3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

The Affected Environment chapter describes the present condition of the physical, biological, social, and economic environment within the U.S. Bureau of Land Management's (BLM) Vernal Planning Area (VPA) prior to the initiation of the Proposed RMP or any alternative. This chapter is organized by existing natural resources and describes the present uses of these resources, fire management, special land designations, and the present socioeconomic conditions. This information provides the basis for evaluating potential changes in the environment due to implementation of the Proposed RMP or any alternative.

3.1.1 GEOGRAPHIC SETTING

The vast area of the VPA covered by this Resource Management Plan (RMP) revision is located in northeastern Utah and includes the Uinta Basin, the East and West Tavaputs Plateaus, the Eastern Uinta Mountains, the Book Cliffs, Diamond Mountain, Nine Mile Canyon, and Browns Park. The area is bounded on the west by the Wasatch Mountains and on the east by the Douglas Creek Arch in Colorado. The Wyoming/Utah state line forms the northern boundary of the VPA, and the Tavaputs Plateau and the Book Cliffs form the southern boundary.

3.1.2 RESOURCE SETTING

Within the VPA, public lands administered by the BLM encompass 1,725,512 acres (approximately 30%) of the land area. Most of the land that the BLM manages is in the eastern and southern portions of the VPA and is generally characterized by habitats associated with the Colorado Plateau. Other government agencies that manage land in the area include the U.S. Forest Service (USFS), U.S. National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), Utah Division of Wildlife Resources (UDWR), and Utah School and Institutional Trust Lands Administration (SITLA). Additional lands are held in private ownership or are located within the boundaries of the Uintah and Ouray Indian Reservation.

The lands of the VPA are characterized by a variety of valuable natural resources, including oil, natural gas, minerals, livestock forage, and unique vistas and land formations that draw both developers and visitors to the area. These user groups place demands on the resources under the jurisdiction of the BLM that either directly or indirectly affect the management of associated resources.

3.2 AIR QUALITY

Air quality within the VPA and its surrounding airshed has the potential to be affected by such activities as emissions from the construction and operation of oil and gas facilities, access roads, and other elements of management activities. This section describes the existing air quality resource of the VPA and the applicable air regulations that would apply to the alternatives.

3.2.1 REGIONAL OVERVIEW

The climate in the VPA is characterized as arid, with cold winters and hot summers. Annual precipitation (rainfall and snowfall) in the VPA ranges from 8 to 35 inches and is dependent largely on elevation and aspect. Temperature inversions, where air temperatures near the ground are colder than the temperatures above, are common in the basins and other lower elevational areas of the VPA. Inversions commonly occur in winter when snow accumulation on the ground combines with short daylight hours. In summer, inversions dissipate rapidly when early morning sunlight warms the air near the ground surface. Inversions can hinder air pollutant dispersion by preventing emissions from mixing with the ambient air in the vertical direction. On average, mean morning mixing heights in the area are approximately 1,000 feet; mean afternoon mixing heights are more than 7,800 feet (Holzworth 1972). Mean morning mixing heights tend to be lowest in summer and fall, and highest in winter.

Air pollutant dispersion in the VPA is also dependent on wind direction and speed. Wind information available from the Western Regional Climatic Center (WRCC) and the BLM as part of their remote automated weather stations (RAWS) project (http://raws.dri.edu/) for 1996 show that although wind direction is highly influenced by the local terrain, the wind direction in the northern portion of the VPA tends to be northwesterly, i.e. blowing from the northwest to the southeast (Kings Point – Dutch John RAWS station). The wind direction in the western and southern portions of the VPA tends to be southwesterly, i.e., blowing from the southwest to the northeast (Five Mile - Duchesne and Winter Ridge RAWS stations, respectively). Figure 3.2.1 presents representative windroses for these locations in the VPA.

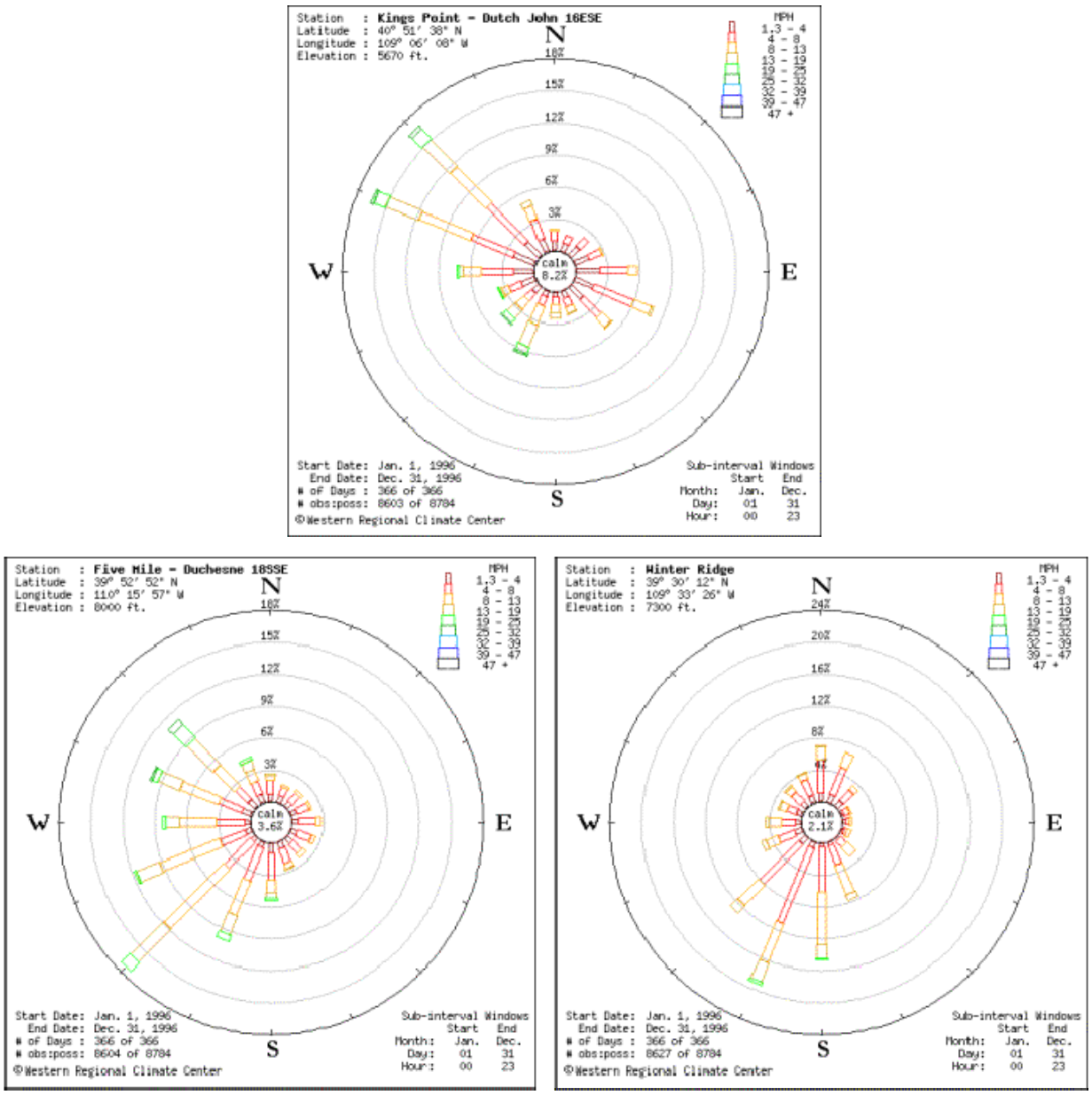

Figure 3.2.1. Representative windroses for the VPA (RAWS data, 1996).

3.2.2 Baseline Air Quality

The VPA is located in a region designated as unclassifiable for PM_{10} and unclassifiable/attainment for all other airborne pollutants [See 40 CFR Part 81] (L. Svoboda, EPA Region VIII, 2005).

3.2.3 REGULATORY SETTING

The U.S. Environmental Protection Agency (EPA) delegates the authority to manage air resources to the state when a State Implementation Plan (SIP) is approved and implemented. The UDEQ currently has approved SIPs for air quality programs under its jurisdiction, and the EPA has delegated authority for all air quality issues in the State of Utah, excluding Uintah and Ouray Indian Reservation lands. The air quality in Utah is currently regulated by the Utah Division of Air Quality (UDAQ). All stationary sources of air pollution are subject to the air quality regulations and standards under the UDEQ administration.

A portion of the VPA is located within the Uintah and Ouray Indian Reservation. The UDEQ does not have authority to administer air quality programs on Uintah and Ouray Indian Reservation lands. Sources located within Native American Indian Territory are not regulated by any SIP approved programs; and they are subject only to the federal air quality programs under the authority of EPA Region 8.

The Federal Clean Air Act (FCAA) amendments of the 1990s require all states to control air pollution emission sources so that national ambient air quality standards (NAAQS) are met and maintained.

In addition to these requirements, the National Park Service (NPS) Organic Act requires the NPS to protect the natural resources of the lands it manages from the adverse effects of air pollution. In 1978, the US Forest Service (USFS) Air Monitoring Program was established to protect all USFS managed lands from the adverse effects of air pollution. In 1988, the USFS became a primary participant in the national visibility monitoring program titled Interagency Monitoring of Protected Visual Environments (IMPROVE). Starting with the enactment of the Regional Haze Rule, the USFS has provided regional haze monitoring representing all visibility-protected federal VRM Class I areas where practical.

Air quality in a given location is defined by pollutant concentrations in the atmosphere and is generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). One measure of a pollutant is its concentration in comparison to a national and/or state ambient air quality standard. The National Ambient Air Quality Standards (NAAQS) and Utah Air Quality Standards are health-based criteria for the maximum acceptable concentrations of air pollutants (with a margin of safety) at all locations to which the public has access. The NAAQS are established by the EPA and are outlined in the Code of Federal Regulations (40 CRF 50). An area that does not meet the NAAQS is designated as a nonattainment area on a pollutant-by-pollutant basis. The State of Utah has adopted the NAAQS as state air quality standards. In 2004, the EPA passed a suite of actions called the Clean Air Rules of 2004 aimed at improving America's air quality. Two of the rules, the Nonroad Diesel Rule and the Ozone Rules, will potentially improve the future air quality of the VPA.

3.2.4 REGIONAL AIR EMISSIONS

The VPA covers Daggett, Duchesne, and Uintah Counties and part of Grand County. Currently, emission sources within the VPA consist of mostly oil and gas development facilities and mining

sites. There are also fugitive dust sources associated with these sites, construction activities and roadways. A detailed listing of emission sources in and around the VPA, along with information on how specific sources were addressed in the air quality modeling, is available the TSD (Trinity and Nicholls, 2006, tabular source information is found in Appendix C).

3.2.4.1 National Ambient Air Quality Standards (NAAQS) and Criteria

The significant criteria for potential air quality impacts include NAAQS requirements for CO, PM_{10}, $PM_{2.5}$, SO_2, O_3, and NO_2/NO_x. Applicable federal and state criteria are presented in Table 3.2.1.

Table 3.2.1. Applicable Ambient Air Quality Standards

Pollutant	Averaging Period	National Ambient Air Quality Standards ($\mu g/m^3$)	State Ambient Air Quality Standards ($\mu g/m^3$)
CO	1-Hour [a]	40,000 $\mu g/m^3$	
	8-Hour [a]	10,000 $\mu g/m^3$	
PM_{10}	24-Hour [a]	150 $\mu g/m^3$	
$PM_{2.5}$	24-Hour [c]	35 $\mu g/m^3$	
	Annual [b]	15 $\mu g/m^3$	
SO_2	3-Hour [a]	1,300 $\mu g/m^3$	700 $\mu g/m^3$ [d]
	24-Hour [a]	365 $\mu g/m^3$	260 $\mu g/m^3$ [e]
	Annual [b]	80 $\mu g/m^3$	60 $\mu g/m^3$ [e]
O_3	8-Hour	0.075 ppm	
NO_2	Annual [b]	100 $\mu g/m^3$	

[a] Not to be exceeded more than once per year on average over 3 years.

[b] The 3-year average of the weighted annual mean. PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 ug/m^3.

[c] The 3-year average of the 98th percentile of 24-hour concentrations must not exceed 35 $\mu g/m^3$

[d] Colorado standard, more stringent than the NAAQS.

[e] Wyoming standard, more stringent than the NAAQS.

3.2.4.2 Criteria for Prevention of Significant Deterioration (PSD)

The applicable air quality criteria also include the PSD increments, which limit the incremental increase of PM_{10}, SO_2 and NO_2 above the legally defined baseline levels. A PSD Increment is the maximum increase in ambient concentrations that is allowed to occur above a baseline concentration for a pollutant. The increments are evaluated for both the Class I and Class II areas. PSD Increments have not yet been established for $PM_{2.5}$ and are not addressed in increments analysis.

The National Ambient Air Quality Standards (NAAQS) and Utah Air Quality Standards are health-based criteria for the maximum acceptable concentrations of air pollutants at tall locations to which the public has access. All NEPA analysis comparisons to the PSD Class I and II

increments are intended to evaluate a threshold of concern for potential impacts, and do not represent a regulatory PSD Increment Consumption Analysis. The determination of PSD increment consumption is a regulatory agency responsibility conducted as part of the New Source Review process, which also includes a Federal Land Management Agency's evaluation of potential impacts to Air Quality Related Values (AQRV) such as visibility, aquatic ecosystems, flora, fauna, etc.

Although the EPA has revised the $PM_{2.5}$ (particulate matter less than 2.5 microns in effective diameter) Ambient Air Quality Standard, this revised limit will not be enforceable until formally approved. However, due to public concern and possible impacts on human health and visibility, $PM_{2.5}$ is being considered in this analysis. Current NAAQS and Utah Air Quality Standards, and PSD Class I and II increments are discussed below. The increment standards addressed in this study are listed in Table 3.2.2.

Table 3.2.2. Increment Standards for Class I and Class II Areas

Pollutant	Averaging Period	Class I Increment ($\mu g/m^3$)	Class II Increment ($\mu g/m^3$)
PM_{10}	24-Hour	8	30
	Annual	4	17
SO_2	3-Hour	25	512
	24-Hour	5	91
	Annual	2	20
NO_2	Annual	2.5	25

The PSD Class I Areas included in the analysis are listed in Table 3.2.3. Limitations on the additional amount of air pollution allowed in these areas from major emitting facilities are strict. The remainder of the project area is classified a PSD Class II, where similar but less stringent incremental pollution limits apply. These increments are shown in Table 3.2.2.

Potential air quality impacts from the Proposed RMP and Alternatives are analyzed and reported in Chapter 4. However, the analysis is prepared solely under the requirements of NEPA, in order to assess and disclose "reasonably foreseeable" impacts to both the public and the Bureau decision maker before a Record of Decision is issued. Due to the preliminary nature of the NEPA air quality assessment, it should be considered a reasonable upper estimate of potential impacts. Actual impacts at the time of development may be lower.

UDEQ is the air quality regulatory agency responsible for determining potential impacts once detailed development plans have been made, subject to applicable air quality laws, regulations, standards, control measures and management practices. Therefore, the State of Utah has the ultimate responsibility for reviewing and permitting air pollutant emission sources before they become operational. EPA has this responsibility on tribal lands. Representative background concentrations recommended by UDEQ and other appropriate sources were added to the modeled results for comparison to the appropriate ambient air quality standards as outline in Table 3.2.4.

Table 3.2.3. Sensitive Areas to Be Considered in the Analysis

Mandatory Federal Class I Area (unless otherwise specified) [a]	Managing Agency [b]	Class Category	State
Arches NP	NPS	Class I	UT
Browns Park NWR	USFWS	Class II	UT
Canyonlands NP	NPS	Class I	UT
Capitol Reef NP	NPS	Class I	UT
Dinosaur NM	NPS	Class II[c, d]	UT/CO
Flaming Gorge NRA	FS	Class II[e]	UT/WY
High Uintas WA	FS	Class II[c]	UT
Ouray NWR	USFWS	Class II	UT
USFS Request (Areas near Mount Olympus, Twin Peaks, Lone Peak, Mount Timpanogos, and Mount Nebo)	FS	Class II	UT

[a] NP= National Park, WA=Wilderness Area, NWR=National Wildlife Refuge, NM=National Monument, NRA=National Recreation Area.

[b] NPS= USDI - National Park Service. USFWS = US Fish & Wildlife Service, FS= USDA - Forest Service.

[c] Sensitive Class II areas included in the analysis. (Archer, 2001a and Archer, 2002a)

[d] SO2 increments in these Class II areas in Colorado have the same protection as Class I areas.

[e] Sensitive Class II areas included in the analysis per CDPHE. (Machovec, 2002)

Sensitive areas of the Ute Indian Tribe were also considered.

Table 3.2.4. Background Concentrations for Vernal RMP Area

Pollutant	Annual ($\mu g/m^3$)	24-Hour ($\mu g/m^3$)	8-Hour ($\mu g/m^3$)	3-Hour ($\mu g/m^3$)	1-Hour ($\mu g/m^3$)	Monitoring Station Location Description
NO_2	10	-	-	-	-	Recommended by the Utah Dept. of Environmental Quality.[a]
SO_2[b]	5	10	-	20	-	Estimates based on the 1993 PSD application for Bonanza Power Plant, Deseret Generation and Transmission.
PM_{10}	10	28	-	-	-	Recommended by the Utah Department of Environmental Quality.[a]
CO[c]	-	-	4,236	-	6,984	Grand Junction, Mesa County, Colorado. (Highest monitored concentration in 2001.)[d]

[a] Background concentrations recommended by the Utah Department of Environmental Quality in memorandum No. DAQP-003-03, dated on January 17, 2003 from Richard W. Sprott to Yu Shan Huang.

[b] The SO2 background concentrations are provided by Tom Orth, UDEQ. (Orth 2002)

[c] The CO concentrations are reported in ppm: 8-hr, 3.7 ppm; 1-hr, 6.1 ppm.

[d] Monitoring station was nearest to the Vernal RMP area. This background concentration is a conservatively high estimate for the Vernal RMP area since it was measured in an urban area.

3.2.4.3 VISIBILITY CRITERIA

Federal Class I areas, which include certain national wilderness areas, national memorial parks, and national parks, are afforded the highest level of protection. Ambient air increments that apply within Class I areas are more stringent than those that apply to other areas (i.e., Class II areas). In addition to more stringent ambient air increments, Class I areas are also protected by the regulation of AQRVs within their borders. Federal Land Managers (FLMs) are responsible for the management of Class I areas. Mandatory Federal Class I areas (sensitive areas) considered in the Air Quality modeling methodology for the Vernal and Roan Plateau air analysis were Dinosaur National Monument, Canyonlands National Park, Flaming Gorge NRA, Arches National Park, and Capitol Reef National Park.

3.2.5 CONSISTENCY WITH NON-BUREAU PLANS

The Vernal Field Office manages its resources consistent with other plans not administered by the BLM. EPA Region 8 regulates all air quality related issues in the Uintah and Ouray Indian Reservation; while the UDEQ regulates the air quality related issues in the state of Utah, except on Indian lands.

In addition to the federal and state air quality programs mentioned in the previous section, the BLM is also committed to manage the VPA consistent with the Utah Smoke Management Plan (SMP). The BLM, U.S. Forest Service, National Park Service, Utah Department of Natural Resources, U.S. Fish and Wildlife Service, and the UDEQ currently have a signed Memorandum of Understanding (MOU) in place to regulate the prescribed burning activities in Utah (UDAQ 1999). The MOU requires the BLM to report all prescribed fire activities to the SMP program coordinator. UDEQ has incorporated the SMP into UAC R307-204 in 2001. Each prescribed fire must first be approved by the SMP through issuance of a burn permit in order to assure that the burning activity will not cause dangerous air quality conditions.

3.2.6 GLOBAL CLIMATE CHANGE

On-going scientific research has identified the potential impacts of climate changing pollutants on global climate. These pollutants are commonly called "greenhouse gases" and include carbon dioxide, CO_2; methane; nitrous oxide; water vapor; and several trace gas emissions. Through complex interactions on a regional and global scale, these emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space. Although climate changing pollutant levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused CO_2 concentrations to increase dramatically, and are likely to contribute to overall climatic changes, typically referred to as global warming. Increasing CO_2 concentrations also lead to preferential fertilization and growth of specific plant species.

Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies, 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Figure 3.2.2 demonstrates that northern latitudes (above 24° N) have exhibited temperature

increases of nearly 1.2°C (2.1°F) since 1900, with nearly a 1.0°C (1.8°F) increase since 1970. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of these "greenhouse gases" are likely to accelerate the rate of climate change.

The Intergovernmental Panel on Climate Change (IPCC) has recently completed a comprehensive report assessing the current state of knowledge on climate change, its potential impacts, and options for adaptation and mitigation. At printing of this PRMP/FEIS, this assessment is available on the IPCC web site at http://www.ipcc.ch/. According to this report, global climate change may ultimately contribute to a rise in sea level, destruction of estuaries and coastal wetlands, and changes in regional temperature and rainfall patterns, with major implications to agricultural and coastal communities. The IPCC has suggested that the average global surface temperature could rise 1 to 4.5 degrees Fahrenheit (°F) in the next 50 years, with significant regional variation. The National Academy of Sciences (2006) has confirmed these findings, but also indicated that there are uncertainties regarding how climate change may affect different regions. Computer models indicate that such increases in temperature will not be equally distributed globally, but are likely to be accentuated at higher latitudes, such as in the Arctic, where the temperature increase may be more than double the global average (BLM 2007). Also, warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. Vulnerabilities to climate change depend considerably on specific geographic and social contexts.

The BLM recognizes the importance of climate change and the potential effects it may have on the natural environment. Several activities occur within the planning area that may generate emissions of climate changing pollutants. For example, oil and gas development, large fires, and recreation using combustion engines, can potentially generate CO2 and methane. Wind erosion from disturbed areas and fugitive dust from roads along with entrained atmospheric dust has the potential to darken glacial surfaces and snow packs resulting in faster snowmelt. Other activities may help sequester carbon, such as managing vegetation to favor perennial grasses and increase vegetative cover, which may help build organic carbon in soils and function as "carbon sinks".

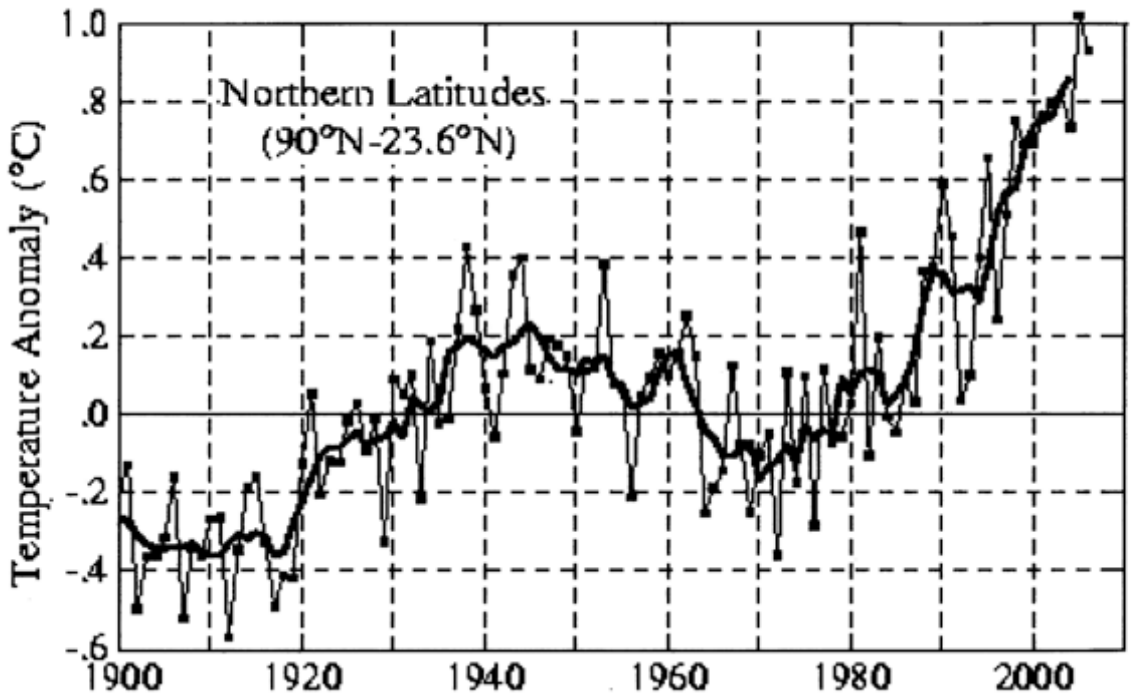

Figure 3.2.2. Annual mean temperature change for northern latitudes (24–90° N). Source: Goddard Institute for Space Studies (2007).

3.3 CULTURAL RESOURCES

The VPA has a wide array of environmental settings and resources long used by humans. Consequently, the VPA encompasses a large and diverse assemblage of prehistoric archaeological sites, historical archaeological sites and localities, and locations of traditional cultural value. For the purpose of this chapter, *cultural resources* are defined as both prehistoric and historical archaeological sites and structures, as well as non-archaeological and non-structural sites (i.e., waterways, view sheds, and resource areas) that have been identified as important for traditional and/or ideological reasons by the various Native American groups with ancestral and/or present ties to the area. Many of these cultural resources have multiple associations and use values. These non-renewable resources provide a record of prehistoric and historical cultures and events and have use value for many contemporary groups including local residents, scientists, and Native Americans.

3.3.1 PREVIOUS PROJECTS AND KNOWN CULTURAL RESOURCE TYPES WITHIN THE VPA

Various explorers, scholars, government institutions, academic institutions, and private cultural resource consulting firms have carried out anthropological and archaeological research within the VPA. The quality and quantity of research carried out by these different entities has, to date,

proven highly variable. Previous research projects range from small surveys of a limited geographic area to large, linear projects spanning the entire VPA.

Beginning as early as 1892 and extending to 1926, approximately seventeen significant archaeological projects were completed in the Uinta Basin. These projects recorded numerous sites and recovered many artifacts and data. As most of these projects were undertaken in a period when rigorous scientific standards were not the norm, much of the data is poorly recorded, reports are descriptive or speculative in nature, or data has been lost. Nonetheless, these early reports remain valuable as descriptive or comparative sources of data (Spangler 1995:81).

By the mid-1930s, the application of more rigorous and systematic archaeological standards was becoming more common. Beginning in this period, researchers focused on areas where high site frequencies were anticipated (i.e., in canyons, along drainages, near permanent water, etc.). As expected, research in these areas yielded high frequencies of sites with evidence of permanent settlement and horticulture. Areas that have been studied in this manner include the Dinosaur National Monument area, Nine Mile Canyon, and various areas along the Tavaputs Plateau and Uinta Basin foothills (Spangler 1995:181). Prior to the 1970s, archaeologists associated with universities or research institutions carried out archaeological research in these areas. The passage of several environmental protection laws during the 1960s and 1970s (the foremost being the National Historic Preservation Act of 1966) spurred cultural resource management archaeology across the country. In the Uinta Basin, the first significant cultural resource management projects were carried out in the 1950s and 1960s, with a quantitative jump noted in the early 1970s (Spangler 1995:190). Since the 1930s, more than 62 significant archaeological projects have been completed in the Uinta Basin (Spangler 1995). Numerous archaeological sites were recorded during these projects, with large numbers recommended eligible to and many actually nominated to the NRHP (Appendix D).

3.3.2 Prehistoric and Ethnographic Site Types

The following section provides a basic description of the primary known prehistoric site types within the VPA. Some site types, such as artifact scatters, are included because they are common throughout the area and are a major component of the Section 106 compliance workload for BLM archaeologists. Others, such as burials, rock art, and ceremonial sites, may not occur in as large numbers as do artifact scatters but are included because they represent significant management challenges to the BLM due to their importance to Native American tribal groups.

Rock Art – A large number of rock art sites have been identified in the Uinta Basin and more are likely to exist. Rock art sites identified in the Uinta Basin are highly variable and may range from one depiction to a panel or series of panels with numerous depictions. Some sites contain large, multiple, and interconnected rock art panels. In addition to variations in size, numerous different rock art styles have been recorded in the Uinta Basin. In some instances rock art is located near other types of sites; in other instances, rock art is isolated. As rock art is frequently located in difficult terrain, a comprehensive survey of existing rock art and its relationships to other sites has been difficult to complete. Finally, rock art sites have routinely been subjected to acts of vandalism and are susceptible to deterioration (Spangler 1995:140-145). Currently, there

remains much to be learned regarding known rock art sites with a high probability for further significant rock art discoveries.

Well-preserved Open Camp and Village Sites – Open camp and village sites are similar large prehistoric occupations, distinguished primarily on the basis of the presence or absence of residential structures. Campsites located on plateaus, outcrops, and valley floors characterize open campsites. These sites typically have evidence of lithic scatters, ceramic scatters, and projectile points, and are often defined on the presence of remnants of hearths and other features. Many of the sites have been characterized as hunting and butchering activity areas.

Platform Sites – Platform sites, or sites located on top of flattened knolls, are rare within the Uinta Basin. One site overlooking the Green River is an unusual site on a knoll that appears to have been leveled off, whether manually or by environmental processes is unknown. The leveled surface of the knoll has a circular structure made of flat sandstone slabs approximately 1.5 feet high with the interior filled with a light-colored clay material. This structure is unknown in function and, to date, it is the only known feature of its type within the Uinta Basin. Others could be present with the Uinta Basin, but have yet to be discovered.

Rock Shelters and Caves – As their name implies, rock shelter sites contain evidence of human occupation located within existing rock overhangs or caves. The range of rock shelter sites includes relatively long-term single occupations, multiple reuse occupations through time, and ephemeral single-use episodes. Rock shelters and caves are generally located within canyons, near permanent water sources, such as rivers or streams. Most of these sites also tend to be located on the southern side of canyons (Spangler 1995:162), although they can be found within any portion of geologically suitable areas.

Prehistoric Architectural Sites – A relatively wide range of site types is included in this category. Architectural sites have been recorded in open-air and sheltered settings, at nearly all elevations, and in virtually every environment within the Uinta Basin. However, some types of architecture are restricted to only certain regions or settings. To date, the range of architectural sites includes stone or masonry structures, pit structures, temporary brush structures, tipi rings, sweat lodges, storage structures or granaries, stone alignments or walls, cairns, and rubble mounds. Structures such as tipi rings, temporary brush structures, and perhaps sweat lodges are located in more open environments, on knolls, cliff edges, or terraces. Stone or masonry structures, granaries, and often walls are found in cliffside rock shelters, in canyons or on ledges. Other stone or masonry structures can also be found in open areas, stream and river terraces, upland ridges, small cliff openings, and butte or mesa faces. Typically, such structures are found within reasonable proximity of sandstone formations and outcrops, which provide much of the source material for building them.

Prehistoric Artifact Scatters – Prehistoric artifact scatters may be encountered in open-air or sheltered settings and in nearly all environment types and elevations. These types of sites are located throughout the Uinta Basin and number from the hundreds to the thousands. Artifact scatters typically consist of lithic artifacts such as chipped stone debitage, tools, cores, and tool and core fragments. However, many artifact scatters may also contain ceramic artifacts, groundstone artifacts, or a combination of lithic, ceramic, and groundstone artifacts. Previously

recorded artifact scatters in the Uinta Basin range from only a few to hundreds (or even thousands) of artifacts. Artifact scatters do not typically contain evidence of architecture, although smaller features, such as hearths, may be present either on the surface or below the surface. The function of artifact scatters is highly variable and can be subject to differing interpretations. Minimally, artifact scatters are likely to have been involved in short-term land-use settlement systems.

Prehistoric Resource Procurement Sites – Locations where prehistoric populations procured a specific resource are common within the Uinta Basin. A wide range of resources appear to have been exploited in a manner that left archaeological evidence, including game animals (hunting sites), chipped stone materials (lithic procurement sites), and floral materials (botanical processing sites). Several different hunting site types have been identified to date, including hunting blinds, game drives, game traps, and butchery sites. Hunting sites can be designed to either funnel game toward a desired goal or to hide the hunter in ambush-style hunting. In general, hunting sites are identifiable due to the strategic placement of rock or brush structures along game trails, water sources, near topographic features that restricted game movement, or in locales that provide an advantage in elevation. Butchery sites are typically identified by the presence of high numbers of animal bones that bear evidence of processing - such as cut marks or diagnostic breakage patterns. In many instances, the kill location and butchery location are the same.

Prehistoric Ceremonial Sites – Ceremonial sites are usually located in areas with panoramic views, and are recognized by the presence of a stone circle or alignment that contains little or no artifacts. Ceremonial sites are interpreted as vision quest locations (Reed and Metcalf 1999:52). The vision quest interpretation has largely been inferred from ethnographic work among modern Native American groups. However, the actual nature of prehistoric ceremonial sites is currently not well understood.

Prehistoric Isolated Features – Sites recorded as prehistoric isolated features typically consist of one isolated cultural feature that has few or no associated artifacts. In many instances the isolated feature is unidentified, while in other cases the feature is identified as a simple cultural feature (i.e., a cairn, etc.).

Prehistoric Landscapes – Prehistoric landscapes are a type of cultural resource that encompasses a range of cultural resource sites within a given environment. The study of prehistoric landscapes is a relatively new endeavor in the New World. This approach has become more common in the Old World, namely Great Britain and Europe. The interaction of human sociopolitical and economic systems and the landscapes in which humans live and create environments is one main focus of research into landscape archaeology. In short, prehistoric landscape can be defined as including humans and their anthropogenic ecosystem.

The types of landscapes that could be characterized within the Uinta Basin include canyons and plateaus. These encompassing landscapes are large in scale, but contain hundreds of smaller, more distinct units of residential dwellings, storage areas, resources scatters, etc., that make up the landscape. Individually, the sites within a given landscape may not be particularly noteworthy or significant. However, when each site is taken into consideration with other,

geographically close sites, a landscape emerges that encompasses multiple types of past human uses of the landscape. These individual sites cluster together in a setting that sets it apart from the region as a whole. These landscapes could also have importance for extant Native American tribes as sacred or important places with cultural importance.

Prehistoric Trails – Travel routes along river corridors and open drainages were common ways for prehistoric peoples to get from area to area. The White River was a traditional Ute travel route within the eastern Uinta Basin to western Colorado (Spangler 1995:872). Other trail areas have been formally identified to the east of the region (Reed and Metcalf 1999:51) as well as in the Book Cliffs (Blaine Phillips personal communication 2002), and additional unidentified prehistoric and protohistoric trails are likely to exist within the region. Prehistoric trails could potentially be identified through remote sensing and ground-truthing.

3.3.3 HISTORICAL SITE TYPES

The following section provides a basic description of the primary known historical site types within the VPA. Undoubtedly, other site types do exist within the area, but those listed here comprise the bulk of historical sites currently managed by the BLM.

Historical Architectural Sites – Historical architecture sites range from simple one-room cabins to multi-story and multi-room structures. Historical structure sites may contain abandoned structures or evidence of structures, while other sites might consist of a structure or structures that are still in use. To date, historical architecture sites include structures such as cabins/homesteads, forts or military posts, trading posts, private residences, line shacks, civic structures, stone or masonry walls, fences, corrals or pens (both Anglo and Ute), sheds, barns, or outhouses. Although typically located in desirable areas or near reliable water sources, historical architecture can be found in nearly every setting or environment. Among the more common structural sites with the VPA are those towns, such as Dragon, Watson, and Rainbow mines, and rail sidings associated with gilsonite mining in the region.

Artifact Scatters/Middens – Historical artifact scatters and middens may consist of one or more of the following: glass, ceramics, cans, building materials, barbed wire, cartridge cases, faunal material, personal items, or miscellaneous artifacts. Artifact densities may range from relatively sparse to relatively dense scatters. Historical artifact scatters can represent light or intense land use, and can be encountered in nearly any environment or elevation. Artifact scatters may be associated with isolated residences, larger settlements, campsites, or, they may be the result of random dumping episodes.

Aspen Art and Historical Inscriptions – Aspen art (i.e., dendroglyphs) and historical inscriptions are present on BLM lands within the VPA. These inscriptions have been found both on trees (primarily aspen) and on rock faces. Aspen art is considered to be any historical carving or engraving made on trees. Aspen art includes carvings related to activities such as settlement (e.g. as property markers) as well as random works found near roads or near historical campsites. The frequencies of aspen art range from a single mark, multiple markings on one tree, or a series of markings on multiple trees. Aspen art is often associated with particular ethnic groups, such as the Basque (primarily in Nevada), or with particular labor groups, such as sheepherders, timber

men, and others who spend time within aspen groves. Elsewhere in Utah, particular groves of trees became favorites for carvers, and dozens of inscriptions can be found which span long periods of time. These groves essentially became historical "message boards" for users of the area.

Historical Burials/Cemeteries – Early historic period burials may consist of isolated burials of a few or one individual, while early cemeteries will contain numerous individuals. Currently, several cemeteries exist within the Uinta Basin. In addition, several isolated burials, located both on public and private land, have been recorded. Other isolated burials might yet be encountered.

Irrigation Systems/Canals – The development of agriculture and ranching in the Uinta Basin often required the building of waterworks to bring water into relatively dry regions. In general, irrigation works are considered as improvements, which have been made on natural drainages, or as the construction of new waterways. Irrigation works can include ponds, dams, concrete, stone-lined or earthen ditches or canals, headgates, culverts, diversion gates, or wells.

Mining Sites – In many parts of the Uinta Basin, the mining industry has played an important economic role. Mining related sites are variable. Recorded examples include small-scale mining efforts at one locale, small-scale operations at multiple sites, and complex mining works at one or more locations carried out by large mining firms. The goals of Uinta Basin mining efforts are also varied, with several different kinds of precious metals (i.e., gold, silver, copper, and uranium), minerals, and hydrocarbons sought. Besides the actual mine or quarry, mining sites can have related architecture, temporary camps, ore piles, middens, artifact scatters, burials, or aspen art located nearby. Additionally, railroads constructed specifically to serve the mining industry may also be associated with mine sites.

Oil and Gas Industry Sites – Oil and gas industry historical sites can consist of pipelines, wells, processing and transport facilities, and "prospects." The first well in the Uinta Basin was drilled on the East Tavaputs Plateau in 1900 (Spangler 1995:822). Although unsuccessful, the sinking of this first well foreshadowed the fervent activity that would occur in the area 40 years later. While more than 40 wells were drilled in the Uinta Basin between 1908 and 1913, most historical archaeological and structural sites associated with the industry date to the post-World War II era, when oil and gas exploration began in earnest.

Privies/Outhouses – Prior to the installation of buried sewer lines, sanitation facilities often consisted of excavated pits designed to collect and contain waste. Although originally intended to serve as sanitation facilities, privies often served as secondary refuse dumping locales. Also during use, personal items were often accidentally dropped into privies. Through secondary dumping and accidental loss, many privies contain high frequencies of artifacts. As privies routinely contain high numbers of artifacts, in an often-undisturbed subsurface deposit, privies may serve as valuable sources of data. Privies are routinely found in association with campsites, private residences, public structures, military posts, and commercial buildings. Privy sites have been found on mining sites and other industrial sites as well. No clear indication of the frequency and/or distribution of such sites could be gleaned from Spangler (1995), thus it is unclear how many historical privies and outhouses are present on BLM lands within the VPA. However,

given their general association with permanent and/or long-term occupation sites, few privies are likely to be found on BLM lands.

Historical Transportation Sites – Establishing efficient transportation routes was one of the main goals of explorers and settlers during the settlement of the west. The Uinta Basin was no different. As Euroamericans settled the Uinta Basin, establishing efficient travel avenues was of vital importance in aiding the growth of settlements, the mining industry, and the agriculture and ranching businesses. To date, identified transportation related sites include trails, paths, paved or unpaved roads, bridges, railroads, wagon or stagecoach routes, stagecoach or railroad stops, railroad section stations, ferry sites, and airstrips or runways. Furthermore, as trappers and fur traders routinely used waterways for travel, the shores of various sections of waterways might contain evidence of early travel. Several East-West and North-South transportation routes used and developed by the Northern Ute bands in the 19th and early 20th centuries are known within the VPA. These include "Pony Trails" and "Wagon Trails". These routes gave access into and out of western Colorado and into and out of the San Rafael area of Utah. Burials, rockart and other site types are associated with these routes.

3.3.4 Non-Archaeological Site Types

Non-archaeological site types are distinguished from archaeological site types in order to discuss places that are not necessarily associated with prehistoric or historical artifacts assemblages and collections. Tribal representatives typically identify these sites during the government-to-government consultation process that is required of federal agencies. However, Traditional Cultural Properties can also be identified by representatives of other culture groups, such as historical culture groups associated with the Euro-American migration to the western United States. Some common site types are lakes and springs, land features, and traditional gathering or collection areas.

Lakes and Springs – Several tribes, including the Shoshone and Ute, claim places of water as places of traditional importance and have traditional stories about mythical beings, or water spirits that live in lakes, rivers, and springs (Spangler 1995). No specific places of this type have been identified in lands managed by the VFO. However, an ethnographic overview for the Flaming Gorge Dam Environmental Impact Statement prepared by SWCA for the USBR recorded several stories about "water babies" and other mythical beings seen in the Green River in historic times (Rhodenbaugh and Newton 2000). None of these areas were identified as Traditional Cultural Properties.

Traditional Gathering or Collection Areas – Traditional plant or other resource gathering areas may be places of traditional importance to Native American groups. These areas are generally places where Native Americans go to collect resources such as medicinal plants used and minerals to be used in ceremonies and are often in current use when identified. Recently, Native Americans have also identified hunting areas as Traditional Cultural Properties (Newton and Hancock 2000). No specific places of this type have been recorded on lands managed by the VFO.

Land Features – Large geographic regions, such as deserts, mountain ranges, and valleys are often identified as Traditional Cultural Places but few have been formally documented as such. According to Deloria and Stoffle (1998), the Oquirrh Mountains and Granite Mountain near Salt Lake contains various places that are considered to be traditionally important or sacred to the Goshute Indians. Deloria and Stoffle did not specify what these places were or precisely where they were located. Bull Lake, which is located on the Wind River reservation, is considered to be a place of traditional importance to the Eastern Shoshone (Shimkin 1986). It is said that Bull Lake is where monsters live and if eaten, the monsters will change into water buffalo and disappear. No specific places of this type have been recorded on lands managed by the VFO.

3.3.5 General Site Locations and High Site Density Areas

Cultural resources are scattered throughout the VPA. Present knowledge of their locations is largely constrained by the nature of cultural resource investigations, most of which have been driven by the Section 106 compliance needs of development projects. As such, existing data on site types, locations, and significance (use values) consists of snapshots across the VPA rather than a comprehensive picture. Nevertheless, based on these data, as well as on a number of overview surveys, it is possible to define the types of environmental settings where prehistoric and historical sites are more or less likely to occur. Overview surveys and existing data provide a general picture of site location tendencies that can be used to describe the places where prehistoric and historical sites are likely to exist.

During the late 1970s and early 1980s a number of surveys called "Class II" surveys were undertaken in order to attempt to determine if environmental variables could predict prehistoric archaeological site location in a way that would preclude the need to conduct formal surface inventories in particular environmental settings (Spangler 1995:226). Because the surveys found that prehistoric archaeological sites could be found across nearly all environmental zones, these surveys failed to meet their original goals. Furthermore, the surveys were unable to accurately predict specific site locations. However, the surveys were able to demonstrate good associations of prehistoric archaeological sites with general environmental zones. In other words, while specific site locations could not be predicted, and it appeared that there was potential for the presence of at least one or a few cultural resource sites in nearly all environmental zones of a given area, the Class II surveys were able to identify zones that had higher and lower frequencies of prehistoric archaeological sites.

The association of prehistoric archaeological sites with particular environmental zones can serve as a useful management tool for identifying areas where anticipated activities would have greater or lesser potential for impacts on prehistoric cultural resources. The Class II surveys, summarized in Spangler (1995:226-242), identified that proximity to water and certain vegetation types tended to influence site density. Areas within approximately 1 km of permanent water or within immediate proximity of a semi permanent water source appear to have high probabilities for cultural resource site occurrence. Furthermore, vegetation zones dominated by juniper were also identified as areas with high potential for cultural resource site locations. Finally, areas of intermittent sand dunes also tended to have high densities of prehistoric archaeological sites. Areas lacking water, juniper trees, or sand dunes, and areas of relatively steep slope tended to have low site densities. Areas of high site density tended to have between 1

and 7 sites per square mile with an average of 4.87 sites/square mile while areas of low density had less than 1 site per square mile (Spangler 1995:226-242).

The locations of historical cultural resource sites are more difficult to predict. Because historical populations have greater ease of transportation and different economic interests, historical site locations are not as constrained by availability of water and particular vegetative resources as were the locations of prehistoric occupations. Furthermore, linear historical sites such as roads, railroads, and canals, are likely to crosscut a wide variety of topographic settings and environmental zones. Nonetheless, two factors are likely to have conditioned the location of most historical cultural resource sites—proximity to watered/arable land for agriculture and proximity to mineral resources for extractive industries.

For the purposes of analysis, these factors were utilized to develop zones of high and low probability for cultural resource site locations. All areas within approximately 1 km of permanent water, or within juniper vegetation zones, sand dunes, or general area of historical mining districts were considered high site probability zones. Areas with greater than 30% slope, or not having any of the high site probability factors were considered low site probability zones.

In addition, four areas of high site density have been identified within the VPA through previous investigations. These areas, and the acreages they encompass, are identified in Table 3.3.1. To be certain, other areas of high site density exist within the planning area but have not yet been identified and verified through field studies. Areas of high site density, such as those listed in Table 3.3.1, have many significant use values. In particular, they have high scientific and conservation values, and in some cases, high traditional values as well. Such areas also tend to have high public use values, but these are outweighed by other use values that necessitate the restriction of activity within the areas.

Table 3.3.1. Known High Site Density Areas within the VPA

Site Name/Number	Acreage
Little/Devil's Hole	10,878 acres
Uinta Foothills	33,059 acres
Upper Willow Creek	4,304 acres
Site 42Un1388 (Four Mile Wash)	560 acres

3.3.6 Known National Register Listed Sites

Existing data do, however, identify several cultural sites of determined local, regional, or national significance and four areas of high site density. The sites of determined significance are listed on the National Register of Historic Places (NRHP) (Table 3.3.2). Although these sites have been listed on the NRHP, it should be remembered that sites which have been determined eligible for listing on the NRHP but are not currently listed are afforded the same level of protection and consideration in planning and land-use decisions as those that are listed. However, since the locations of every single eligible site within the planning area are not known, largely because of the dearth of investigative surveys that have been conducted, it is not possible to

provide a comprehensive list or map of all such sites. Therefore, only those NRHP-listed sites are provided herein.

Table 3.3.2. Known National Register Listed Sites within the VPA

Site Name/Number	Area
Cockleburr Wash Petroglyphs	Jensen
Dr. John Parson Cabin Complex	Browns Park
John Jarvie Historic Ranch District	Browns Park
Little Brush Creek Petroglyph Panel	Vernal
McConkie Ranch Petroglyphs	Dry Fork
Nine Mile Canyon	Nine Mile Canyon (East Portion)

3.3.7 Summary of Cultural Resources

Cultural resources within the Vernal area are numerous, diverse, and widely dispersed. The resources range from small, ancient artifact scatters associated with prehistoric populations to historical resources like cabins, homesteads, mines, and railroads. Although these resources have been documented over years of study, a comprehensive picture of the exact distribution of the resources is not possible due to the large area encompassed and the lack of region-wide systematic study.

Nonetheless, previous data and investigations do provide a general picture of the types of sites present and their locations. Although it is not possible to provide exact data on the location of all types of cultural resources and to therefore gauge with precision the effects of particular management decisions on those resources, it is possible to derive general tendencies for site locations that can be use to gauge the relative probability and relative severity of the impacts of various management decisions on cultural resources in the overall area. For the purposes of subsequent analyses, areas within the VPA would be divided into zones with "High" and "Low" probabilities for cultural resources, based on the relationships between site location and environmental variables that have been established by previous research (Spangler 1995:226–242). High probability zones would be considered those that are within 1 km of permanent water, a juniper zone, sand dune areas, and historical mining districts. Low probability zones would be all areas with greater than 20% slope and areas not meeting the criteria for definition as a high probability zone. These criteria provide replicable proxy data for site location, and can be used to gauge whether a management decision is more or less likely to impact cultural resources.

3.4 Environmental Justice

The Executive Order on Federal actions to address environmental justice in minority populations and low-income populations (Executive Order 12898, with explanatory memorandum) directs federal agencies to assess whether their actions have disproportionately high and adverse human health or environmental effects on minority communities and low-income communities. The Ute Tribe constitutes both a minority community and a low-income community.

Federal minerals are located on 188,500 acres of the Hill Creek Extension, Uintah and Ouray Indian Reservation in Uintah County 113,684 acres within the Hill Creek Extension are Indian minerals. The Hill Creek Extension has important cultural and economic values for the Northern Ute Tribe. This area, as with other areas on the reservation, is economically important because of oil and gas royalties, rights-of-way fees and employment opportunities.

The Uintah and Ouray Indian Reservation has 3,725 Tribal members living on the reservation. The total potential labor force is approximately 1,600, of which about 42% are considered unemployed. Approximately 80% of those who are employed work for the Tribe. Eighty-three percent of those that are employed earn less than $14,000 annually. Mineral resources, particularly oil, gas, and oil shale, are the greatest economic assets of the Tribe. Other minerals on the reservation include tar sands, coal, gilsonite, bentonite, wurtzilite, phosphate, and sand and gravel. Raising cattle and the growing of livestock feed are other important economic activities that occur on the reservation (BLM 1999).

The southern portion of the Hill Creek Extension, along the Book Cliffs divide, has important traditional life ways and religious values for the Tribe. This area has been distinguished as "wilderness" by the Tribe because of its relatively pristine condition. Big game hunting is an important traditional lifestyle for Tribal members. Some religious ceremonies of the Ute people require plants and other materials that are located here. Additionally, the Hill Creek Extension contains numerous archaeological sites, including rock art, camps and burials that have sacred meaning (Duncan 1992).

3.5 Fire Management

3.5.1 Resource Overview

Fire management planning policy requires that a Fire Management Plan, including fire prevention, preparedness, suppression, and use as well as subsequent restoration and rehabilitation, be conducted on an interagency basis. The Fire Management Plan conforms to the National Fire Plan and Federal Wildland Fire Management Policy (USDI 1995). The Vernal Field Office is a major partner in the Uinta Basin Interagency Fire Center (Center). The Center conducts all initial and extended-attack dispatching for the BLM, Ashley National Forest, the Uintah-Ouray Indian Agency, the USFWS - Ouray and Browns Park National Wildlife Refuges, the Utah Division of State Lands and Forestry, and the Utah component of Dinosaur National Monument. An annual operating plan (AOP) has been developed by the Center to establish operating procedures for coordinated responses and cooperative sharing of resources throughout the VPA. Consolidation of dispatch services in the Center has improved coordination of interagency fire planning among the land management agencies in the area.

Wildland fires are integral natural forces affecting public lands within the VPA. In the 10-year period from 1989 to 1998, 497 wildland fires burned a total of 8,540 acres in the VPA. Of these wildland fires, 445 were caused by lightning, and 52 were human-caused ignitions. During the period from 1999 through 2001, 24,294 acres were treated by prescribed burning in a total of

nine treatment areas. Plans for the following five years included prescribed burns on approximately 11,000 acres annually (see Fire Management Plan for specific sites and acreage).

Historically, a lack of funding from resources programs limited the fuels program to a few prescribed fires. The fire suppression program was funded at limited levels until the new Fire Management Plans (FMPs) were completed, and suppression of wildland fire was the only fire management tool used. The fire suppression policy did not take into account the long-term effects on the ecosystems of the area or the long-term costs associated with it. By restricting the natural role of fire in the ecosystem, fuel loads have increased over the years. Pinyon-juniper, sagebrush, and other shrub-type species have become the dominant vegetation communities. Other large conifer species (e.g., Douglas fir, Ponderosa pine) have become decadent, and the health of these stands has declined (see Woodlands and Forest section).

More than one million acres have been designated as needing fire treatments within the VPA. Treatment goals are to reduce the potential for catastrophic stand-destroying wildland fire, enhance wildlife habitat, and increase vegetation diversity. These VPA fire treatment areas also include forage areas for livestock and wildlife, mineral resources including oil and gas fields, and popular hunting and fishing areas. The area is mainly rural, but has an increasing number of residences and population centers within four identified Wildland Urban Interface (WUI) areas.

3.5.2 Fire Management Categories

The VPA is divided into fire management categories, and the appropriate fire treatment response for the VPA would be managed using the Fire Management Polygons (A, B, C, and D) as described in BLM Handbook 1601 - land-use Planning, and as summarized below:

> **Category A.** Areas where unplanned fire is not desired at all.
>
> **Category B.** Areas where unplanned fire is not desired because of current conditions. Prescribed fire use is allowed to obtain resource management objectives. Mechanical/chemical treatments would be used where social and/or resource constraints preclude the use of prescribed fire.
>
> **Category C.** Areas where wildland fire is desired. Prescribed fire is allowed and may be extensive to obtain resource management objectives. Mechanical/ chemical treatments would be used where social and/or resource constraints preclude the use of prescribed fire.
>
> **Category D.** Areas where wildland fire is desired, and there are few or no constraints for its use.

Fire suppression activities and the appropriate management response (AMR) would be implemented through the guidance developed in the fire management categories and developed for the Vernal Field Office. The criteria used in developing the categories were determined by an interdisciplinary team of resource specialists. Criteria for each category are described below:

Category A. This category includes the salt desert shrub type where the risk of cheatgrass (a noxious weed) invasion is high after an area has been burned or treated. Also included are the major river corridors in the VPA where fire would destroy Fremont cottonwood, which is a keystone species that is presently declining. Constraints to fire management activities include cultural resource sites, high recreational use, highly developed oil and gas fields, high invasive weed potential, and threatened and endangered (T&E) species habitat. Wildland fire for resource use is not appropriate.

Category B. This category includes identified crucial deer winter range and crucial sage grouse habitat. Within this habitat, Wyoming sagebrush is identified as a keystone species, which has been in a continual state of decline because of widespread drought and invasive species encroachment. Also included within this polygon are the four identified WUI areas, including cultural resource sites, adjacent urban interfaces, sage grouse and deer winter range habitat, moderate potential for invasive weeds, and T&E species habitat. Wildland fire for resource use is not appropriate.

Category C. This category contains the pinyon-juniper type, along with the aspen/Douglas fir, mountain browse, and non-crucial areas of the sagebrush type. Fire is desired to achieve resource objectives. Constraints to fire management activities include a limited amount of oil and gas development, non-critical sage grouse habitat, a limited amount of T&E species habitat, and a limited amount of cultural resources. Wildland fire use for resource objectives is appropriate.

Category D. This category contains all of the existing Wilderness Study Areas (WSAs) within the VPA. The role of fire would be widely incorporated, as there are few resource constraints within these polygons. Constraints to fire management activities would include WSA-designated areas, non-critical sage grouse habitat, a limited amount of T&E species habitat, and a limited amount of cultural resources. Wildland fire use for resource objectives is appropriate.

3.6 HAZARDOUS MATERIALS

3.6.1 BLM HAZARDOUS MATERIALS MANAGEMENT PROGRAM GOALS

Hazardous materials are defined as any material that, because of its quantity, concentration, or physical or chemical characteristics, may pose a real hazard to human health or the environment. Hazardous materials include flammable or combustible material, toxic material, corrosive material, oxidizers, aerosols, and compressed gases.

The Hazardous Materials Management Program, a program that provides guidance supplemental to the National Contingency Plan (EPA 1994), typically supports and guides other programs or agencies to ensure that they adhere to all federal and state environmental laws and regulations regarding hazardous materials. The Hazardous Materials Management Program would review this document, the VPA RMP EIS and would also review all National Environmental Policy Act

(NEPA) compliance documents produced for actions within the VPA for hazardous materials management environmental compliance. If the Hazardous Materials Management Program found within the VPA sites that contained hazardous substances, all surface and/or subsurface activities would be suspended until the VPA obtained direction from the appropriate federal and/or state regulatory agency. Monitoring would be carried out in response to assessment, cleanup, and restoration of a contaminated site. Monitoring would be coordinated with other programs to ensure that those program objectives were met.

The owners and operators of oil, gas, and coal bed natural gas (CBNG) wells within the VPA are required to have emergency plans that cover potential emergencies including fires, employee injuries, chemical releases, and other potential hazards related to hazardous materials. Emergency plans typically contain phone numbers for all medical and emergency services and a list of responsible personnel to contact in the case of emergency. The plans would be posted at all emergency facilities, and employees would be trained in emergency response upon being hired by minerals exploration and development, and maintenance companies.

There are no approved hazardous waste disposal facilities on public lands within the VPA. All hazardous wastes are transported out of the VPA to approved disposal facilities that are constructed and operated in accordance with state and federal regulations. Oil and gas operators are required to comply with a Hazardous Substance Management Plan, as directed by the regulations of the Resource Conservation and Recovery Act (RCRA), which regulates transportation and disposal of hazardous wastes. All private business and organizations that handle hazardous materials would be required to comply with EPA regulations pertaining to the storage, use, transportation, and disposal of these materials. The transportation of hazardous materials is subject to guidelines under the Utah Department of Transportation as well as the United States Department of Transportation.

The current BLM, Vernal Field Office declaration statement regarding hazardous materials management within the VPA is as follows:

> Less than 10,000 pounds of any chemical(s) from EPA's Consolidated list of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act [SARA] of 1986, and less than the Threshold Planning Quantity [TPQ] of any extremely hazardous substance(s), as defined in 40 CFR 355, would be used, produced, transported, stored, disposed, or associated with the proposed operation annually. Vehicle and equipment fuel, lubricants, antifreeze and battery acid would be the only hazardous material used or associated with the proposed action. Risk of a release would be very low, and the adverse environmental affect of a release would be minimal because it would be cleaned up immediately and disposed of in an approved waste disposal facility (BLM 2001).

3.6.2 HAZARDOUS MATERIALS RISKS WITHIN THE VPA

There are two types of hazardous materials risks: those risks associated with unauthorized releases, and other hazardous materials risks from controlled uses of materials listed under SARA and 40 CFR 355.

The remote nature of VPA lands creates an opportunity for illegal dumping of hazardous materials. These unauthorized releases could include materials from illegal drug laboratories or the illegal dumping of hazardous materials by private companies or individuals. When these types of dumps are encountered, the dumpsite is secured to ensure public safety, appropriate agencies are contacted, and clean up is conducted in accordance with established BLM plans and procedures. If the source responsible for the dumping is identified, that information would be released to the appropriate authorities for prosecution.

Controlled releases of hazardous materials could be the result of programs conducted by the Vernal Field Office, state or local governments, or operations of local businesses and industries. Authorized sources of hazardous materials could include oil and gas development, mineral extraction and processing operations, landfills and hazardous material disposal sites, aboveground and underground storage tanks, abandoned mine lands (AML), and small businesses.

3.6.2.1 LANDFILLS AND HAZARDOUS WASTE DISPOSAL FACILITIES

There are no approved hazardous materials waste facilities on public lands in the VPA. However, a hazardous materials disposal site is located on private land near Altamont, Utah. BLM policy has been to either close or transfer ownership of all landfills that were historically on Vernal Field Office-administered lands. The Vernal Field Office is currently in compliance with this policy. In order to meet compliance, Red Wash and Jensen landfills were closed; ownership of the Vernal City/County landfill was transferred from BLM ownership; and dumps at the White River oil shale facility were covered and revegetated.

3.6.2.2 STORAGE TANKS

The use of aboveground storage tank (AST) and underground storage tank (UST) operations is regulated by the EPA and administered by the state of Utah. Operators are responsible for understanding and complying with the EPA regulations. Underground storage tanks within the VPA are concentrated primarily within the towns of Vernal and Naples, and along the Highway 40 and 191 travel corridors (UDERR 2004).

3.6.2.3 SMALL BUSINESSES

The types of small businesses and organizations that generate or use hazardous materials include (but are not limited to) automotive shops, dry cleaning businesses, print shops, and hospitals. These operations are regulated by the EPA and administered by the state of Utah. It is the responsibility of the business/organization owner to understand and comply with EPA

regulations pertaining to hazardous materials used or hazardous wastes that are generated by that business or organization.

3.6.2.4 OIL AND GAS

An increased risk of hazardous materials is an indirect effect of oil, gas, and mineral development. As oil and gas development increases so does the use, generation, and transportation of hazardous materials (Table 3.6.1). For descriptions of areas that may be affected by particular kinds of development, see Section 3.9, Mineral Resources.

3.6.2.5 TAR SAND

In the early 1980s, certain tar sand deposits in the Uinta Basin were divided into seven Special Tar Sand Areas (STSAs), as designated by the USGS under direction from Congress pursuant to the Combined Hydrocarbon Leasing Act of 1981. These STSAs are: (1) Pariette, (2) Sunnyside, (3) Argyle Canyon - Willow Creek, (4) Asphalt Ridge - Whiterocks, (5) Hill Creek, (6) P.R. Spring, and (7) Raven Ridge - Rim Rock (BLM 2002).

Tar sands may be extracted via in-situ methods or via surface mining, depending on the depth. In-situ extraction and processing may involve chemicals similar to those for conventional oil and gas (see Table 3.6.1). Hazardous materials associated with surface mining are those primarily used in vehicle and equipment operation, such as battery acid, fuels, lubricants, and antifreeze.

3.6.2.6 GILSONITE

Gilsonite mining operations within the VPA do not conduct mineral processing on the mine site. Therefore, the only hazardous materials used for Gilsonite mining are those associated with vehicle and equipment operation.

3.6.2.7 OIL SHALE

Currently one RD&D lease has been issued to OSEC to prove development potential of oil shale processes. In addition, on SITLA lands, northeast of Bonanza (Sections 10 and 15 of T9S, R25E), is an oil shale project owned by Oiltech. This project is a pilot plant running processing tests of White River Oil Shale.

Table 3.6.1. Hazardous Constituents Potentially Used or Produced During Construction, Drilling, Production, and Reclamation Operations Associated with Oil and Gas Production

Use	Material	Hazardous Constituents
Drilling Materials	Barite	Barium compounds, fine mineral fibers
	Bentonite	Fine mineral fibers
	Caustic Soda	Sodium hydroxide
	Glutaraldehyde	Isopropyl alcohol
	Lime	Calcium hydroxide

Table 3.6.1. Hazardous Constituents Potentially Used or Produced During Construction, Drilling, Production, and Reclamation Operations Associated with Oil and Gas Production

Use	Material	Hazardous Constituents
	Mica	Fine material fibers
	Phophate Esters	Methanol
	Polyacrylamides	Acrylamide, Polycyclic aromatic hydrocarbons (PAHs), Petroleum distillates, Polycyclic organic matter (POM), "Fine mineral fibers
	Retarders	Fine mineral fibers
	Anionic Polyacrylamide	Acrylamide
	Polyanionic Cellulose	Fine mineral fibers
Cement/Plug	Anti-foamer	Glycol ethers
	Bentonite	Fine mineral fibers
	Calcium Chloride Flake	Fine mineral fibers
	Cellophane Flake	Fine mineral fibers
	Cements	Aluminum oxide, Fine mineral fibers
	Chemical Wash	Ammonium oxide, Glycol ethers
	Diatomaceous Earth	Fine mineral fibers
	Extenders	Aluminum oxide, Fine mineral fibers
	Fluid Loss Additive	Acrylamide, Fine mineral fibers, Naphthalene
	Friction Reducer	Fine mineral fibers, Naphthalene, PAHs, POM
	Mud Flash	Fine mineral fibers
	Retarder	Fine mineral fibers
	Salt	Fine mineral fibers
	Silica Flour	Fine mineral fibers
Fracturing Material	Biocides	Fine mineral fibers, PAHs, POM
	Breakers	Ammonium persulphate, Ammonium sulphate, Copper compounds, Ethylene glycol, Fine mineral fibers, Glycol ethers
	Clay stabilizer	Fine mineral fibers, Glycol ethers, Isopropyl alcohol, Methanol, PAHs, POM
	Crosslinkers	Ammonium chloride, Methanol, Potassium hydroxide, Zirconium nitrate, Zirconium sulfate
	Foaming Agent	Glycol ethers
	Gelling Agent	Benzene, Ethylbenzene, Methyl tert-butyl ether (MTBE), Naphthalene, PAHs, POM, Sodium hydroxide, m-Xylene, o-Xylene, p-Xylene
	PH buffers	Acetic acid, Benzoic acid, Fumeric acid, Hydrochloric acid, Sodium hydroxide
	Sands	Fine mineral fibers

Table 3.6.1. Hazardous Constituents Potentially Used or Produced During Construction, Drilling, Production, and Reclamation Operations Associated with Oil and Gas Production

Use	Material	Hazardous Constituents
	Solvents	Glycol ethers
	Surfactants	Glycol ethers, Isopropyl alcohol, Methanol, PAHs, POM
Production Product/Fuel	Natural Gas	n-Hexane, PAHs, POM
	Produced water/drill cuttings	Barium, Cadmium, Chromium, Lead, Manganese, Radium 226, Uranium, Other radionuclides
	Liquid hydrocarbons	Benzene, Ethyl benzene, n-Hexane, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
Fuel	Diesel fuel	Benzene, Cumene, Ethylbenzene, MTBE, Naphthalene, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
	Gasoline	Benzene, Cumene, Cyclohexane, Ethylbenzene, n-Hexane, MTBE, Naphthalene, PAHs, POM, Tetraethyl lead, Toluene, m-Xylene, o-Xylene, p-Xylene
	Jet A	Benzene, Cumene, Cyclohexane, Ethylbenzene, n-Hexane, MTBE, Naphthalene, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
	Propane	Propylene
Geophysical Survey Materials	Explosives, fuses, detonators, boosters, fuels	Aluminum, Ammonium nitrate, Benzene, Cumene, Ethylbenzene, Ethylene glycol, Lead compounds, MTBE, Naphthalene, Nitric acid, Nitroglycerine, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
Pipeline Material	Coating	Aluminum oxide
	Cupric sulfate solution	Cupric sulfate, Sulfuric acid
	Diethanolamine	Diethanolamine
	LP Gas	Benzene, n-Hexane, Propylene
	Molecular sieves	Aluminum oxide
	Pipeline primer	Naphthalene, toluene
	Potassium hydroxide solution	Potassium hydroxide
	Rubber resin coatings	Acetone, Coal tar pitch, Ethyl acetate, Methyl ethyl ketone (MEK), Toluene, Xylene
Emissions	Gases	Formaldehyde, Nitrogen dioxide, Ozone, Sulfur dioxide, sulfur trioxide
	Hydrocarbons	Benzene, Ethylbenzene, n-Hexane, PAHs, Toluene, m-Xylene, o-Xylene, p-Xylene
	Particulate Matter	Barium, Cadmium, Copper, Fine mineral fibers, Lead, Manganese, Nickel, POM, Zinc
Miscellaneous	Acids	Acetic anhydride, Formic acid, sodium chromate, Sulfuric acid

Table 3.6.1. Hazardous Constituents Potentially Used or Produced During Construction, Drilling, Production, and Reclamation Operations Associated with Oil and Gas Production

Use	Material	Hazardous Constituents
	Antifreeze, Heat Control, and Dehydration Agents	Acrolein, Cupric sulfate, Ethylene glycol, Freon, Phosphoric acid, Potassium hydroxide, sodium hydroxide, Triethylene glycol
	Batteries	Cadmium, Cadmium oxide, Lead, Nickel hydroxide, Potassium hydroxide, Sulfuric acid
	Biocides	Formaldehyde, Isopropyl alcohol, Methanol
	Cleaners	Hydrochloric acid
	Corrosion Inhibitors	4-4' Methylene dianiline, Acetic acid, Ammonium bisulfite, Basic zinc carbonate, Diethylamine, Dodecylbenzenesulfonic acid, Ethylene glycol, Isobutyl alcohol, Isopropyl alcohol, Methanol, Naphthalene, Sodium nitrite, Toluene, Xylene
	Emulsion Breakers	Acetic acid, Acetone, Ammonium chloride, Benzoic acid, Isopropyl Alcohol, Methanol, Naphthalene, Toluene, Xylene, Zinc chloride
	Fertilizers	Unknown
	Herbicides	Active and inert ingredients (including proprietary ingredients) of herbicides are addressed and described in the Final PEIS and ROD Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States, June 2007.
	Lead-free thread compound	Copper, zinc
	Lubricants	1,2,4-Trimethylbenzene, Barium, Cadmium, Copper, n-Hexane, Lead, Manganese, Nickel, PAHs, POM, Zinc
	Methanol	Methanol
	Motor Oil	Zinc compounds
	Paints	Aluminum, Barium, n-Butyl alcohol, Cobalt, Lead, Manganese, PAHs, POM, Sulfuric acid, Toluene, Triethylamine, Xylene
	Paraffin Control	Carbon disulfide, Ethylbenzene, Methanol, Toluene, Xylene
	Photoreceptors	Selenium
	Scale inhibitors	Acetic acid, Ethylene diamine tetra, Ethylene glycol, Formaldehyde, Hydrochloric acid, Isopropyl alcohol, Methanol, Nitrilotriacetic acid
	Sealants	1,1,1-Trichloroethane, n-Hexane, PAHs, POM
	Solvents	1,1,1-Trichloroethane, Acetone, t-Butyl alcohol, Carbontetrachloride, Isopropyl alcohol, MEK, Methanol, PAHs, POM, Toluene, Xylene
	Starting Fluid	Ethyl ether
	Surfactants	Ethylene diamine, Isopropyl alcohol, Petroleum naphtha

3.6.2.8 PHOSPHATE

Phosphate deposits exist in the Uinta Basin within the Meade Peak Member of the Permian Park City Formation. Simplot Phosphate (formerly known as SF Phosphate) owns and mines a phosphate deposit that is located on private land within the VPA.

The Utah Division of Water Quality regulates Simplot Phosphate's phosphate mining operation, including the large tailings pond disposal area. Samples of tailings water taken indicate concentrations of phosphate, fluoride, total dissolved solids (TDS), and chromium to have been higher than the Utah Water Quality Standards (UDDW 2003). These standards are the most stringent of the applicable numeric criteria for Big Brush Creek, the nearby creek.

In 1996 Simplot (then SF Phosphate) performed a full-spectrum chemical analysis on a grab sample of the mine's tailings water. With the available data, it is not possible to know if the standards for cyanide, chromium, or zinc exceeded limits because the testing methods did not meet the accuracy levels for those determinations; however, the results indicate that TDS and phosphorus exceeded the limits. Although analyses of tailings solids show that the 1996 tailings solids are non-toxic, non-acid-forming, and non-saline, data showed higher levels of sulfates, hardness, calcium, and TDS in tailings water than those found in Big Brush Creek. This indicates that should tailings water migrate past the seepage collection system into Big Brush Creek, the creek's water would be degraded.

Open plan of operation UTU76097 involves a planned phosphate mill tailings disposal from Simplot Phosphate's milling of phosphate from patented mining claims onto mill sites.

3.6.2.9 MINERAL MATERIALS

Mineral materials include sand, gravel, and building stone. There is currently one open notice under the CFR 3809 BLM Surface Management regulations on public lands within the VPA. This notice, UTU66378, regulates a stone quarry that employs motorized vehicles to extract and haul the stone. Materials used for vehicle and equipment operation, such as battery acid, fuels, lubricants and antifreeze are the hazardous materials associated with surface mining.

3.7 LANDS AND REALTY

As provided by FLPMA, the BLM has the responsibility of planning for and managing public lands. Public lands, as defined by FLPMA, are lands and/or any interest in lands (e.g., mineral estate, reservations, etc.) that are owned by the United States and administered by the Secretary of the Interior, through the BLM. The land surface and mineral ownerships within the VPA are varied and intermingled; consequently, so are the administrative jurisdictions for land use and minerals.

Land and realty program objectives are the following:

- Manage the public lands to support goals and objectives of other resource programs,
- Respond to public requests or applications for land-use authorizations, and

- Acquire administrative and public access where necessary to enhance resource management objectives of the BLM.

3.7.1 LAND OWNERSHIP ADJUSTMENT

As mandated by Sec. 106 (a)(1) of FLPMA (43 USC 1701), public lands are retained in federal ownership except for those public lands that have future potential for disposal (i.e., sale and exchange).

3.7.2 DISPOSAL AND ACQUISITION

As described under Sec. 203 (a) and Sec. 206 of FLPMA (43 USC 1713; 1716), public lands have potential for disposal when they are isolated and/or difficult to manage. Lands in the VPA identified for disposal must meet public objectives (as outlined in Sec. 203 (a) and Sec. 206 of FLPMA), such as community expansion and economic development. Exchanges are initiated in direct response to public requests or by the BLM to improve management of the public lands. The BLM will use both sales and exchange to accomplish disposals to meet plan goals.

Public sales are managed under the disposal criteria set forth in Sec. 203 of FLPMA. Federal law requires lands to be sold at not less than fair market value. Public lands classified, withdrawn, reserved, or otherwise designated as not available or subject to sale are not available for sale.

Public land cannot be effectively administered without legal and physical access. Methods used to acquire legal rights that meet resource management needs include negotiated purchase, donation, exchange, and condemnation. Acquisition alternatives include purchase of fee or less-than-fee interest above, on, and below the surface; perpetual exclusive easements; and permanent or temporary nonexclusive easements. Acquisition of access rights supports one or more of these resources: lands, minerals, forestry, range, wildlife, recreation, and watershed. Acquisitions of road or trail easements are probably the most frequently encountered access needs. Such easements include:

- road easements
- scenic or conservation easements
- sign locations
- stream clearance projects
- utility easements
- hunting and fishing easements
- range improvements

In the case of a split-estate acquisition, courts have historically ruled that use of the mineral estate has precedence over use of the surface estate, regardless of consistency with long-term land-use planning decisions.

3.7.3 WITHDRAWALS

Withdrawals are formal actions that set aside, withhold, or reserve federal land by statute or administrative order for public purposes. A withdrawal may remove areas from the public lands to be managed under the authority of another federal agency or department, although the land does not leave federal ownership. Withdrawals accomplish one or more of the following:

- Transfer total or partial jurisdiction of federal land between federal agencies
- Close (segregate) federal land to operation of all or some of the public land laws and/or mineral laws
- Dedicate federal land to a specific purpose

Withdrawals are often used to preserve sensitive environmental values, protect major federal investments in facilities or other improvements, support national security, and provide for public health and safety. Withdrawals segregate a particular portion of public lands, suspend operation of the public land laws (withdrawn from settlement, sale, location, or entry), and prevent any disposal of public lands or resources involved in certain types of land-use application. Withdrawals remain in effect until specifically revoked.

Withdrawals that no longer serve the purpose for which they were established or that lack sufficient justification of need would be revoked. Withdrawal review is mandated by FLPMA, which requires the BLM to eliminate all unnecessary withdrawals and classifications. Before recommending a withdrawal continuation, alternatives such as rights-of-way (ROWs) and interagency agreements must be explored. Appendix E describes the existing withdrawals within the VPA.

3.7.4 RIGHTS-OF-WAY (ROWS)

All public lands in the VPA are made available for ROW designation, permits, and leases, with the exception of defined exclusion and avoidance areas. Short segments of corridor, or windows, are designated when a full-length ROW corridor cannot be justified. Existing utility windows, ROW concentration areas, and communication sites are the preferred locations for future grants. Designated corridors are the preferred locations for placement of two or more linear or aerial ROWs that are similar, identical, or compatible. Corridors may be designated as Active or Contingency.

3.7.5 UTILITY/TRANSPORTATION SYSTEMS

ROWs are granted on a case-by-case basis. The majority of ROWs granted in the last 20 years have been for oil and gas gathering systems or roads. The majority of these ROWs did not follow designated corridors. Instead, routes were recommended that were the least environmentally damaging and followed de facto utility and transportation systems. Historically, pipeline ROWs granted within the VPA have been small surface pipelines, because they were determined to be the least environmentally damaging. Most of the larger diameter (10+ inches) pipelines (e.g., MAPCO, Northwest and Questar oil/gas transportation pipelines) were buried. The Western Regional Corridor Study Committee recommended that utility corridors cross the VPA.

Exclusion areas prohibit ROWs and corridor/window designation. All WSAs are exclusion areas where new rights-of-ways are prohibited. Avoidance areas are areas where special environmental and/or management considerations exist. ROWs are either not granted in these areas, or, if granted, are subject to stringent terms and conditions. The following avoidance areas were described in the Diamond Mountain and Book Cliffs RMPs:

- Red Mountain
- Six Mile Draw roadless area
- Red Fleet recreation area
- Pariette Wetlands
- Green River corridor
- Development of inventoried recreation sites
- Sage grouse strutting areas
- Scenic corridors
- Archaeological sites
- Fragile watersheds
- Threatened and endangered plant and wildlife habitat areas
- Crucial winter range
- ACECs (Diamond Mountain RMP)

3.7.6 ACCESS

Access to public lands is provided throughout the VPA. Access should be closed or restricted, where necessary, to protect public health and safety and to protect significant resource values. Easements can be acquired to provide access to public lands for recreational, wildlife, range, cultural/historical, mineral, ACEC, special management areas, and other resource needs. Note that all valid existing leases and rights are acknowledged by the BLM, and management actions implemented through approval of the Final RMP and Record of Decision do not apply retroactively to these leases and rights.

Throughout much of Utah, the state owns and manages four isolated sections in each 36-section township. These are generally sections 2, 16, 32, and 36, and are ordinarily one mile square (640 acres). They are primarily administered by the Utah School and Institutional Trust Lands Administration (SITLA) for the purpose of economic support of the state's public schools and institutional trust funds. Activities on state land generally are not substantially different from those on the surrounding land administered by the BLM. Many of the SITLA lands generate funds through grazing permits, right-of-way easements and permits, and hydrocarbon or other mineral leases.

Many BLM lands with management restrictions, such as WSAs, have state lands that are adjacent to or within their boundaries. State lands that are completely or almost entirely surrounded by BLM lands with management restrictions, or are in conjunction with administratively endorsed National Park Service lands, are termed state inholdings.

Existing access to inheld state lands varies. Some of the parcels have direct access through cherry-stemmed or boundary roads of WSAs. Inheld parcels may or may not currently have access, depending upon whether or not existing vehicle routes lead to them. BLM policy, as required by the Cotter decision, is that "the state must be allowed access to the state school trust lands so that those lands can be developed in a manner that will provide funds for the common school...." This decision confined the issue of access to situations directly involving economic revenues generated for the school trust. For example, if a holder of a state oil and gas lease on a parcel of state land that is completely surrounded by a WSA requires access to develop that lease, the BLM must grant the leaseholder reasonable access with consideration given to minimize impacts to wilderness character

3.7.7 PERMITS AND LEASES

Sec. 302 of FLPMA states that public lands may be offered for permit or lease to state, local, or private citizens for use, occupation, or development. For example, the BLM may permit agricultural development, residential use (only under certain very limited conditions), commercial use, advertising, or National Guard use of public lands. Permits are usually short-term authorizations not to exceed 3 years. Leases are long-term authorizations that usually require a significant economic investment in the land. Permits and leases generally require the permittee or lessee to pay rent to the U.S. for the use of federal property.

3.7.8 TRESPASS

Trespass occurrences are known to exist but many have not been documented and pursued because of lack of personnel and higher priority work. Common trespass locations in the VPA are along drainages, oil fields, and other areas bordering public lands. The BLM is responsible for realty trespass abatement, which consists of trespass prevention, trespass detection, and trespass resolution. The method of trespass resolution depends on whether a trespass was intentional or not, the extent and duration of use, and the existence and extent of resource impacts. In the past, trespass resolution has involved the BLM collecting administrative costs from the trespassing party and then either issuing temporary land-use authorizations (such as ROW grants, leases, or permits to resolve unauthorized agricultural use or location of canals, fences, pipelines or other facilities) or requiring that the unauthorized use be discontinued or that the personal property be removed.

3.8 LIVESTOCK AND GRAZING MANAGEMENT

The Vernal Field Office currently administers grazing on 167 allotments throughout the VPA. Of these, five grazing allotments (Dry Creek, Hoy Flat, Offield Mountain, South Pot Creek, and Wild Mountain–Colorado) are located entirely outside the VPA boundary and two allotments (Max Canyon and Blind Canyon) are located entirely on private land inholdings within the VPA. The 160 allotments within the VPA designated for livestock grazing encompass approximately 1,691,116 acres of BLM land. An additional 545,887 acres of other lands (private, state, tribal, etc.) are included within these allotments.

Livestock are regularly permitted to graze on 153 of the 160 allotments as follows: cattle (113), sheep (27), sheep and cattle (12), and horses (1). A few of the cattle and/or sheep allotments also permit some horses. Forty-five of the 153 allotments are currently grazed under a deferment rotation system, which involves delaying grazing in an allotment until the seed maturity of the key forage species.

On the remaining 7 allotments (Red Creek Flat, Rye Grass, Marshall Draw, Taylor Flat, Warren Draw South, Watson-Diamond Mountain and Sears Canyon), cattle are permitted on a temporary, non-renewable basis; however, such use is discretionary.

Within the VPA, 146,161 animal unit months (AUMs) are allocated for livestock, but active permitted use for the 160 allotments is currently 137,897 AUMs. However, the demand for forage resources by livestock (the total average actual use) for the past 10 years was only 78,500 AUMs.[1] Suspended use for the 160 allotments is currently 26,364 AUMs. Comprehensive grazing allotment information is summarized in Appendix L.

3.8.1 Past Grazing Management Categories and Current Range Conditions, Carrying Capacity, Management, and Facilities

Ecological conditions of the two former RMAs (Diamond Mountain and Book Cliffs) were assessed and identified using two different evaluation methods. In the 1994 Diamond Mountain RMP, allotments were evaluated according to seral stages, (Early, Mid or Late). In the 1985 Book Cliffs RMP, allotments were evaluated as being in Excellent, Good, Fair, or Poor ecological condition.

In 1997, the BLM in Utah developed Standards for Rangeland Health and Guidelines for Grazing Management (see Appendix F). These standards are descriptions of the desired condition of the biological and physical components and characteristics of rangelands. Guidelines are management approaches, methods, and practices that are intended to achieve a standard.

The BLM has defined four Fundamentals of Rangeland Health, which are the basic ecological principles underlying sustainable production of rangeland resources. These four fundamentals are embodied in the BLM's new Grazing Regulations (43 CFR Part 4100) and serve as the basis for standards and guidelines for grazing management on BLM-administered public lands in Utah. The Standards and guidelines developed by the Utah Resource Advisory Council provide for conformance with these fundamentals (43 CFR Part 4180.2(b)). The fundamentals are as follows:

- Watersheds are in or making significant progress toward properly functioning physical condition. This condition includes their upland, riparian/wetland, and aquatic components. Soil and plant conditions support infiltration, soil moisture storage, and the release of water that are in balance with climate and landform, and maintain or improve water quality, and timing and duration of flow.

[1] This information was compiled from the Actual Use records of each livestock operator. When actual use was not available, licensed-use figures were used.

- Ecological processes, including the hydrologic cycle, nutrient cycle, and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.

- Water quality complies with State water quality standards and achieves, or is making significant progress towards achieving, established BLM management objectives such as meeting wildlife needs.

- Habitats are, or are making significant progress toward being, restored or maintained for Federal Threatened and Endangered species, Federal proposed, Category 1 and 2, Federal candidate, and other special status species.

3.8.2 CURRENT GRAZING MANAGEMENT CATEGORIES

Following the four fundamentals, the Vernal BLM has since re-evaluated each grazing allotment and designated each as being in one of three management categories: Maintain (M), Improve (I), or Custodial (C). The criteria used for categorizing the allotments were based on resource potential, resource use conflicts, opportunity for positive economic return on public investments, and the present management situation. Sixty allotments are in the I category, 47 are in the M category, and 53 are in the C category.

3.8.2.1 CATEGORY M – MAINTAIN EXISTING RESOURCE CONDITIONS

- The present ecological condition and management are satisfactory.
- Either:
    1. Late to climax seral stage condition will be maintained under present management, if desired; or
    2. Conditions are mid seral stage or improving, with improvement expected to continue under present management, if desired; or
    3. Opportunities for BLM management are limited, either because the percentage of public land is low or the acreage of public lands is small.
- There are no major, land-use resource conflicts with livestock grazing.

- Land ownership status may or may not limit grazing management opportunities.
- Opportunities for positive economic return from public investment may exist.

3.8.2.2 CATEGORY I – IMPROVE EXISTING RESOURCE CONDITIONS

- Present ecological condition is unsatisfactory.
- Ecological condition is in early to mid seral stage.
- Ecological condition is in mid to late seral stage.
- Ecological succession is expected to regress further.