	Golden Sage	234	Humboldt	A Zone
206	Humboldt	Golden Shears	235	Humboldt	B Zone
	Humboldt	Hycroft (207-213) (Crowfoot/Lewis)	236	Humboldt	C Zone
207	Humboldt	Brimstone	237	Humboldt	CX
208	Humboldt	Gap Pit	238	Humboldt	Felix Canyon
209	Humboldt	Graveyard Pit	239	Humboldt	Mag
210	Humboldt	Lewis Pit	240	Humboldt	Preble
211	Humboldt	North Pit (Crowfoot)		Humboldt	Redline(241-242) (Converse)
212	Humboldt	South Central Pit	241	Humboldt	North Redline
242	Humboldt	South Redline	414	Pershing	Majuba Hill
243	Humboldt	Sandman	415	Pershing	Nevada Packard
	Humboldt	Sleeper (244-247)	416	Pershing	Relief Canyon
244	Humboldt	Office		Pershing	Rochester (417-418)
245	Humboldt	Sleeper	417	Pershing	East Pit
246	Humboldt	West Wood	418	Pershing	West Pit
	Humboldt	Trenton Canyon (248-254)	419	Pershing	Rosebud
248	Humboldt	North Peak	420	Pershing	Standard
249	Humboldt	Northwest Valmy	421	Pershing	Trinity

Mine #	County	Mine Name	Mine #	County	Mine Name
	Humboldt	Trenton Canyon (250-253)	422	Pershing	Wildcat (Tag)
250	Humboldt			Pershing	Willard (423-428)
251	Humboldt	East Pit	423	Pershing	Honey Bee Nose Pit
252	Humboldt	South Pit	424	Pershing	Section Line Pit
253	Humboldt	West Pit	425	Pershing	South Pit
254	Humboldt	Valmy	426	Pershing	South West Pit
255	Humboldt	Trout Creek	427	Pershing	Willard Draw Pit
	Humboldt	Twin Creeks (256-257)	428	Pershing	Willard Hill Pit
256	Humboldt	Chimney Creek		Washoe	Hog Ranch (436-444)
257	Humboldt	Rabbit Creek	436	Washoe	139
258	Humboldt	Winnemucca	437	Washoe	Airport
	Humboldt	Buffalo Valley (284-288)	438	Washoe	Bell Spring
284	Humboldt	A/B/O Complex	439	Washoe	East
285	Humboldt	Dore Hill	440	Washoe	Geib
286	Humboldt	North Margin Zone	441	Washoe	Hog Ranch
287	Humboldt	Roof Zone	442	Washoe	Krista
288	Humboldt	South Zone	443	Washoe	West
	Pershing	Bruce (406-408)	444	Washoe	White Mountain
406	Pershing	Discovery Zone	445	Washoe	Mountain View
407	Pershing	Santa Fe East Zone		Washoe	Olinghouse (446-447)
408	Pershing	Santa Fe West Zone	446	Washoe	Main Pit
409	Pershing	Clear	447	Washoe	North Pit
410	Pershing	Colado	448	Washoe	Wind Mountain
411	Pershing	Florida Canyon			
	Pershing	Goldbanks (412-413)			
412	Pershing	KW Zone			
413	Pershing	Main Zone			

Notes: *Other base metals are mined as well.
Source: BLM 2006a.

Table 3-27
Industrial Mineral Deposits of the Winnemucca District Office Planning Area Mineral Assessment Report Winnemucca District Office EIS/RMP Planning Area

Commodity	Deposit # This Report	County	Mine Name	Deposit # Map #142*
Stone, Building	1	Humboldt	Virgin Valley (Wegman Quarry)	9
Clay	2	Humboldt	Bull Basin (Montana Mountains)	8
Clay	3	Humboldt	Disaster Peak	9
Fluorspar	4	Humboldt	Sunset	7
Zeolite	5	Humboldt	Spring Creek	11
Zeolite	6	Humboldt	Chimney Reservoir	12
Barite	7	Humboldt	Anderson	37
Wollastonite	8	Humboldt	Getchell	3
Clay	9	Humboldt	Barret Springs	10
Silica	10	Humboldt	Stone Corral	13
Barite	11	Humboldt	Redhouse	38
Barite	12	Humboldt	Horton – Little Britches	39

Commodity	Deposit # This Report	County	Mine Name	Deposit # Map #142*
Sulfur	13	Humboldt	Sulphur	3
Carbonate	14	Pershing	W. Glen Sexton Mine	13
Silica	14a	Humboldt	Kramer Hill Mine	none
Clay	15	Pershing	Rosebud Canyon	27
Carbonate	16	Pershing	Min-Ad Mine East Range	14
Fluorspar	17	Pershing	Mammoth	34
Sodium Minerals	18	Washoe	Buffalo Springs	19
Gypsum	19	Pershing	Empire	20
Perlite	20	Pershing	North Trinity Range	16
Sulfur	21	Pershing	Humboldt House	4
Fluorspar	22	Pershing	Piedmont	35
Fluorspar	23	Pershing	Valery	36
Clay	24	Washoe	San Emidio	31
Diatomite	25	Pershing	Rye Patch	20
Carbonate	26	Pershing	Humboldt Range	15
Sulfur	27	Washoe	San Emidio	5
Diatomite	28	Pershing	Colado (Velvet District)	21
Perlite	29	Pershing	Trinity Range	17
Aluminum Minerals	30	Pershing	Champion	3
Fluorspar	31	Pershing	Needle Peak	37
Zeolite	32	Pershing	Lovelock	24
Perlite	33	Pershing	Pearl Hill (Velvet District)	18
Aluminum Minerals	34	Pershing	Lincoln Hill	4
Talc Minerals	35	Pershing	Humboldt Range Pinite	13
Pumice	36	Pershing	Lovelock	13
Clay	37	Pershing	Coal Canyon Deposits	28
Fluorspar	38	Pershing	Emerald Spar	38
Carbonate	39	Pershing	Buffalo Mountain	16
Zeolite	40	Pershing	Jersey Valley	25
Gypsum	41	Pershing	Lovelock area	21
Fluorspar	42	Pershing	Susie	39
Fluorspar	43	Pershing	Nevada Fluorspar	40
Clay	44	Pershing	New York Canyon (Stoker)	29
Gypsum	45	Pershing	Corn Beef	22
Silica	46	Washoe	Winnemucca Lake	18
Diatomite	47	Churchill	Nightingale (Truckee Range)	1
Zeolite	48	Churchill	Trinity Range	1
Carbonate	49	Churchill	Ocala	1
Stone, Building	50	Churchill	Trinity Range	1
Diatomite	51	Washoe	Nixon	26
Diatomite	52	Churchill	Trinity	2
Sodium Minerals	53	Churchill	White Plains	1
Diatomite	54	Churchill	Moltan Mine Desert Peak (Hot Spring Mountain area)	3
Stone, Building	55	Churchill	Black Mountain	2
Sodium Minerals	56	Churchill	Eagle Marsh	4
Sodium Minerals	57	Churchill	Carson Sink	3
Pumice	58	Churchill	Posalite	2

Commodity	Deposit # This Report	County	Mine Name	Deposit # Map #142*
Diatomite	59	Churchill	Black Butte	4

Notes: *Deposit number from Nevada Bureau of Mines and Geology Map 142 Industrial Minerals of Nevada. Source: BLM 2006a.

Table 3-28
Major Active Mines within the WDO Planning Area

Mine Name	Commodity
Nevada Packard	Silver
Turquoise Ridge and Getchell Underground	Gold
Hycroft	Gold
Lone Tree	Gold, Silver
Marigold	Gold, Silver
Twin Creeks	Gold, Silver
Coeur Rochester	Silver, Gold
Empire	Gypsum
Florida Canyon	Gold/Silver
W. Glen Sexton	Dolomite
Colado	Diatomite, Perlite
Moltan	Diatomite
MIN-AD	Dolomite
Standard	Gold, Silver

Source: BLM 2006a

Table 3-29
Locatable Mineral Claims within the Planning Area

Active Claim Type	Number of Active Claims	Total Claim Acres
Lode	21,576	431,520
Mill Site	313	1,565
Placer	1,444	129,960
Tunnel Site	1	Unknown

Source: BLM 2006a

planning area are sand and gravel. A minor quantity of decorative and building stone, clay, and decomposed granite is also sold to the public. There are about 65 active sales contracts and 112 free use permits issued to state and local government entities. In addition, there are about 170 material site rights-of-way issued to the Nevada Department of Transportation (NDOT) for sand and gravel operations.

3.3.3 Recreation and Facilities

Recreation

BLM-administered lands in the WDO provide opportunities for a wide variety of outdoor recreation activities and related benefits. While most recreation users participate in dispersed recreation activities, either individually or in small groups, others participate in organized events as participants

or spectators. Many types of dispersed and organized uses provide for a diverse range of visitor needs and expectations. The BLM manages a large percentage of the landbase in the region, making BLM lands a critical resource for providing recreation opportunities to visitors.

The Water Canyon Management Plan (BLM 1997), Porter Springs Recreation Management Plan (BLM 2007c), Pine Forest Recreation Area Management Plan (BLM 1992), and Bloody Shins Trail System Environmental Assessment (BLM 2001a) guide the management of recreation in these specific areas. Due to wildfires during the summer of 2007, most of the Water Canyon area was burned, however the area has since been revegetated and facilities have been added.

Not far from Lovelock, Nevada, is Porter Springs, a prehistoric cultural site, historic mining site, and modern "oasis in the desert." The spring, along with the surrounding trees, provides a striking contrast to the rugged nearby mountains and sweeping arid landscape of the Great Basin. The area provides habitat for a wide variety of animals, from wild horses and burros to migratory birds. Birdwatchers, hunters, campers, and other desert travelers enjoy the spot as a destination or rest stop during outings.

The Pine Forest Range is a site of unique environmental and recreational significance. Emerging from the Black Rock Desert, the Pine Forest Range rises out of desert sage to a subalpine coniferous forest. Of central focus to the site is the glacial moraine-dammed Blue Lake complex. Scattered about the site are numerous mountain meadows and a mix of curlleaf mountain mahogany and aspen forest, in addition to the coniferous forests.

Table 3-30 shows visitation estimates for the entire district and individual sites or areas. Estimates were derived from the Recreation Management Information System (RMIS), a BLM recreation database. Approximately 70,000 recreational users visited the WDO planning area in 2004; the Water Canyon and Pine Forest/Blue Lakes Recreation Areas accounted for over 20 percent of total visitor activity in this year. Winnemucca Mountain, which is in the Winnemucca urban interface, is increasing in popularity for area residents, accounting for more than 15 percent of total visitor activity.

Table 3-30
Local Recreation Visitation (2004)

Recreation Area	Annual Visitors
WDO Area (*includes all sites and dispersed uses*)	*70,000*
Winnemucca Mountain	11,275
Bloody Shins Mountain Bike Trail	8,875
Water Canyon Recreation Area	8,050
Pine Forest/Blue Lakes Recreation Area	8,000
Lovelock Cave Backcountry Byway	3,750
California National Historic Trail	2,000
Winnemucca Dry Lakebed OHV	1,400
Humboldt Range	1,300
Various Caves	75
Source: BLM 2004c	

Table 3-30a
Trends in Visitation (1994-2004)

	2000[1]	2001	2002	2003	2004
Visits	78,000	44,000	46,000	50,000	70,000
Visitor Days	160,000	48,000	57,000	62,000	74,000

[1]The BLM RMIS data collection was revised during 2000 and may not have produced accurate visitation figures for 2000.
Source: BLM 2004c

Table 3-30a shows the total visitation to the WDO planning area over a ten-year period by visits and visitor days. A visit is one person's trip, or visit, to planning area public lands. A visitor day represents one person engaging in an activity for any part of one day.

Black Rock Desert—High Rock Canyon NCA

In 2000, approximately 1.2 million acres in the northwestern portions of the WDO were designated for protection of their scenic, cultural, biological, and recreational resources. Opportunities to participate in unique recreation activities attract visitors from across the country, through the WDO, to the Black Rock Desert Playa and surrounding wilderness. Although this RMP does not address recreation within the NCA, the location of the NCA and its popularity among residents of Nevada and surrounding states contributes to the overall recreation visitation to the WDO.

Dispersed Recreation

Dispersed recreation activities include but are not limited to OHV use, camping, hunting and fishing, visiting interpretive and educational exhibits, touring the historic trails, sightseeing, pleasure driving, rock and mineral collecting, photography, picnicking, hiking, mountain biking, and hot spring bathing. This wide range of activities is possible because most of the lands within the WDO boundary are public and accessible and offer a variety of settings suitable for different recreation activities. The WDO began collecting recreation data in 1990. Table 3-31 summarizes the time people spent in 2004 engaging in various dispersed recreation activities while visiting the WDO planning area.

Commercial, Competitive, and Organized Group Recreation Uses

A variety of commercial, competitive, and organized group uses occur within the WDO, all of which are administered under the special recreation permit (SRP) program. SRPs allow specified recreational uses of public lands and related waters. Many of the commercial permits, such as those issued to hunting outfitters and guides, are used throughout the district. Competitive permits, such as motorcycle races, are confined to a preapproved race course. A large percentage of the races that have occurred in the Winnemucca District have taken place in the southwest portion of the WDO. Other examples of permitted activities include OHV racing, mule racing, mountain bike races, various horse events, wagon trains, cattle drives, four-wheel drive tours, rocketry, and other miscellaneous events. Table 3-32 shows the number and type of permits and the number of participants over a ten-year period. The numbers of visitor use authorizations, used for noncommercial tours, noncompetitive activities, and other uses requiring stipulations but with a smaller degree of management are also displayed in Table 3-32.

Table 3-31
Dispersed Recreational Activity (2004)

Activity	Percent of Total*
Camping	70
OHV	60
Pleasure driving	50
Photography	30
Picnicking	10
Rock hounding	5
Mountain biking	5
Environmental education	5
Hiking/walking/running	5
Nature study	5
Target practice	5
Backpacking	3
Specialized sport/Event	3
Hunting	2
Viewing cultural sites	1

Notes: *The percentage may reflect a variety of activities occurring together, which results in use totaling more than 100 percent
Source: BLM 2002b

Table 3-32
Special Recreation Permits

Year	Permit Type (Competitive, Commercial, Organized Group)	Number of Permits	Number of Participants
1994	Competitive	8	3,157
	Commercial	12	
1995	Competitive	7	5,863
	Commercial	14	
1996	Competitive	4	10,024
	Commercial	11	
1997	Competitive	3	3,435
	Commercial	8	
1998	Competitive	12	15,225
	Commercial	12	
1999	Competitive	7	26,954
	Commercial	19	
	Visitor Use Authorization	1	
2000	Competitive	10	27,900
	Commercial	15	
	Visitor Use Authorization	1	
2001	Competitive	14	28,280
	Commercial	16	
	Visitor Use Authorization	1	
	Group	1	
2002	Competitive	13	28,744
	Commercial	17	
	Group	1	
2003**	Competitive	6	2,263
	Commercial	9	
2004	Competitive	5	3,244
	Commercial	12	

Notes: **In 2003 the Black Rock NCA started keeping separate records for NCA SRPs
Source: BLM 2004c

While only 12 permits were issued to commercial guides and outfitters from the WDO in 2004, the current state-wide permitting system allows other offices to permit use in the planning area as well. Due to the lack of coordination among BLM district offices, the actual number of guides and guided trips conducted in the WDO is unknown. Unauthorized group uses have also become an issue in recent times.

OHV Use

The Winnemucca District has outstanding opportunities for OHV recreation on system roads, thousands of miles of user-classified, unmaintained ways, and several dry lake beds that are passable by vehicle. Approximately 60 percent of visitors to the planning area use OHVs at some point during their visit. OHV use is dispersed throughout the WDO. For most visitors, OHVs are used to access recreation destinations by road and to tour remote jeep trails and historic trails. However, a certain percentage of OHV users travel cross-country (off roads or ways) as part of their recreation activity, for example to chase or retrieve game or for challenging play, which has led to resource impacts and conflicts among user groups. Past MFPs and amendments have imposed vehicle restrictions to protect high-value resource areas in the Pine Forest SRMA and in WSAs.

Sand dunes and playas have become popular destination areas for OHV users and may be suitable for cross-country vehicle travel. However, areas adjacent to the dune and lakebeds that appear resilient to users sometimes suffer degradation. Intensive OHV use has adversely affected the visual integrity of unique landscape features, important scenic landmarks, and significant cultural resources. Cross-country travel by ATVs and dirt bikes has created numerous new trails and roads, often in areas that are susceptible to erosion and are not suitable for vehicle travel.

OHV Designations

OHV designations within the WDO were established in 1983[2]. The RMP for the NCA included OHV designations for the entire planning area. Discretionary closures are made in emergency situations such as imminent resource damage, and areas within WSAs are limited to existing routes.

BLM-administered lands are open, limited, or closed for OHV use. The BLM maintains current designated areas as follows:

- Closed: 25,242 acres are closed to OHV use (17,838 acres in the Pine Forest Area, 160 acres of the George W. Lund Petrified Forest, 4,544 acres of critical habitat in the Granite Range and any other bighorn habitats deemed appropriate annually during bighorn sheep lambing season [February 1-May 31], 121 acres in Water Canyon Zone 1 [permanent], and 2,579 acres in Water Canyon Zone 2 [seasonal]);
- Open: Most of the planning area is designated as open to OHV use (6,782,790 acres, including culturally sensitive areas, areas surrounding the Lovelock Cave, Class I, II, III, IV, and V segments of National Historic Trails, and the trail viewshed); and.
- Limited: All WSAs would be managed to limit OHV use to existing ways and trails (416,570 acres).

[2] *Federal Register* 48, no. 176 (September 1983)

Key Features

The most popular recreation destinations include areas that contain water resources, developed facilities, or trails and opportunities to experience historic and prehistoric sites (Table 3-33). Other features that attract visitors include areas with high game populations, opportunities for rock and mineral collecting, and the large, flat dry lakebeds in the district. The table lists areas that the BLM has managed by developing and implementing activity level plans. However, several of the plans are either incomplete or in need of revision to address new issues or needs.

Table 3-34 identifies the areas and resources that represent some of the most popular destinations for dispersed uses in undeveloped areas. These sites and resources are not actively managed for recreation uses and benefits, but they significantly contribute to the overall recreation opportunities available in the WDO planning area.

Table 3-33
Developed and Semideveloped Recreation Areas within WDO Planning Area

Management Area/Site	Attractions and Recreation Uses	Recreation Facilities
Blue Lakes Threshold	Glacial Lakes, hiking, camping, self-guided exploration, hunting and fishing opportunities	Rustic campsites (fire ring, picnic table), a vault toilet trailhead kiosk, hiking trails, and parking
Onion Valley Reservoir	Perennial reservoir, camping, self-guided exploration, hunting and fishing opportunities	Rustic campsites (fire rings, picnic tables, vault toilets), and day-use picnic areas
Little Onion Reservoir	Perennial reservoir, camping, self-guided exploration, hunting and fishing opportunities	No facilities
Knott Creek Reservoir	Perennial reservoir, camping, self-guided exploration, hunting and fishing opportunities	No facilities
Water Canyon Recreation Area	Perennial stream, trail riding and hiking, camping, self-guided exploration, and hunting opportunities	Primitive campsites, picnic areas, and an interpretive walking trail. Upper trailhead for Bloody Shins Trail
Bloody Shins Trail System	Multiple use trail system, trail riding, hiking, cross-country skiing, and other types of self-guided exploration	Two trailheads, one in Kluncy Canyon and the other in Water Canyon. Multiple use trail system includes: 5.6 mi. easiest 6.9 mi. intermediate 6.9 mi. advanced
Lovelock Cave Backcountry Byway	Interpretive/picnic site	Two interpretive panels, a half-mile interpretive trail, toilets, and parking area

Table 3-34
Undeveloped Recreation Areas within WDO Planning Area

Management Area/ Resource	Attractions and Recreation Uses	Recreation Facilities
Winnemucca Sand Dunes	Sand dunes and a user-defined road network; hiking, biking, OHV riding	Many miles of roads and trails; a paved road to the top of Winnemucca Mountain; trailhead kiosk at sand dunes and outside of town
Hot Springs	Numerous hot springs at various temperatures and flow rates	No BLM facilities. Warning signs posted alerting visitors of dangers associated with bathing in the springs
Historic trails	California Trail, California Trail (Truckee Route), 1856 Nobles Route, California Trail (Carson Route), 1843-44 Fremont Exploration Route, 1852 and 1856 Nobles Route, 1852 Nobles Route, and Applegate-Lassen Trail	No BLM facilities. Historic trail segments in the WDO planning area total 420 miles

Facilities

While BLM does place an emphasis on resource-based versus facilities-based recreation activities, developed facilitates do occur within the planning area. Existing facilities include numerous capital improvements, such as fences, spring developments, windmills, trails, roads signs, or cattle guards. Recreation facilities are sited in the Pine Forest Recreation Area. Onion Valley Reservoir maintains the only organized campground. At Onion Valley Reservoir and at the near by Blue Lakes Trailhead, are six public primitive restrooms, fire rings, tables, and a number of public information kiosks. BLM also manages the McDermitt administrative site, established for fire suppression activities. The site is near the Oregon border within the WDO planning area and contains barracks for approximately 15 to 20 seasonal firefighters, water, and septic; one permanent full-time staff person lives on-site year round.

3.3.4 Renewable Energy

Renewable energy includes solar power, wind, and biomass resources. As demand has increased for clean and viable energy to power the nation, consideration of renewable energy sources available on public lands has come to the forefront of land management planning.

In cooperation with the National Renewable Energy Laboratory, the BLM assessed renewable energy resources on public lands in the western United States (BLM and DOE 2003). The BLM reviewed the potential for concentrated solar power (CSP), photovoltaics (PV), wind, biomass, and geothermal energy on US Department of the Interior, Bureau of Indian Affairs, and Forest Service lands in the West. Hydropower was not addressed. While geothermal is a renewable energy source, it is considered a leasable mineral and, therefore, is covered under Section 3.3.2, Minerals – Leasable, Locatable, and Salable, of this document.

Solar

Approximately nine percent of BLM lands within the WDO are considered favorable for developing a solar resource of six kilowatt-hours or greater per square meter per day on a slope of less than or equal to one percent. The solar resource would be in the form of CSP systems that track the sun throughout the day, such as trough collectors or dishes. The planning unit ranked fourth in total land area among the top 25 BLM planning units in the US having the highest CSP potential. About four percent of BLM lands within the WDO are considered favorable (with a solar resource of six kilowatt-hours per square meter per day or greater) for PV development (BLM and DOE 2003). Areas favorable for PV are concentrated southeast of Empire. The planning area also was among the top 25 BLM planning areas in the US having the highest PV potential.

Wind

Wind power classes range from 1 (lowest) to 7 (highest). BLM-managed lands in portions of the planning area are Class 3 and higher, although the planning area is not in the top 25 BLM planning units in the US having the highest wind energy potential (Class 5 and higher) (BLM and DOE 2003). The Programmatic EIS on Wind Energy Development on BLM-Administered Lands in the Western United States (BLM 2004b) categorizes BLM-administered lands into areas having a low, medium, or high potential for wind energy development from 2005 through 2025, on the basis of their wind power classification. Wind resources in Class 3 and higher could be developed economically with current technology over the next 20 years. Class 3 resources have medium potential; resources in Classes 4 and higher have high potential. The Programmatic EIS identifies scattered public land parcels in the planning area with medium or high wind resource potential that might be developed economically with current technology; these are concentrated along ridgetops near the western and southeastern WDO boundaries. There has been some interest in developing wind energy within the WDO. Current activity includes placement of meteorological towers.

Biomass

The BLM/National Renewable Energy Laboratory study evaluated the long-term sustainability to support biomass plants using the monthly Normalized Difference Vegetation Index (NDVI) computed from National Aeronautics and Space Administration's (NASA's) Advanced Very High Resolution Radiometer Land Pathfinder satellite program. The WDO is not in the top 25 BLM planning areas having the highest potential for biomass resources. For an area to have biomass development potential, it had to meet the following criteria: an NDVI of 0.4 for at least four months between April and September, a slope less than 12 percent, no more than 50 miles from a town with at least 100 people, and BLM- and USFS-compatible land use. About three percent of BLM lands within the WDO meet these criteria, along I-80 near Lovelock, Winnemucca, and Golconda, along Route 140 between Winnemucca and Denio, along US 95 near Orovada, and near Paradise Valley. The areas with the highest biomass potential are near Lovelock, slightly north of Golconda, and just south of the Disaster Peak WSA (BLM and DOE 2003).

3.3.5 Transportation and Access

Roads within the WDO planning area provide access for recreationists, ranchers, resource specialists, and administrators. Interstate Highway 80, United States 95 Veterans Memorial Highway, and State Highway 447 are the primary paved roads in the planning area. Other improved roads in

the planning area include Little Owhyee, High Road, Water Canyon, Blue Lakes, and Onion Reservoir. The transportation network is composed of state, county, and BLM System Roads.

Most of BLM's System Roads fit into one of three functional classifications: resource roads, local roads, and collector roads. Each BLM road is assigned a maintenance level, ranging from 1 to 5, with 1 representing the lowest level of maintenance and 5 representing the highest. Routes designated as maintenance level 1 are not registered in the BLM maintenance system, and there are no maintenance level 5 classifications in the planning area. Approximately 80 percent of the roads in the planning area are classified as maintenance level 2. User cost, safety, comfort, and travel time are primary road management considerations.

BLM's System Roads inventory includes 75 roads. Approximately 70 percent of these are resource roads, which receive minimum maintenance, are typically open seasonally, receive limited traffic, and are primarily for BLM administrative use. They are frequently classified at maintenance level 2. Local roads normally serve a larger resource area and connect to collector roads or to county or state highways. Collector roads normally provide access to large blocks of public land and connect to or are extensions of county and state highways. They generally receive the highest volume of traffic on all the roads in the BLM road system and require the highest standards for safety, comfort, and travel time. Collector roads are commonly classified at maintenance level 4, receiving the highest amount of maintenance annually and comprising five percent of the BLM's road network.

All BLM System Roads in the planning area are considered low-volume native surface roads; there are no bituminous-surfaced roads, but there are numerous crushed/pit run aggregate surfaced roads. Most roads have evolved into the system over the years as the public created their own access. Roads with the highest public use receive regular routine maintenance. Native surfaced roads are susceptible to seasonal damage by users and closure due to weather conditions. Use of these roads during the wet season causes irreparable resource damage to both the resource and the road itself. Increased levels of visitor use in the planning area are triggering the need to improve roads and upgrade maintenance levels based on that use.

BLM System Roads classified maintenance level 4 have the highest use and need for public safety. Maintenance classifications are updated through on-the-ground condition surveys and observations performed by the District Engineering staff. Roads of high priority use within the planning area include the following:

- Little Owhyee, maintenance level 4;
- High Road, maintenance level 4;
- Water Canyon, maintenance level 4;
- Blue Lakes, maintenance level 3; and
- Onion Reservoir, maintenance level 3.

In 2003, the BLM State Office nominated approximately 460 miles of routes for increased maintenance classification and additional funding. Over 260 miles are within the WDO planning area and are listed on Table 3-35. Maintenance activities for these roads are not appropriate for the level of use they are receiving. For example, several routes being maintained at maintenance level 4 should be maintained at maintenance level 5; however, there are no routes designated as

maintenance level 5 in the WDO planning area because staff and budget levels could not support requirements for level 5 maintenance.

Table 3-35
State of Nevada Road Nominations Within the WDO

Rank	Road Name	Road #	Miles	$K
1	Trego	2097	2.00	150
2	Water Canyon	2095	5.70	491
3	High	2048	42.71	9,600
4	Sulphur Jackson	2049	34.60	600
5	Sand Basin	2083	5.01	600
6	Blue Lake	2014	33.67	500
10	Little Owyhee	2003	56.05	150
11	Soldier Meadow	20-200	17.00	1,500
12	Crowley Jordan	2009	27.21	350
16	Panther Canyon	2031	14.78	145
18	Nine Mile	2050	14.78	200
20	Stone House	2033	10.65	150
			264.16	14,436
			459.77	**17,556**

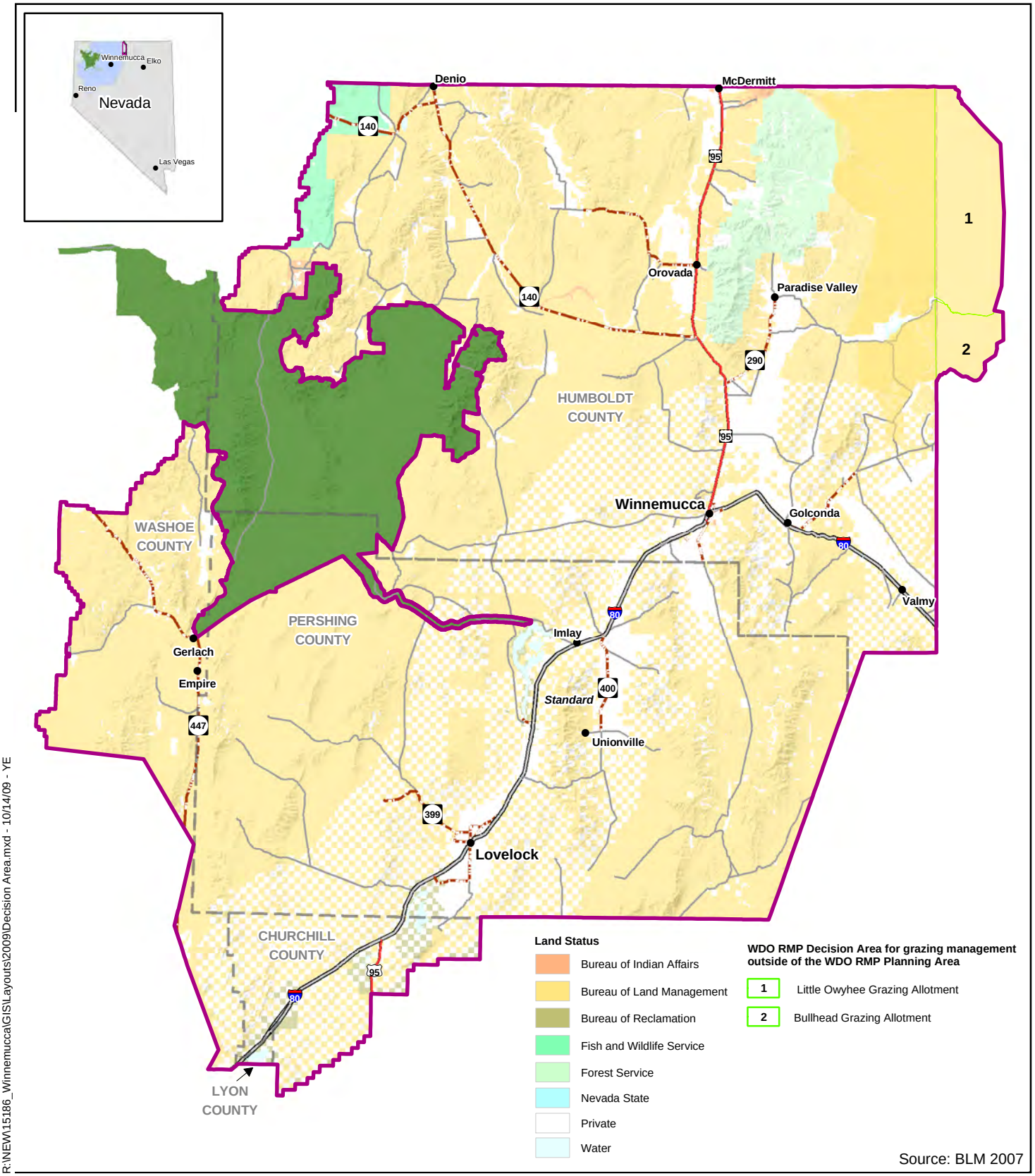
BLM is designated as its authority for road maintenance through 23 US Code from Federal Highways Administration through Federal Lands Highway Program. Even though no BLM roads are considered "public roads" at this time, BLM is still responsible for the safety of its employees and the public that uses BLM System Roads.

3.3.6 Lands and Realty

Land Status

The WDO decision area encompasses about 7.3 million acres of public lands and includes most of the resources or resource uses on public land for which the BLM has authority and makes decisions (Figure 3-28). The BLM's decision area includes minerals of split estate (areas where the BLM administers federal subsurface minerals, but the surface is owned by a nonfederal entity, such as private land). It does not include other private lands, state lands, Indian reservations, federal lands not administered by the BLM, and lands within the planning area of the RMP for the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area and Associated Wilderness Areas and other contiguous lands.

The WDO planning area administrative boundary encompasses 11,223,566 acres in Humboldt and Pershing counties and parts of Washoe, Lyon, and Churchill counties; this acreage includes all lands within the WDO administrative boundary regardless of ownership. The WDO decision area, which is the area applicable to this planning effort, encompasses about 7.3 million acres of public lands and does not include the BLM NCA in the northwestern portion of the WDO planning area (Table 3-36). Due to the scattered land pattern and the isolated nature of many of the public land parcels, management can be difficult.



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Winnemucca District Office RMP/EIS Decision Area

Legend

- BLM Winnemucca RMP Decision Area
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-28

Table 3-36
Landownership in the WDO Planning Area

Landowner	Acres
Bureau of Land Management*	8,448,130
Bureau of Indian Affairs	21,991
US Fish and Wildlife Service	107,169
US Forest Service	274,825
State of Nevada	.28
Private	2,338,639
Water Features	32,812
Total Planning Area**	11,223,566

*Includes NCA acres.
**Does not reflect land administered by WDO outside of administrative boundary.
Source: BLM 2005e

The Railroad Act of 1862 and water resources are the main influences on land ownership in the planning area. Under the Railroad Act, the government gave the railroad company ten square miles of land for each mile of track that was completed (National Park Service 2005). The Railroad Act granted to the railroad every other section (one square mile) twenty miles each side of the railroad centerline. This grant resulted in a checkerboard pattern of public-private land parallel to the railroad right-of-way that still exists. Along with the land grants, a 400-foot right-of-way was also given to the railroad company.

Where there was water, the railroad sold the land. Where there was no water the railroad retained ownership until the 1990s. The Homestead Act of 1862 turned over vast amounts of the public domain to private citizens, who homesteaded where there was water. In the planning areas, private landownership follows the path of streams down canyons. In some places settlers claimed the land around springs.

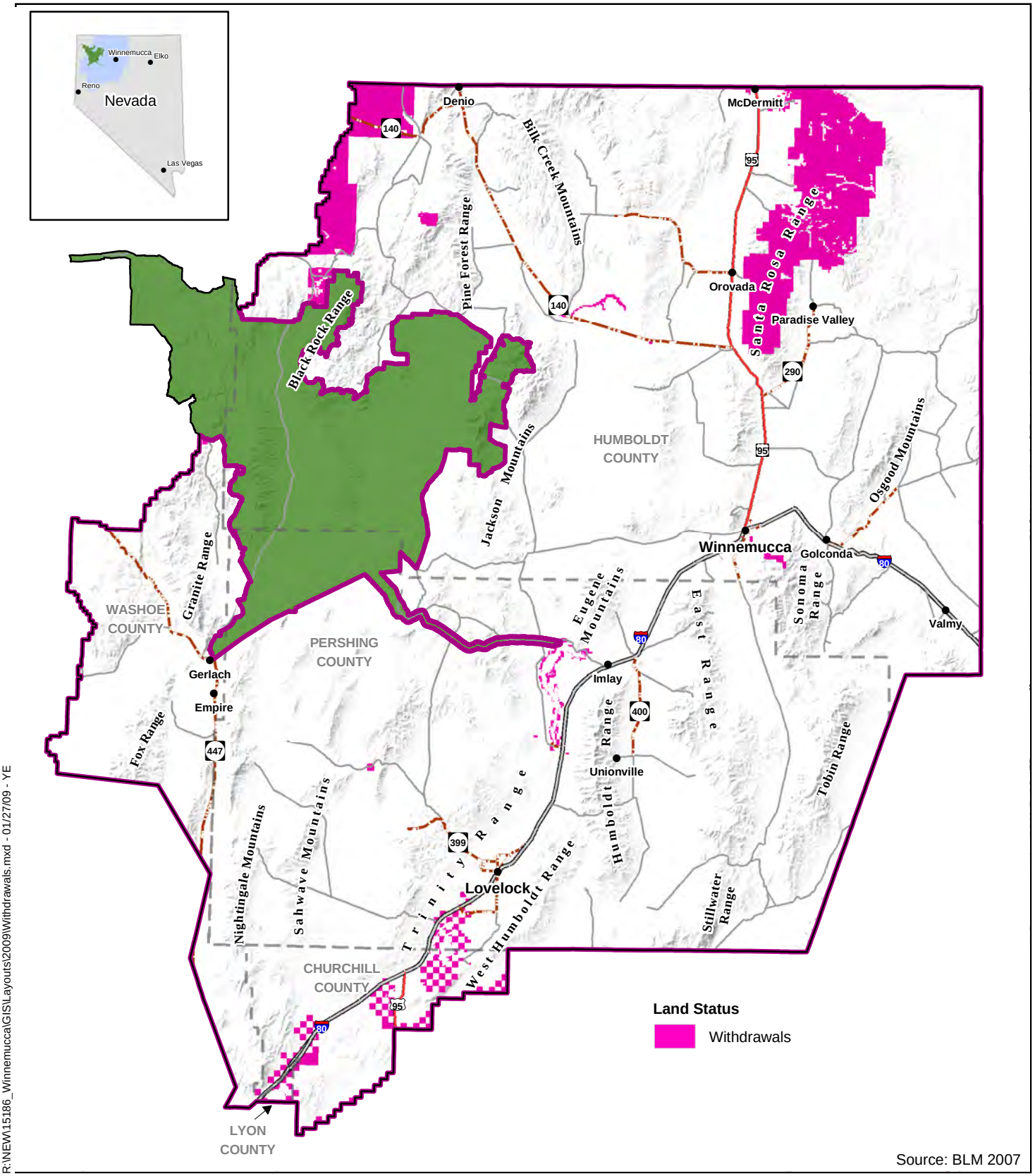
Withdrawals

A withdrawal is a formal action that results in one or more of the following actions:

- Transfers total or partial jurisdiction of federal land between federal agencies;
- Segregates (closes) federal land to some or all of the public land laws and mineral laws; or
- Dedicates land for a specific public purpose.

The three major categories of formal withdrawals are congressional, administrative, and Federal Power Act or Federal Energy Regulatory Commission withdrawals. Congressional withdrawals are those made by Congress in the form of public laws (Acts of Congress). Administrative withdrawals are made by the President, Secretary of the Interior, or other authorized officers of the executive branch of the federal government. Federal Power Act or Federal Energy Regulatory Commission withdrawals are power project withdrawals established under the authority of the Federal Power Act of 1920.

The WDO area includes several withdrawals (Figure 3-29). The land around Rye Patch Reservoir and land in the area of Toulon and the Humboldt Sink were withdrawn for the Bureau of



Source: BLM 2007

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Winnemucca District Office RMP Existing Withdrawals

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-29

Reclamation. In addition, the Sheldon National Wildlife Refuge was withdrawn for the US Fish and Wildlife Service, and the Santa Rosa Ranger District was withdrawn for the US Forest Service. Also, the Fort McDermitt Indian Reservation and Summit Lake Indian Reservation are in the northern portion of the planning area. Other types of withdrawals or de facto withdrawals include land use classifications for recreation and public purposes. These withdrawn lands receive varying degrees of management, depending on the land uses and type of withdrawal.

By Executive Order, dated April 17, 1926, Public Water Reserve 107 (PWR 107), all public lands of the United States containing a spring or water hole needed or used for public purposes were included in a blanket withdrawal without identification of the lands affected. According to the Executive Order, the land is "withdrawn from settlement, location, sale, or entry." Lands withdrawn under PWR 107 have not all been identified on Master Title Plats, so a land transaction can occur without the knowledge that the land is withdrawn under PWR 107. This makes protection and management under this Executive Order difficult.

Land Use Authorizations

Land use authorizations are issued for a variety of purposes, both short-term and long-term. Examples of short-term uses include agricultural leases and other uses involving minimal land improvements or disturbances. Examples of long-term uses include rights-of-ways for power lines, highways, roads, communication sites, and sand and gravel sites.

Land Use Permits and Leases

A lease is an authorization to possess and use public land for a fixed period. A lease is issued when there is going to be substantial construction, development, and improvement and there is an investment of large amounts of capital that will be amortized over time.

Permits are authorized when uses of public lands will be short-term and involve little or no land improvement, construction, or investment. Permits have been a method used to clear up unauthorized use, stipulating that the applicant remove or halt the unauthorized use and rehabilitate the land if necessary.

The Recreation and Public Purposes Act allows state and local governments, as well as qualified nonprofit organizations, the opportunity to lease (and potentially patent) public land where there is a strong public need for a particular use. The WDO has leased lands under this authority for a variety of purposes.

Rights-of-Way

The WDO has designated one utility corridor on the Black Rock Playa along the Western Pacific Railroad tracks. In addition there is a utility corridor for the nationwide gas line from Owyhee across the planning area and Valmy power lines from the Valmy power plant across the planning area. Transportation system authorizations include reservations made for state and federal highways and ROWs granted to counties and individuals for access roads. Attempts are made to group compatible facilities where possible.

The BLM has had a longstanding partnership with the Western Utilities Group concerning planning, identification, and designation of utility corridors in the western United States. The BLM endorsed

the Western Utilities Group's 1992 Western Regional Corridor Study and committed to using it as a primary reference in designating utility corridors through the land use planning process.

With the large number of varying ROW authorizations, it is important that all environmental resources and concerns be taken into consideration. There could be loss of resources or environmental damages that may be prevented if compatible uses are analyzed and, where possible, consolidated.

The BLM typically uses avoidance and exclusion areas to protect resources and to prevent unnecessary or undue environmental damages.

According to current BLM guidance and the President's National Energy Policy, the BLM objective is to continue to make BLM-administered land available for needed ROWs where consistent with national, state, and local plans and to use ROWs in-common to minimize environmental impacts and proliferation of separate ROWs. This guidance and policy also pertains to ROWs for alternative, renewable energy resources, such as wind, solar, geothermal, and biomass.

Communication Sites

The WDO has numerous communication sites within its boundaries. Most of the sites are occupied by more than one user.

Land Tenure Adjustment

As stated above, the WDO area contains a mixed ownership land pattern. Although the potential for resource values may be high on some public land parcels, lack of access or isolation from other resources of these parcels make it very difficult to manage. Land tenure adjustments within the planning area help to resolve split mineral estate situations, to consolidate public land (through sale, exchange, or acquisition), to acquire access, and to resolve unauthorized use cases. Land tenure adjustments are also important to the local and state governments to consolidate ownership and to make lands available for public purposes. FLPMA and other federal laws, Executive Orders, and policies suggest criteria to use when categorizing public lands for retention or disposal and for identifying acquisition priorities.

Split Mineral Estate

Split mineral estate situations typically involve private surface ownership and federal subsurface ownership. There is no statistical data as to the percentage of split estate lands in the planning area. Additionally, there are some split estate situations were the federal government owns the surface and the mineral estate is held by private individuals. Through various acts, the federal government has retained mineral values, while encouraging settlement. As late as the 1980s, BLM policy concerning mineral estate was to reserve all oil and gas rights, as well as any other mineral values. Those lands in which the United States has reserved minerals and which contain valuable mineral resources are generally kept in federal ownership. Many of the private surface owners have requested that the subsurface minerals be sold or transferred to their ownership. Management of the existing split estates has been and will continue to be a challenge.

Consolidation

With the current scattered land pattern of the WDO area, the BLM continues to struggle with the management of isolated or small parcels. Many of these parcels have little resource value and would be a benefit to a private citizen and the local tax base. Large areas of land should be categorized for land tenure adjustments allowing the BLM to use the proper authority to block up land. By blocking up lands, management would be more effective. The BLM could dispose of lands with lower resource values and could acquire lands with valuable habitat, recreational value, scenic value, or opportunity for resource development. More acreage would be available for lease or conveyance under the Recreation and Public Purposes Act, allowing the state and nonprofit organizations to develop and use lands for important community recreation and public purposes.

Land Disposal

BLM lands classified as being available for disposal are identified in the 1999 Lands Amendment (BLM 1999). Public lands that may be suitable for disposal through transfer to another agency, exchange, or public sale are identified as Zone 3 lands (2,989,030 acres). Public lands identified in Zone 2 (1,281,383 acres) are evaluated on a case-by-case basis to determine if they are suitable for disposal. All lands in Zone 1 (2,936,548 acres) will be retained in federal ownership. Public land is exchanged when parcels meet the criteria under Section 206 of FLPMA. Public land is sold when parcels meet the disposal criteria under Section 203 of FLMPA.

Zone 3 lands are located throughout the WDO. However, no criteria are identified in the Lands Amendment defining the exact locations of boundaries separating Zone 3 lands from Zone 1 and 2 lands. As a result of having to rely on lines drawn on a map, it has been difficult identifying the boundaries of Zone 3 lands, especially around Interstate 80.

Certain lands have been excluded from disposal through the planning process or congressional action. Excluded from disposal are crucial wildlife habitat areas, as identified in the Paradise-Denio MFP and Sonoma-Gerlach MFP (BLM 1982a, 1982b). Lands that have been withdrawn from appropriation under the public land laws are also excluded from disposal. Additionally, lands within a designated wilderness or wilderness study area are required to be retained in federal ownership. On July 25, 2000, Congress passed the Federal Land Transaction Facilitation Act (FLTFA, PL 106-248). Lands identified for disposal in land use plans as of that date may be sold or exchanged under FLTFA, and the monies received from sales or exchanges could be retained in an account and used by the BLM and other federal agencies to purchase additional lands. The money is not deposited in the General Treasury. Lands identified in the 1999 Lands Amendment would qualify under this act.

Land Acquisition

Private land acquisition is authorized under section 205 of the FLPMA, primarily through land exchanges with private landowners and the state. According to the 1999 Lands Amendment, land acquisitions are considered on a case-by-case basis and must meet acquisition criteria outlined in the Lands Amendment (BLM 1999).

The Southern Nevada Public Land Management Act (SNPLMA) became law in October 1998. One of the provisions of SNPLMA was for the orderly disposal of certain federal lands in Clark County,

Nevada, and for the acquisition of environmentally sensitive lands in the state of Nevada. The WDO has acquired lands using SNPLMA funding and may do so in the future.

IM NV-2005-062 provides guidance on the administration of purchased lands. Acquisitions of land and interests in land using funds authorized under the SNPLMA and the FLTFA are completed for special purposes and require special management considerations to protect the resource values on these lands. NEPA compliance is required for all acquisitions. Unless the existing land use plan and activity plan and the accompanying NEPA documents are sufficiently detailed, site-specific analysis and a distinct written decision would be required for acquisitions funded under the authority of the SNPLMA and FLTFA.

Land Retention

According to the 1999 Lands Amendment, in general, all public lands (Zone 1, 2, and 3) administered by the WDO will be retained unless, through environmental analysis and public scoping, it is determined that the lands meet the criteria for disposal and the disposal action is in the public's interest (BLM 1999). However, all lands in Zone 1 (2,936,548 acres) will be retained in federal ownership.

Access

Access needs are subsequently prioritized and worked on when there are landowners willing to grant an easement to the BLM or sell land in order to provide access to public lands. In recent years private property owners have begun to close access to public lands where that access is across private lands. Usually this closure is due to a change in ownership of the private property. The closings pose two problems to the BLM. First, they create problems in managing the public lands. Land managers and specialists must find alternate routes into the public lands. This can be critical in emergency situations such as fire suppression.

The second problem is that the public expects to have access to their public lands, especially when there has been a traditional route that is suddenly closed. The public then demands that the BLM acquire access through the private property.

It is anticipated that these access problems will continue as traditional properties are sold to individuals and entities that do not wish to allow the public to cross their property to access public lands.

Trespass

Trespass includes unauthorized use, unauthorized occupancy, and unauthorized development. Unauthorized use refers to activities that do not appreciably alter the physical character of the public land or vegetative resources. Some examples of unauthorized use include the abandonment of property or trash, enclosures, and use of existing roads and trails for purposes that require a right-of-way grant. Unauthorized occupancy refers to activities that result in full- or part-time human occupancy or use. An example would be the construction, placement, occupancy, or assertion of ownership of a facility or structure (such as a cabin, house, natural shelter, or trailer). Unauthorized development means an activity that physically alters the character of the public lands or vegetative resources. Examples include cultivation of public lands and road or trail construction/realignment.

There are some documented and unresolved trespass cases in the WDO area. The BLM expects that there are trespass cases that have not been discovered or documented. Some of the trespasses include dumps, roads, and occupancy. Workload priorities and limited staffing usually require that unauthorized use/occupancy cases go unresolved. There could be a public safety issue associated with unauthorized use/occupancy, as well as a potential loss of valuable resources. If the unauthorized use damages the lands or resources, taxpayer money may need to be expended to repair the damages. Resolving the unauthorized use of public lands could protect valuable resources, prevent damage to resources, protect public safety, and allow the BLM to collect money for damages, processing, monitoring, and rental.

3.4 SPECIAL DESIGNATIONS

The special designations fall within the WDO administrative boundary, but several areas are within the planning area of the Black Rock Desert-High Rock Canyon Emigrant Trails (Black Rock) National Conservation Area (NCA) Plan, which was approved in 2004. Special designation areas addressed in the Black Rock NCA plan will not be addressed in the Winnemucca RMP.

3.4.1 Areas of Critical Environmental Concern and Research Natural Areas

An ACEC is an area of public land where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes or to protect life and safety from natural hazards. The restrictions associated with an ACEC designation are determined at the time the designation is made and are designed to protect the values or serve the purposes for which the designation was made.

There is one ACEC within the administrative boundary of the WDO. The Osgood Mountain Milkvetch ACEC, located within the WDO RMP decision area, is approximately 60 acres. This ACEC is habitat for the Osgood Mountain milkvetch (*Astragalus yoder-williamsii*), state listed as critically endangered.

Appendix F contains the relevance and importance evaluation analysis report of 29 areas nominated as ACECs for the BLM, Winnemucca District Office, RMP/EIS. The evaluations document whether nominations meet the relevance and importance criteria as provided in *BLM Manual 1613 "Areas of Critical Environmental Concern."* Three of the 29 nominations meet the criteria and will move forward for further consideration. The Osgood Mountain Milkvetch ACEC will also be brought forward. The remaining 25 nominations have been dropped from further analysis as potential ACECs.

Future management of ACECs would be outlined in a subsequent ACEC management plan. The plan may, for example, indicate that ACECs could be considered for mineral withdrawal in order to protect the resources for which the ACECs were designated.

3.4.2 Wild and Scenic Rivers

According to the Wild and Scenic River Report (Appendix G-BLM 2006b), three stream segments have potential for inclusion in the National Wild Scenic Rivers System, as follows:

- North Fork of the Little Humboldt River

  - Length within Planning Area, 18.0 miles,
  - Tentative classification, 18 miles Wild,
  - Proposed boundary, approximate 0.5-mile corridor centered on the river, from private land at Greeley Crossing to private land upstream of Chimney Reservoir;
- Crowley Creek
  - Length within Planning Area, 13.6 miles in the Montana Mountains,
  - Tentative classification: 5 miles Wild and 8.6 miles Scenic,
  - Proposed boundary: Approximately 0.5-mile corridor centered on the river, from the headwaters to private property;
- Washburn Creek
  - Length within Planning Area, 11.8 miles in the Montana Mountains,
  - Tentative classification, 5 miles Wild and 6.8 miles Scenic, and
  - Proposed boundary, approximately 0.5-mile corridor centered on the river, from the headwaters to confluence with Little Washburn Creek.

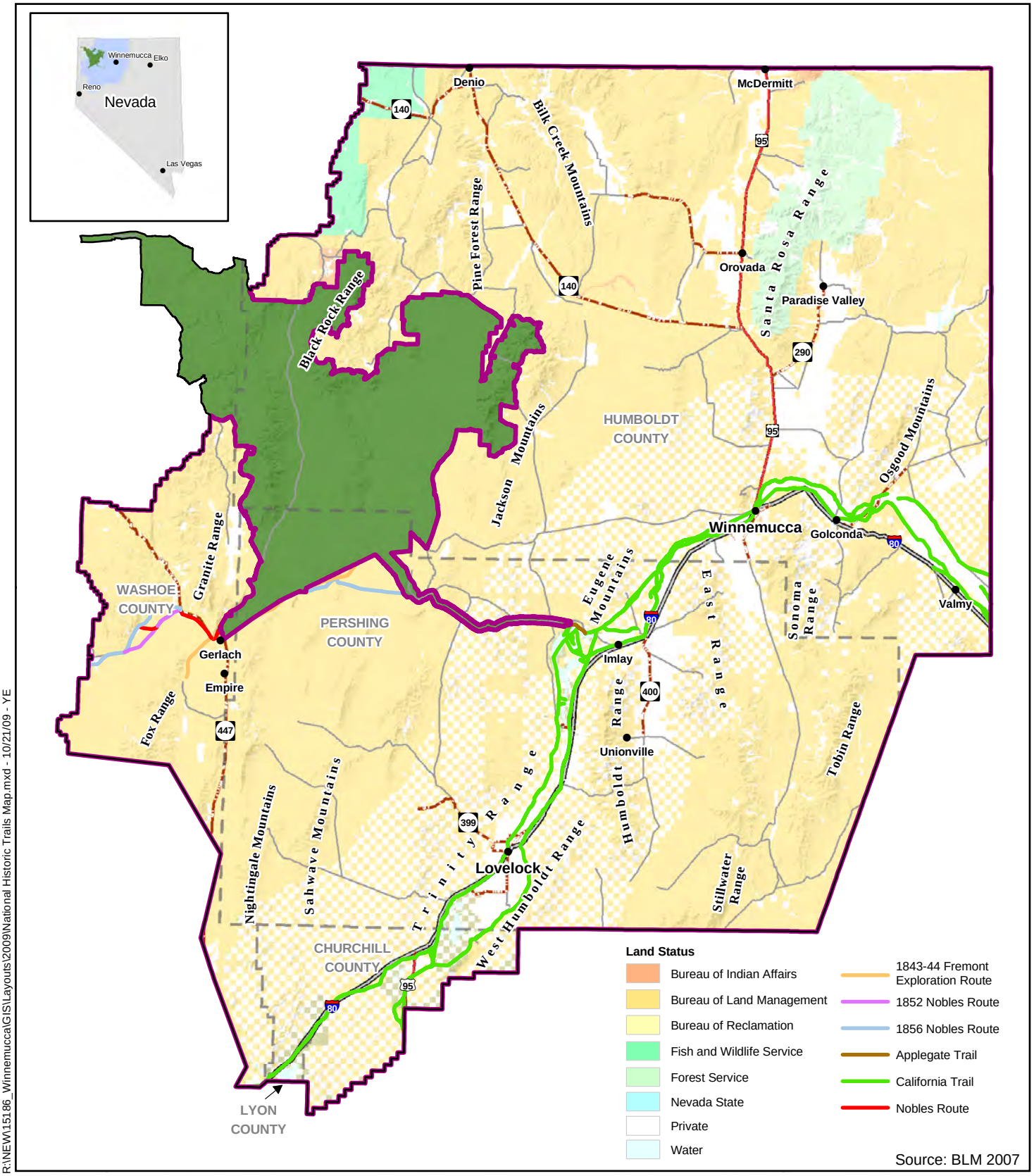
The outstandingly remarkable values of these river segments and land use along these rivers is described in detail in the Wild and Scenic River Report (BLM 2006b).

3.4.3 Backcountry Byways

The WDO currently maintains one backcountry byway, the Lovelock Cave Back Country Byway. This is a 20-mile driving tour, showcasing thousands of years of human history. The tour begins in Lovelock at the historic Marzen House Museum, which has a BLM exhibit featuring artifacts from Lovelock Cave and vicinity. From there, 11 numbered stops (12 total including the museum) highlight the Central Pacific Railroad, Lovelock's Chinatown, its unique courthouse, the California Trail, the area's agricultural, natural, and cultural history, and Lovelock Cave. Discovered in the early twentieth century, prehistoric artifacts found in Lovelock Cave, including the world's oldest duck decoys, provided a valuable insight into lifeways of the native people who had once lived in the area. A short nature trail at the site identifies many of the plants that were essential to survival of those early inhabitants. An interpretive driving guide leads the visitor along the route, and interpretive signs at the Marzen House and Lovelock Cave provide additional information. A children's activity book makes the byway family friendly. There is a restroom and sheltered picnic table and parking area at the cave. The byway was designated in 1994 and was dedicated in 2003. A recreation area management plan and a cultural resource management plan have been completed. The Lovelock Cave Backcountry Byways is also addressed under Section 3.3.3, Recreation and Facilities.

3.4.4 National Trails

National Trails include the California Trail and Applegate-Lassen Trail (Figure 3-30). These trails are described under Section 3.2.14, Cultural Resources. National Trails addressed in the Black Rock NCA plan will not be addressed in the Winnemucca RMP.



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Winnemucca District Office RMP National Historic Trails

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-30

3.4.5 Wilderness, Wilderness Study Areas, and Lands with Wilderness Characteristics

As described in the Wilderness Act of 1964 (PL 88-577), naturalness occurs when an area generally appears to have been affected primarily by the forces of nature with the imprint of humans substantially unnoticeable. Wilderness character conditions tend to be more qualitative in nature, measuring the overall landscape and naturalness of an area as a result of changes to levels of recreational activities, development, and surrounding land use trends. Indicators that can quantitatively be measured include changes to route designations, including the number of unauthorized trails, the number of encounters with other users, and anticipated facility development. Human-caused sights and sounds outside the inventory area should not automatically lead to a conclusion that the area lacks wilderness characteristics.

Areas that offer solitude should provide "outstanding" opportunities for individuals to avoid sights, sounds, and evidence of other people in the inventory area. Factors influencing solitude may include natural screening, such as vegetation or topography, or the opportunity for a person to find a secluded spot. Unconfined recreational experiences focus on undeveloped recreational activities or those that do not require facilities or motorized equipment.

IM 2003-275, Consideration of Wilderness Characteristics in Land Use Plans (Excluding Alaska), provides guidance regarding the consideration of wilderness characteristics in the land use planning process (BLM 2003b). Typically, the resource information contained in the BLM wilderness inventories was collected to support a land use planning process. Public wilderness proposals represent a land use proposal. In either case, the BLM is authorized to consider such information during preparation of a land use plan amendment or revision. For example, information contained in BLM wilderness inventories and public wilderness proposals may be considered when developing the affected environment section of the NEPA document that accompanies the land use plan. The information may also be used to develop the range of alternatives or to analyze the environmental impacts to the various natural, biological, and cultural resources, as well as resource uses.

During the RMP/EIS public scoping period, a public advocacy group identified the following areas as having potential for wilderness character:

- Lava Beds/Dry Mountain;
- Bluewing Mountains;
- North Sahwave Mountains;
- Fencemaker Area of the East Range; and
- Portion of the Tobin Range, between the China Mountain WSA and the Mount Tobin WSA.

These citizen-proposed areas were evaluated by the Nevada Wilderness Coalition, the Pershing County Checkerboard Lands Committee, and BLM staff. The Nevada Wilderness Study Area Notebook (BLM 2001b) was used as a basis for the evaluations. In general, the remote and rural natures of the lands within the planning area have helped to protect the potential wilderness characteristics of the areas. Wilderness characteristics, such as roadlessness, naturalness, and areas that offer solitude and opportunities for primitive, unconfined recreational experiences should be evaluated.

Existing BLM records and institutional knowledge of the area indicate the Lava Beds/Dry Mountain area is crisscrossed with several roads that are frequently used. Also, the western portion of the Bluewing Mountain area (the playa) is also crisscrossed with roads and is used heavily for recreation by motorized and mechanized vehicle and model aircraft operators. Because of this, the Lava Beds/Dry Mountain Area and the western portion of the Bluewing Mountain area will not be analyzed. The remaining portion of the Bluewing Mountains and the other three identified areas are analyzed in this RMP (Appendix A, Figure 2-80).

There are seven designated wilderness areas and portions of two others within the BRDHRCET NCA RMP area, which is encompassed by the WDO administrative boundary. The Lahontan Cutthroat Trout WSA/ISA is also within the planning area boundary of the BRDHRCET NCA. Because these areas were addressed in the BRDHRCET NCA RMP, they are not mentioned further in this document.

The BLM has conducted a wilderness characteristics inventory of certain lands purchased in 2008. Also identified as the Jaksick Purchase, these lands were acquired with SNPLMA funds. SNPLMA authorizes the BLM to sell certain public lands in the Las Vegas Valley and to use the proceeds to acquire environmentally sensitive lands throughout Nevada. The BLM conducted the wilderness characteristics inventory during the summer of 2009 to analyze two groups of acquired land parcels, both in the Granite Range north of Gerlach, Nevada. A wilderness characteristics area is at least 5,000 roadless acres that are largely natural and with outstanding opportunities for either solitude or a primitive and unconfined type of recreation. As a result of the inventory, the following two areas were identified as having wilderness characteristics:

- Granite Peak Wilderness Characteristics Area (approximately 42,700 acres) and
- Buckhorn Peak Wilderness Characteristics Area (approximately 23,400 acres).

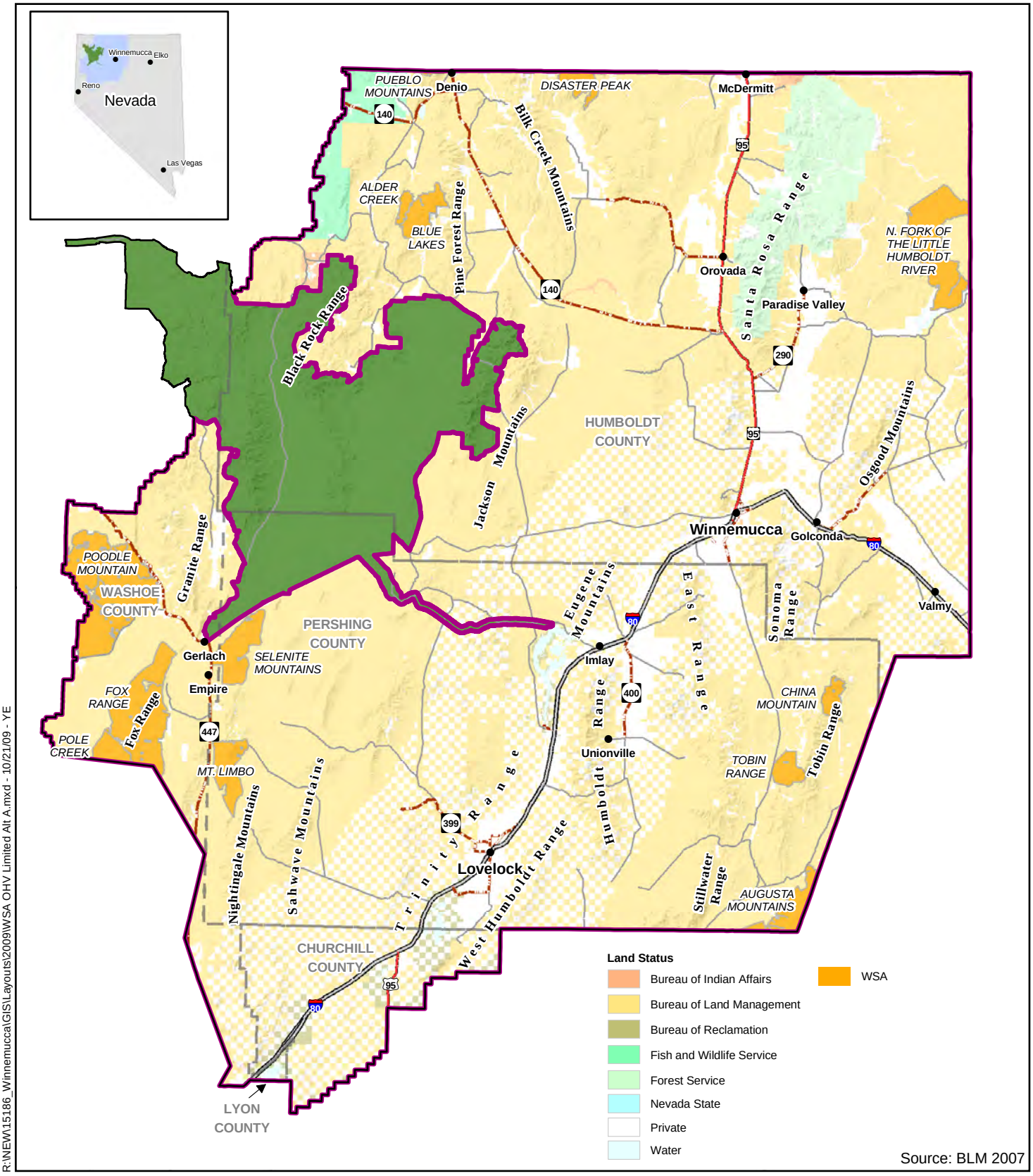
These two areas are analyzed in this RMP/EIS.

There are 13 WSAs within the WDO administrative boundary (Table 3-37 and Figure 3-31). These WSAs total approximately 493,670 acres, about 416,652 acres of which are within the WDO decision area boundary. The conditions of the WSAs have remained largely the same since they were designated in 1980, although there have been some impacts associated with increased OHV use.

The WDO manages WSAs in other districts, and other districts manage WSAs in the WDO. The Disaster Peak and Pueblo Mountain WSAs are partially in Oregon, and Poodle Mountain is partly within the BLM Eagle Lake District Office jurisdiction. Augusta Mountain is partly within both the Carson City and Battle Mountain District Office jurisdictions, and the North Fork of the Little Humboldt River WSA is partly within the BLM Elko District Office jurisdiction.

Detailed descriptions of the characteristics and features of each of the WSAs are included in the Nevada Wilderness Study Area Notebook, April 2001 (BLM 2001b). WSAs are managed in accordance with the "Interim Management Policy for Lands under Wilderness Review," in BLM Handbook H-8550-1 (BLM 1995).

The following summary provides the BLM's recommendation based on the Nevada Wilderness Study Area Notebook (BLM 2001b):



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Winnemucca District Office RMP Wilderness Study Areas

Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-31

Table 3-37
Wilderness Study Areas within WDO Administrative Boundary

Wilderness Study Area	WSA Number	Total Acreage of WSA	Total Acreage of WSA within WDO Planning Area Boundary	Total Acreage of WDO BLM-administered lands within the WSA	Planning Area Boundary
Poodle Mountain	NV020-012	141,646	113,617	116,134	WDO/Eagle Lake District
Fox Range	NV020-014	75,659	75,646	75,528	WDO RMP
Augusta Mountains	NV020-108	88,286	24,267	24,256	WDO Carson City District/Battle Mountain District
Mount Limbo	NV020-201	24,857	24,856	24,810	WDO RMP
North Fork Little Humboldt	NV020-827	69,590	69,474	69,305	WDO/Elko
Selenite Mountains	NV020-200	31,947	31,948	31,948	WDO RMP
Disaster Peak	NV020-859	32,040	12,697	12,696	WDO/OR
China Mountain	NV020-406P	10,296	10,296	10,201	WDO RMP
Tobin Range	NV020-406Q	13,291	13,291	13,161	WDO RMP
Blue Lakes	NV020-600	19,951	19,951	19,904	WDO RMP
Alder Creek	NV020-600D	5,179	5,179	5,143	WDO RMP
Pole Creek	NV020014A	12,959	12,959	12,957	WDO RMP
Pueblo Mountains	NV020-642	72,690	607	607	WDO/OR

Source: BLM 2001b.

- Poodle Mountain—The recommendation for this WSA is to release all 142,050 acres to uses other than wilderness;
- Fox Range—The recommendation for this WSA is to release all 75,404 acres to uses other than wilderness;
- Augusta Mountains—The recommendation for this WSA is to release all 89,372 acres to uses other than wilderness;
- Mt. Limbo—The recommendation for this WSA is to designate 12,750 acres as wilderness (including 50 acres outside the WSA) and to release 11,002 acres to uses other than wilderness;
- North Fork Little Humboldt—The recommendation for this WSA is to designate 8,900 acres as wilderness and to release 60,783 acres to uses other than wilderness;
- Selenite Mountains—The recommendation for this WSA is to release all 32,041 acres to uses other than wilderness;

- Disaster Peak—The recommendation for the WSA is to designate 31,170 acres as wilderness and to release 2,400 acres to uses other than wilderness;
- China Mountain—The recommendation for this WSA is to release all 10,358 acres to uses other than wilderness;
- Tobin Range—The recommendation for this WSA is to release all 13,107 acres to uses other than wilderness;
- Blue Lakes—The recommendation for the WSA is to designate 16,400 acres as wilderness and to release 4,108 acres to uses other than wilderness;
- Alder Creek—The recommendation for this WSA is to release all 5,142 acres to uses other than wilderness;
- Pole Creek—The recommendation for this WSA is to release all 12,969 acres to uses other than wilderness; and
- Pueblo Mountains—The recommendation for the WSA is to designate 26,150 acres as wilderness and to release 46,654 acres to uses other than wilderness.

These recommendations are based on conditions in 2001, and in some situations, the conditions may have changed. Acreage discrepancies between the acreage figures identified in the Nevada Wilderness Study Area Notebook and Table 3-37 are due to changes in land status from 1991 to 2009.

3.4.6 Watchable Wildlife Viewing Sites

The following are watchable wildlife viewing sites in the planning area:

- High Rock Canyon;
- Mahogany Creek;
- Pine Forest Mountains;
- McGill Canyon;
- Santa Rosa Mountains; and
- Sonoma Creek.

High Rock Canyon is near High Rock Lake and east of Vya, Nevada (Clark 1993). The lake attracts tundra swans (*Cygnus columbianus*) and killdeer. Steep canyon walls shelter nests used by golden eagles, great horned owls, red-tailed hawks, American kestrels (*Falco sparverius*), and prairie falcons. Cliff crevices and holes provide habitat for roosting bats and nesting white-throated swifts (*Aeronautes saxatalis*). Brushy areas and riparian thickets offer views of calliope hummingbirds (*Stellula calliope*), lazuli bunting (*Passerina amoena*), and green-tailed towhees (*Pipilo chlorurus*). Wrens, sparrows, snakes, and lizards are common. Sage-grouse, mule deer, coyotes, and pronghorn are visible among the mountain mahogany and sagebrush.

Bounded by wet meadows and corridors or aspens and willows, Mahogany Creek is a high mountain creek in big sagebrush country near Sheldon National Wildlife Refuge (Clark 1993). It supports spawning populations of Lahontan cutthroat trout. Riparian growth is inhabited by resident and migratory songbirds, including mountain bluebirds (*Sialia currucoides*), yellow warblers (*Dendroica petechia*), hermit thrushes (*Catharus guttatus*), and red-naped sapsuckers (*Sphyrapicus nuchalis*). Pacific tree frogs (*Pseudacris regilla*) and Great Basin spadefoot toads (*Spea intermontana*) are found in seeps. Chukars, sage-grouse, ground squirrels, northern goshawks, Cooper's hawks (*Accipiter cooperii*), red-tailed hawks, coyotes, long-eared owls, bobcats (*Lynx rufus*), cougars, mule deer, and pronghorn are also found at this site.

Pine Forest Mountains is south of Denio Junction and contain rugged granite spires flanked by high-elevation meadows and lakes (Clark 1993). Sage thrashers (*Oreoscoptes montanus*), California quail, and black-tailed jackrabbits (*Lepus californicus*) inhabit foothill sagebrush. Golden eagles, American kestrels, northern harriers, red-tailed hawks, and burrowing owls are found at this site. Creek drainage contains chukars. Northern slopes contain California bighorn sheep and mule deer. Pronghorn are in the flatlands. A large meadow attracts mule deer and sage-grouse. Meadowlarks (*Sturnella neglecta*), mountain bluebirds, and other songbirds inhabit aspen-lined basins. Mule deer, yellow-bellied marmots (*Marmota flaviventris*), and coyotes are found around lakes. Onion Valley Reservoir is populated by occasional waterfowl and shorebirds. A spring-fed playa is a late spring staging area for many waterfowl and shorebirds, particularly snowy plovers (*Charadrius alexandrinus*).

McGill Canyon is northwest of Winnemucca. Jagged limestone ridges and outcroppings tower above this narrow canyon, sheltering California bighorn sheep and mule deer (Clark 1993). Golden eagles, prairie falcons, red-tailed hawks, black-tailed jackrabbits, cottontails (*Sylvivagus* spp.), and ground squirrels are found at this site. Sage-grouse, chuckars, and mourning doves inhabit the grassy basin. Streamside vegetation provides cover for warblers, wrens, hummingbirds, and occasional porcupines (*Erethizon dorsatum*) and long-tailed weasels (*Mustela frenata*). Yellow-bellied marmots are in rocky areas, and rock wrens are in crevice nests. Coyotes, kit foxes, cougars, and bobcats may also be found at this site.

Santa Rosa Mountains is east of Orovada. Bighorn sheep, mule deer, and ruffed grouse (*Bonasa umbellus*) inhabit this mountain desert (Clark 1993). Mule deer, chukars, yellow-bellied marmots, golden eagles, northern goshawks, ruffed grouse, red-shafted flickers (*Colaptes auratus cafer*), and many songbirds are found at this site. Streams contain Lahontan cutthroat trout, and deer and great blue herons (*Ardea herodias*) are found in wet meadows. Pronghorn and sage-grouse are on the plateaus. Rocky outcrops contain California bighorn sheep.

Sonoma Creek is south of Winnemucca. Black-tailed jackrabbits, mule deer, and coyotes can be found on the arid sideslopes (Clark 1993). Prairie falcons, golden eagles, American kestrels, and California quail are also found at this site. The creek's leafy canopy sustains northern flickers and many songbirds, including green-tailed towhees, song sparrows (*Melospiza melodia*), and lazuli buntings. Fallen tree and underbrush shelter chukars, long-tailed weasels, and mountain cottontails. In years of good runoff, the creek supports toad populations, common snipe (*Gallinago gallinago*), and waterfowl, including spring-nesting mallards.

3.5 SOCIAL AND ECONOMIC

3.5.1 Tribal Interests

Native American tribes with interest in the planning area are the Alturas Indian Rancheria, the Battle Mountain Band, the Burns Paiute Tribe, the Cedarville Rancheria, the Confederated Tribes of Warm Springs Reservation, the Fallon Paiute-Shoshone Tribe, the Fort Bidwell Indian Community, the Fort McDermitt Tribe, the Klamath Indian Tribe, the Lovelock Paiute Tribe, the Pit River Tribe, the Pyramid Lake Paiute Tribe, the Reno-Sparks Indian Colony, the Shoshone-Bannock Tribes, the Shoshone-Paiute Tribes of the Duck Valley, the Summit Lake Paiute Tribe, the Susanville Indian Rancheria, the Washoe Tribe, the Winnemucca Indian Colony, and the Yomba Shoshone Tribe. These tribes are within or close to the planning area counties or have economic or cultural interests in the planning area. Tribal members contribute to local and regional economies by purchasing goods and services, disbursing salaries, and providing contractual services and general operating expenses.

Larger reservations within the planning area include the Summit Lake Indian Reservation and Fort McDermitt Indian Reservation, both of which fall within the northern region of the planning area in Humboldt County. The Summit Lake Indian Reservation consists of approximately 10,098 tribal land acres and 765 allotted acres. The Fort McDermitt Indian Reservation covers approximately 16,355 tribal land acres, 145 allotted acres, and 160 acres of tribal fee land (Inter-Tribal Council of Nevada 2004).

Indian Trust Assets are legal interests in property, physical assets, or intangible property rights held in trust by the United States for Indian tribes or individual Indians. Common examples of trust assets may include lands, minerals, hunting and fishing rights, water rights, other natural resources, and money. This trust responsibility requires that all federal agencies ensure their actions protect Indian Trust Assets. There are no known Indian Trust Assets present in the planning area.

Tribes have expressed interest in general land use and natural resource management issues in the planning area and in access and use of traditional lands, religious areas, and resources. Native American traditional uses are discussed in the cultural resources section.

Some of the environmental management concerns of the Northern Paiutes and Western Shoshones are as follows:

- The potential for an increase in pollution of the air, water, and earth and the interrelatedness of these impacts throughout the region;
- Concerns about transportation and spills of potentially hazardous chemicals from mining;
- Reduction in the water table due to mining, geothermal development, and water resource development, affecting springs and riparian areas that contain culturally important berries and medicinal plants;
- Disruption in the life cycles of wildlife; and
- Loss of plant and wildlife habitat in mining areas and the need for appropriate measures to reestablish plant and animal species during reclamation.

Tribal representatives also raised other concerns and issues, as follows:

- Hiring of Native American workers, particularly tribal environmental/cultural liaisons, in mining expansion;
- Hiring of tribal monitors for construction of fiber optic lines and geothermal development;
- The desirability of transfers of BLM-managed lands to tribes within the WDO administrative boundaries; and
- The perceived lack of regulations regarding OHV use on WDO-administered lands.

Additional issues documented in the ethnographic assessment are as follows:

- The need for tribal notification before any archaeological excavation;
- Timely tribal notification when human remains are discovered on lands administered by the WDO;
- Appropriate procedures for the use of tribal monitors in mining operations;
- The need to enforce confidentiality regarding the location of culturally sensitive sites; and
- The view of many Western Shoshones that most of present-day Nevada was never ceded to the United States (Bengston 2006).

3.5.2 Public Health and Safety

Public health and safety management is intended to protect public health and safety on BLM-administered public lands, to comply with applicable federal and state laws, to prevent waste contamination, and to minimize physical hazards due to any BLM-authorized actions or illegal activities on public lands. When health and safety hazards from past grazing, mining, or milling activities, illegal dumping, and natural hazards are identified, they are reported, secured, or cleaned up according to federal and state laws and regulations, including the federal Comprehensive Environmental Response, Compensation, and Liability Act. Parties responsible for contamination are liable for cleanup and resource damage costs, as prescribed by law.

Mines

The Nevada Division of Minerals (NDOM), a part of the Commission on Mineral Resources, is responsible for administering programs and activities to promote, advance, and protect mining and the development and production of petroleum and geothermal resources in Nevada (Durbin and Coyner 2004). NDOM administers the Abandoned Mine Lands Program under the authority provided by Nevada Administrative Code 513. The regulations make current mining claimants responsible for abating hazardous conditions on lands under their control. In March 1999, the BLM initiated the formation of a Nevada Abandoned Mine Land Environmental Task Force to begin remediating environmental problems associated with abandoned and inactive mines. The BLM and NDOM cooperatively manage the Abandoned Mine Lands Program through a formal memorandum of understanding. In certain mining districts, the planning areas have numerous abandoned mine workings. Structures such as shafts, adits, winzes, tunnels, and pits pose safety hazards to the public. Hazardous materials and dynamite are also safety hazards at abandoned mine sites. According to NDOM's *Abandoned Mine Lands Program Fact Sheet* (January 30, 2008), 1,367 physical hazards associated with abandoned mine lands have been discovered in Humboldt and

Pershing Counties, and 1,041 mines have been secured. Mine hazards that may result from modern mining are managed by the BLM's Minerals Administration Program, described in Section 3.2.2.

Hazardous Materials

The BLM has limited regulatory authority over hazardous materials or substances, which are defined in various ways under a number of regulatory programs. Hazardous materials represent potential risks to public health and safety when not managed properly during transportation, storage, and use.

Hazardous materials may include chemical, biological, and radioactive materials. They may be on or near public land where hazardous or regulated material use and storage are authorized. Hazardous sites also result from unauthorized or illegal use or disposal. Contamination of air, soil, surface water, and groundwater contamination may result from improper handling or storage.

The two primary types of hazardous material sites on or near public land are related to mining or agricultural use or storage. Other sites are occupancy related and both authorized and unauthorized shooting ranges. Periodically the WDO uses herbicides to treat land that has been invaded by noxious weeds and invasive exotic species. All EPA use restrictions and requirements for toxicants are followed wherever control devices are used on public lands. Hazardous materials are transported over the interstate and rail systems that cross or are near public land. Most sites are permitted by NDEP, the Nevada State Fire Marshal, BLM surface management regulations, or realty programs. The BLM does not maintain a comprehensive database of hazardous materials sites, but the Nevada State Fire Marshal maintains a list of sites with current hazardous materials permits.

The Winnemucca District Office provides for public safety by maintaining a hazardous material emergency contingency plan to facilitate correct responses to hazardous materials situations, to establish procedures for reporting such incidents, and, in some cases, to guide possible remediation of the situation. This plan provides guidance to district office employees on how to react to a hazardous materials situation and whom to contact for assistance.

Health and safety may be affected by hazardous materials and conditions that have resulted from prior industrial or commercial activities on public lands or adjacent privately held properties, three of which are the following:

- American Antimony abandoned mill site in Antelope Valley, where there is lead and cadmium flue dust in an uncontained pile;
- Orovada pesticide dump, where pesticide containers have been buried in trenches over the years; and
- A leaking underground fuel tank at Denio Junction, which may have contaminated nearby public land.

Remediation or monitoring of these sites is ongoing. No hazardous material sites within the resource area are listed on the US EPA National Priorities List.

Solid Waste

Solid waste issues include illegal dumping (either in conjunction with a residence or simply at a convenient location), dumping in reclaimed gravel pits, and littering along roadsides and in areas

frequented by ATV users, for example, the sand dunes. Although there is no database detailing the locations of all the solid waste sites, some sites are known. Many of the rural ranches have solid waste sites, and a few ranchers have been warned about dumping on public land. Most sites are small, generally less than five acres.

The only permitted solid waste sites on public land would be the Class III landfills operated by the mines. Many of the larger mines have Class III landfills waivers that are permitted by NDEP. A waiver is obtained from NDEP and inspected by them, and, on occasion, by BLM inspectors under BLM surface management regulations.

Most sites contain typical household garbage and debris. Any hazardous materials are household chemical products in small quantities or regulated materials, such as petroleum products. A few sites in agricultural areas may have pesticide or herbicide containers.

The number of discarded tires has increased since the landfill has started charging for taking them. Sites are more of a problem if they contain unknown chemicals that need characterization. There has not been a significant increase in known sites.

Illegal Dump Sites

Illegally dumped wastes are primarily nonhazardous materials that are dumped either to avoid disposal fees or the time and effort required for proper disposal (US EPA 1998b). Illegal waste dump sites usually contain the following materials:

- Construction and demolition waste, such as drywall, roofing shingles, lumber, bricks, concrete, and siding;
- Abandoned automobiles, auto parts, used oil and filters, and scrap tires;
- Appliances;
- Furniture;
- Yard waste;
- Household trash; and
- Medical waste.

If not addressed, illegal dumps often attract more waste, potentially including hazardous wastes, such as asbestos, household chemicals and paints, automotive fluids, and commercial or industrial wastes.

The largest issue related to public health and safety is the illegal dumping of waste in an unpermitted area (US EPA 1998b) because the health risks may be significant. Areas used for dumping may be easily accessible to people, especially children, who are vulnerable to public health and safety issues that include the following:

- Physical hazards (protruding nails or sharp edges) and chemical hazards (harmful fluids or dust);

- Rodents, insects, and other vermin. Dump sites with scrap tires provide a breeding ground for mosquitoes, which can multiply 100 times faster than normal in the warm stagnant water standing in scrap tire casings. Severe illnesses, such as encephalitis and dengue fever, have been attributed to disease-carrying mosquitoes originating from scrap tire piles;
- Dump sites can catch fire, either by spontaneous combustion or, more commonly, by arson;
- Illegal dumping can affect proper drainage, making areas more susceptible to flooding when wastes block ravines, creeks, culverts, and drainage basins. In rural areas, open burning at dump sites can cause forest fires and severe erosion as fires burn away trees and undergrowth;
- Dump site runoff containing chemicals may contaminate wells and surface water used as sources of drinking water; and
- Dump sites serve as magnets for additional dumping and other criminal activities.

Hot Springs

Hot springs may be associated with geothermal power sites or be located in isolated areas. No hot springs are maintained for recreational use, but unauthorized use of geothermal waters for recreation does occur. Hot springs on public lands can be extremely hot and dangerous. Use can result in scalding, contact with chemical fumes, cuts and abrasions, and bacterial irritations or diseases. The WDO informs visitors to stay out and stay safe. Some springs can be extremely hot and should be avoided to prevent being scalded. The BLM maintains and places warning signs at dangerous hot springs with temperatures above 100 degrees Fahrenheit. Hot springs with a temperature above 120 degrees Fahrenheit are fenced to discourage entry.

Explosives

Public health and safety could be affected by the presence of mining-related explosives or unexploded ordnance on or near public lands. Incidents in Nevada have included lost live ordnance, crashes, dumped fuel tanks, and wayward missiles. Mining-related explosives from historic and active mining operations have been found on public land. BLM personnel or contractors remove accumulations of hazardous materials or solid waste from public land; this includes removing, disarming, or neutralizing explosives. The BLM coordinates with the Defense Department and Army Corps of Engineers to study and mitigate hazards from formerly used defense sites.

3.5.3 Social and Economic Conditions and Environmental Justice

This section discusses the socioeconomic resources of the region of influence (ROI). These resources are discussed in greater detail in the Winnemucca Resource Management Plan Socioeconomic Report (BLM 2006c), which is included in Appendix H of this document. The planning area encompasses about 7.3 million acres of land managed by the BLM in west-central Nevada. These lands are within portions of five northwestern Nevada counties: Churchill, Humboldt, Lyon, Pershing, and Washoe. These counties were identified as the ROI for socioeconomic analysis because most of the effects on the population and economy would occur within this local region, including effects on local government tax bases and social services and infrastructure. Data for Nevada is presented for comparison and to analyze the possible broader

effects of the proposed project. Socioeconomic conditions addressed include population, housing, employment, schools, and the protection of children.

The project area is predominantly rural. Project area communities include cities, rural towns, and outlying rural areas. The cities of Winnemucca and Lovelock provide services, shopping, and diverse amenities for leisure and recreation. The region's rural towns, such as Denio, Empire, Gerlach, Golconda, Imlay, and McDermit, have smaller populations. The presence of services, hospitals, affordable housing, schools, shopping, and recreation are directly related to where the counties' populations reside. The employment base for most of these communities is mining, agriculture, industry, gaming, and tourism.

With almost 83 percent of lands in Nevada under federal ownership, Nevada's economy is affected by BLM land management decisions. Humboldt County, which has the largest percentage and total acreage of land under federal ownership in the WDO, has the greatest opportunity for effect. Whereas Lyon County, which is composed of approximately 67 percent federal land and has the lowest total acreage of federal lands within the WDO planning area, would be less likely to be affected. The recreation, mining, and agricultural sectors are dominant economic interests represented on BLM-administered lands within the WDO planning area in Nevada; the forestry and timber sectors have a minimal economic presence on WDO lands.

The high percentage of BLM lands within the planning area counties has made the WDO planning area a highly desirable recreation area for activities, including boating, fishing, hiking, hunting, and mountain biking. The counties attract both local visitors and those from other counties. As a result, local economies receive economic benefit from recreation activities that occur nearby through recreation and use fees that are returned to the state and through visitor expenditures in the traveler accommodations industry and for other goods and services. Nevada has the highest per capita receipts generated from travel expenditures within the US, and the traveler accommodation industry is projected to be the fastest-growing employment sector in the state. With the rising popularity of outdoor recreation and the demand for use of federal lands, visitor use of public lands within the WDO and local economic activity also can be expected to increase. While most recreational use on public lands does not require a permit, some activities (such as the Burning Man Festival) are permitted activities that provide recreation opportunities to thousands of people while generating significant revenue for the WDO.

Nevada ranked second in the US in terms of value of overall nonfuel mineral production in 2003 (excluding oil, gas, coal, and geothermal). Nevada's production of gold helped make the US the third leading gold producer in the world in 2003 (Nevada Bureau of Mines and Geology 2003). Numerous commodities are produced in the state, several of which occur on BLM administered lands. The influence of the mining sector in Humboldt and Pershing Counties makes them economically vulnerable because of their lack of diversity. Nevada has been identified as an economically vulnerable state due to its dependence on minerals (BLM 2000).

Grazing revenues are found to be the greatest in those counties with the highest proportion of BLM land, and northern Nevada has been identified as one of these areas (BLM 2000). These areas typically have low population densities and low per capita income (Sections 2.1 and 2.2). Grazing is most important to the economies in areas that are agriculturally dependent, very rural, and not economically diverse. With three of the five planning area counties (Lyon, Humboldt, and Churchill)

among the top five generators of agricultural sales, the economies of these counties are most likely to be affected by grazing management decisions within the WDO.

Churchill County

Churchill County is the southernmost county in the planning area, bordered by portions of Washoe and Lyon Counties on the west, Pershing County on the north, Lander County on the east, and portions of Nye and Mineral Counties on the south. The northwestern portion of this county is within the planning area (BLM 2006c). The only urban area in Churchill County is the city of Fallon, and there is property proposed for development between Fernley and Fallon (near Hazen). Churchill County ranked eighth among the seventeen Nevada counties in population in 2000 and tenth in area.

Humboldt County

Humboldt County is in the northern portion of the planning area, bordered by Elko County on the east, Lander County on the southeast, Pershing County on the south, Washoe County on the west, and Oregon on the north (BLM 2006c). In 2000, it ranked ninth among the seventeen Nevada counties in population and fourth in area. Humboldt County is sparsely populated, with most of its population living in the only incorporated city, Winnemucca. The most rapidly growing area of the county is Grass Valley, which is adjacent to and immediately south of Winnemucca. Other urban areas in the county include Denio, McDermitt, Orovada, Paradise Valley, and Golconda.

Lyon County

Lyon County is in the extreme southwest portion of the planning area, bordered by Churchill County on the northeast, Mineral County on the southeast, California on the south, small portions of Douglas and Carson City Counties on the west, and Storey County on the northwest (BLM 2006c). It ranks sixth among the seventeen Nevada counties in population and fourteenth in area. Dayton, Fernley, and Silver Springs are the county's three largest cities. Increasing at the rapid rate of 72 percent from 1990 to 2000, Lyon County was the third fastest growing county in Nevada.

Pershing County

Pershing County lies in the middle of the planning area, bordered by Washoe County on the west, Churchill County on the south, Lander County on the east, and Humboldt County on the north (BLM 2006c). It ranks eleventh among the seventeen Nevada counties in population and eighth in area. Lovelock is the county's largest city and contains about half of Pershing County's population (approximately 7,500 people).

Washoe County

Washoe County is in the far west portion of the planning area, bordered by California on the west, Oregon on the north, Humboldt, Pershing, Churchill, and Lyon Counties on the east, and Storey and Carson City Counties on the south (BLM 2006c). It ranks second among the 17 Nevada counties in population and seventh in area. Reno, the second largest city in Nevada, is in Washoe County, as are Sparks and Incline Village, at Lake Tahoe.

Definition

Socioeconomic resources include population, employment, income, housing, earnings, and schools. Population is the number of residents in the area and the recent change in population growth; employment data takes into account labor sectors, labor force, and statistics on unemployment; income information is provided as an annual total by county and as per capita income; housing includes numbers of units, ownership, and vacancy rate; earnings-by-industry provides a measure of the health of local business activity; and school enrollment and capacity are important considerations in assessing the effects of potential growth.

Population

Table 3-38 presents population figures for Nevada and the five planning area counties from 2000 to 2005, when the populations in all counties increased, with the exception of Pershing County, whose population decreased by 4.52 percent. Lyon County experienced the largest increase (37.22 percent) in population. Washoe County was the most populous county in both 2000 and 2005, while Pershing County was the least populous county within the project area (US Census Bureau 2004). The population of Nevada increased by nearly 20.72 percent between 2000 and 2005. From 2000 to 2005, the population of all five counties had grown an average of approximately 15.34 percent to 485,344 people. Population growth was reflected mainly in an increase in the average number of households. The number of persons per household increased only in Pershing County and statewide (Table 3-40).

Churchill County's population is influenced by its proximity to employment centers outside the county, providing residences for workers with jobs primarily in Carson City, Fernley (Lyon County), and the Reno–Sparks area (Washoe County). Population fluctuations in Humboldt and Pershing Counties are most likely due to trends in the mining and farming industries. Mining replaced farming as the dominant economic sector in Humboldt County's economy, affecting employment, personal income, and other regional economic sectors. Most of Lyon County's growth is occurring at manufacturing sites in Fernley and along the lower Carson River, where present day "bedroom" communities (for Carson City) have taken the place of nineteenth century mining camps and milling

Table 3-38
County Population Totals 2000-2005

County	2000	2005	% Change 2000-2005
Churchill	23,982	24,680	2.91
Humboldt	16,106	17,155	6.51
Lyon	34,501	47,344	37.22
Pershing	6,693	6,390	-4.52
Washoe	339,486	389,775	14.81
Planning Area	420,768	485,344	15.34
Nevada	1,998,257	2,412,301	20.72

Sources: US Census Bureau 2004; BLM 2006c

Table 3-39
County Population Projections 2005-2025

County	2005	2010	2015	2020	2025	2005-2025 Change	2005-2025 Percent Change
Churchill	26,876	29,489	32,053	34,565	34,781	7,905	29.41
Humboldt	15,943	15,212	14,286	14,025	15,280	-663	-4.15
Lyon	45,317	54,385	62,547	69,469	88,548	43,231	95.39
Pershing	7,010	7,040	7,012	7,063	6,744	-266	-3.79
Washoe	385,887	415,402	442,878	466,546	579,299	193,412	50.12
Nevada	2,448,201	2,806,940	3,125,677	3,412,147	4,315,334	1,867,133	76.26

Source: Nevada State Demographer's Office 2007

Table 3-40
County Housing Estimates 2000-2005

County	Housing Units 2000	Vacancy Rate 2000	Persons per Household 2000	Housing Units 2005	Vacant Housing Units 2005	Persons per Household 2005	Housing Units Percent Change
Churchill	9,732	2.6%	2.64	10,332	820	2.64	6.16
Humboldt	6,954	3.9%	2.77	7,030	1,221	2.77	1.09
Lyon	14,279	3.1%	2.61	16,647	1,272	2.61	16.58
Pershing	2,389	3.5%	2.69	2,380	427	2.68	-0.37
Washoe	143,908	2.0%	2.53	168,342	11,824	2.53	16.97
Nevada	827,457	2.3%	2.64	1,019,427	76,292	2.62	23.20

Source: Nevada State Demographer's Office 2007

sites. While a significant portion of the county's population lives within this Dayton area, many of these persons hold jobs and are counted as being employed in Carson City. Population trends in Washoe County are heavily influenced by the Reno-Sparks area gaming industry, the most dominant industry in Washoe County in terms of jobs, payrolls, personal incomes, and its direct and indirect effects on other sectors of the county's economy (BLM 2006c).

Table 3-39 presents population projections for the five counties of the planning area and Nevada from 2005 to 2025. Humboldt County's population is expected to decline from 2005 to 2025 by 663 people (a decrease of 4.15 percent), as is Pershing County's population, which is projected to decline by 266 people (a decrease of 3.79 percent). The populations of all other counties in the planning area are expected to increase by a range of 29.41 percent to 95.39 percent by 2025. The population of Lyon County is projected to have the highest growth by 2025, growing by 43,231 people (an increase of 95.39 percent). By 2025, the population of Nevada is expected to increase by 1,867,133 people (an increase of 76.26 percent) (Nevada State Demographer's Office 2007).

Housing

Table 3-40 presents 2000 and 2005 housing data for the five planning area counties and Nevada. Washoe County and Lyon County have had the greatest percent increases, 16.97 percent and 16.58 percent, respectively, in the number of housing units added between 2000 and 2005. Pershing

County had a decrease in housing units by -0.37 percent. Between 2000 and 2005, Nevada increased its housing supply by 191,970 units (US Census Bureau 2004).

Employment

Table 3-41 provides basic data on employment in the six planning area counties and Nevada. Total employment for all of the counties in 2000 was estimated at 209,223 jobs, with an average unemployment rate of 7.3 percent. Of the planning area counties, Humboldt County had the largest unemployment rate (8.3 percent), while Washoe County had the lowest unemployment rate (5.0 percent). Nevada's unemployment rate of 6.2 percent was below that of the planning area's average of 7.3 percent.

Table 3-41
County Employment Statistics (2000)

County	Employed	Unemployed	Unemployment Rate
Churchill	10,288	641	5.9%
Humboldt	7,017	636	8.3%
Lyon	15,399	1,137	6.9%
Pershing	2,268	187	7.6%
Washoe	171,723	8,956	5.0%
Total Planning Area	209,223	11,770	7.3%
Nevada	933,280	61,920	6.2%

Source: US Census Bureau 2004

Table 3-42 provides a breakdown of the planning area counties' employment by sector and average sector growth between 1990 and 2000. On average, the category with the largest number of jobs and the largest sector growth within the counties was the services sector. Other industry sectors that experienced substantial employment increases within the six counties were the government, transportation/utility/information, and finance/insurance/real estate sectors. During the same decade, employment within the planning area decreased in the agriculture/forestry/fishing/mining sector by 33.7 percent and in the trade sector by 2.6 percent.

Table 3-42
County Employment by Sector and Average Sector Growth (1990-2000)

Sector (Total Percent Change)	Churchill	Humboldt	Lyon	Pershing	Washoe	Planning Area Total
Agriculture/Forestry/ Fishing/Mining (-33.7%)						
1990	728	1,850	895	675	2,993	8,540
2000	632	1,726	777	517	1,292	5,665
Construction (33.4%)						
1990	810	620	898	132	9,519	12,195
2000	958	559	1,464	95	13,008	16,270
Manufacturing (27.9%)						
1990	492	275	1,271	91	10,438	12,656
2000	854	252	1,892	177	12,903	16,184

Sector (Total Percent Change)	Churchill	Humboldt	Lyon	Pershing	Washoe	Planning Area Total
Transportation/ Utility/Information (28.4%)						
1990	517	384	466	116	11,995	13,620
2000	877	542	1,196	182	14,528	17,493
Trade (-2.6%)						
1990	1,341	1,193	1,530	359	29,364	34,175
2000	1,559	963	2,615	218	27,693	33,282
Finance/Insurance/ Real Estate (20.7%)						
1990	374	162	274	32	8,993	9,870
2000	343	103	790	46	10,584	11,909
Services (41.6%)						
1990	2,244	1,501	2,716	411	61,645	69,000
2000	3,989	2,447	5,470	707	84,268	97,699
Government (39.1%)						
1990	678	415	533	131	5,787	7,710
2000	1,076	425	1,195	326	7,447	10,721

Sources: US Census Bureau 2004; Bureau of Economic Analysis (BEA) 2004

The services sector was the only sector that experienced growth in all five counties, with the greatest increase occurring in Humboldt County (63.0 percent). Between 1990 and 2000, services in Humboldt County increased from 23.5 percent of the job sector to 34.9 percent. Pershing County had the second highest increase of 36.7 percent (increasing from 21.1 percent in 1990 to 31.2 percent in 2000). Accommodation and food services provided the highest percentage of employment in 2005 for the counties in the ROI for which detailed employment data by industry was available. Health care and social assistance and administrative and waste services also provided services sector employment (BEA 2009a, 2009b). These sectors typically derive their growth in response to growth in other industries and the demands of a growing population.

Schools and Protection of Children

In April 1997, President Clinton signed Executive Order (EO) 13045, Protection of Children from Environmental Health Risks and Safety Risks. This EO requires federal agencies to identify, assess, and address disproportionate environmental health and safety risks to children from federal actions. This section identifies school and student enrollment within the planning area.

The school districts of all five counties provided K-12 education for approximately 80,305 students during the 2004-2005 academic year. Washoe County had the largest student enrollment (63,322 students), and Pershing County had the smallest student enrollment (797 students) of the planning area counties (National Center for Education Statistics 2007).

Environmental Justice

On February 11, 1994, President Clinton signed EO 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. It requires federal agencies to identify and avoid disproportionate impacts on minority or low-income communities. This section identifies any minority or low-income communities that could be affected by the proposed project.

Table 3-43 provides demographic information for the five planning area counties in 2000. According to US Census Bureau data, the white population was the dominant race in all five planning area counties. The largest racial minority within the counties is Hispanic, followed by the Native American/Alaska Native population. The smallest racial minority groups represented in the planning area are the black/African American and the Asian/Pacific Islander population, each constituting 1.7 percent of the planning area population. Note, however, that the 2000 census included the option to report oneself as a member of two or more ethnic groups, and this factor may affect the reporting for certain ethnic groups.

Table 3-43
Total Percentage of Population by Race/Ethnicity (2000)

County	White	Black, African American	Native American, Alaska Native	Asian, Pacific Islander	Some Other Race	Two or More Races	Latino, Hispanic, Any Race
Nevada	75.2%	6.8%	1.3%	4.9%	8.0%	3.8%	19.7%
Churchill	84.2%	1.6%	4.8%	2.9%	3.2%	3.3%	8.70%
Humboldt	83.2%	0.5%	4.0%	0.7%	8.5%	3.1%	18.9%
Lyon	88.6%	0.7%	2.4%	0.7%	4.6%	2.9%	11.0%
Pershing	77.7%	5.3%	3.4%	0.8%	9.4%	3.3%	19.3%
Washoe	80.4%	2.1%	1.8%	4.8%	7.7%	3.3%	16.6%
Average Total	83.1%	1.7%	3.4%	1.7%	7.0%	3.0%	15.5%

Note: In combination with other races. The categorical figures/percentages may add up to more than the total population (100 percent) because individuals may report more than one race.
Source: US Census Bureau 2004

As discussed in Section 3.5.1, Tribal Interests, several tribes that use WDO lands have concerns regarding health and safety with respect to mining activities and overall pollution levels, as well as maintaining access to traditional lands and uses. These groups of Native Americans could be disproportionately affected by changes in land management, depending on the location, timing, extent, and types of changes that would be implemented. The concerns of these groups are described in Section 3.5.1, and the potential for effects on these populations is further discussed in Section 4.5.1, Environmental Consequences, Tribal Interests. While other racial and ethnic groups are present, there is no evidence to suggest that they would be disproportionately impacted by WDO land management decisions. To the extent that a particular racial or ethnic group would rely on ranching on WDO lands as a sole or primary source of income, that group could be disproportionately affected by decisions on grazing permits.

Table 3-44 provides income statistics for the planning area's five counties and for Nevada in 2000. The planning area's average median household income and per capita income, $43,534 and $19,902, respectively, are both slightly lower than that of Nevada, at $44,581 and $21,989, respectively. Housing would be affordable for the median income household if no more than 25 percent of the household income went to paying the mortgage, given a 20 percent down payment. Based on an interest rate of 8.03 percent in 2000, the median-value house would be affordable to the median income household in the ROI overall (Sonoran Institute and Headwaters Economics 2009).

In addition, the planning area counties have an average poverty rate of 10.5 percent, the same percentage as the statewide poverty level. The poverty line in 2000 for an individual of working age (under 65 years) was at $8,794; for a family of three it was $13,738 (average household size in the ROI was between two and three people), and for a family of four it was $17,603 (average family size in the ROI was between three and four people) (US Census Bureau 2009).

Table 3-44
Income and Poverty Statistics (2000)

County	Median Household Income	Per Capita Income	Percentage of Population Living in Poverty (2000)	Farm Income per Capita
Nevada	$44,581	$21,989	10.5%	$11,569
Churchill	$40,808	$19,264	8.7%	$7,539
Humboldt	$47,147	$19,539	9.7%	$20,130
Lyon	$40,699	$18,543	10.4%	$13,598
Pershing	$40,670	$16,589	11.4%	$11,877
Washoe	$45,815	$24,277	10.0%	$8,568
Average Total	$43,534	$19,902	10.5%	$12,661

Sources: US Census Bureau 2004; BEA 2009c

As shown in Table 3-44, farm incomes fell below the poverty line in Churchill and Washoe Counties and were below average per capita incomes throughout the ROI, except in Humboldt County. In all of the ROI, except Churchill and Washoe Counties, farm income per capita was above the state average. These figures indicate that changes that would affect grazing permittees and available AUMs could disproportionately affect low-income populations, to the extent that the incomes of grazing permittees in the WDO would be considered low-income and that these permittees rely on ranching on WDO lands as a sole or primary source of income. Farming/ranching was the primary source of income on roughly 38 percent of the WDO allotments (BLM 2009b).

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