

**U.S. Department of the Interior
Bureau of Land Management**

**Craters of the Moon National Monument & Preserve
Analysis of the Management Situation
Draft Management Plan Amendment
and Environmental Impact Statement**

PREPARING OFFICE

U.S. Department of the Interior
Bureau of Land Management
Shoshone Field Office
400 West F Street
Shoshone, ID 83352 USA
(208) 732-7200
(208) 732-7317
BLM_ID_CRMO@blm.gov



**Craters of the Moon National
Monument & Preserve Analysis of
the Management Situation
Draft Monument Management Plan Amendment
Environmental Impact Statement**

**Prepared by
U.S. Department of the Interior
Bureau of Land Management
Craters of the Moon National Monument and Preserve
Idaho, Twin Falls District, Shoshone Field Office
Shoshone, ID**

Table of Contents

1. Introduction	1
1.1. Introduction	1
1.1.1. Purpose of and Need for the Monument Management Plan Amendment	1
1.1.2. Purpose	1
1.1.3. Need	2
1.1.4. Purpose of the Analysis of the Management Situation	2
1.1.5. Planning Area Description	2
2. Planning Area Profile	9
2.1. Resources	11
2.1.1. Soil Resources	11
2.1.2. Water Resources	13
2.1.3. Vegetation Resources	15
2.1.4. Wildlife and Fish, Including Special Status Species	26
2.1.5. Native American Rights and Interests	39
2.1.6. Cultural Resources	40
2.1.7. Visual Resources	41
2.1.8. Wilderness Study Areas	44
2.1.9. Lands with Wilderness Characteristics	44
2.2. Resource Uses	45
2.2.1. Livestock Grazing	45
2.2.2. Travel and Transportation	50
2.2.3. Recreation and Visitor Use	50
2.2.4. Socioeconomic Values	51
2.2.5. Climate Change	54
3. Specific Mandates and Coordination/Consistency with Other Plans	55
3.1. Specific Mandates and Legislative Constraints	57
3.2. Planning Process	58
3.3. Relationship to BLM Policies, Plans, and Programs	59
3.3.1. Data Summary	60
3.3.2. Collaboration	61
3.3.2.1. Intergovernmental, interagency, and Tribal relationships	61
3.3.2.2. Cooperating Agencies	62
3.3.2.3. Tribes	62
3.3.2.4. Other Federal Agencies	62
3.3.2.5. Other stakeholder relationships	62
3.3.3. Related Plans	63
4. Current Management Direction	65
4.1. Introduction	67
4.1.1. Desired Future Conditions	67

4.1.1.1. Soil and Water Resources	67
4.1.1.2. Vegetation Resources	67
4.1.1.3. Fish and Wildlife	68
4.1.1.4. Wildfire Ecology and Fuels Management	68
4.1.1.5. Native American Rights and Interests	68
4.1.1.6. Cultural Resources	69
4.1.1.7. Visual Resources	69
4.1.1.8. Wilderness and Wilderness Study Areas	69
4.1.1.9. Livestock Grazing	69
4.1.1.10. Transportation and Travel Management	70
4.1.1.11. Recreation and Visitor Experience	70
4.1.1.12. Social and Economic Conditions	70
4.1.2. Management Actions to be Carried forward from the 2007 Craters of the Moon MMP	71
5. Summary of Scoping/Issues and Management Opportunities	79
5.1. The Scoping Process	81
5.2. Identification of Issues	81
5.3. Issues Addressed	82
5.3.1. Management Opportunities	83
5.3.1.1. Issue 1: Livestock Grazing Management	83
5.4. Issues Considered but Not Further Analyzed	84
5.4.1. Issues beyond the scope of the plan	85
6. List of Preparers	87
7. References	91
Appendix A. Common and Scientific Names of Plant and Animal Species Occurring at Craters of the Moon National Monument and Preserve	105
Appendix B. Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management (USDI BLM, 1997)	113
Appendix C. Greater Sage-Grouse Occupied Breeding Habitat Methodology on Craters of the Moon BLM National Monument Lands	117
Appendix D. Greater Sage-Grouse Habitat Assessment Framework	119
Appendix E. Applicable Laws, Regulations, and Policies	123

Appendix F. Glossary	129
F.1. Glossary	129
Appendix G. Acronyms and Abbreviations	141
G.1. Acronyms	141

List of Figures

Figure 1.1. Planning Area Overview Map	5
Figure 1.2. Detailed Plan Area Map	6
Figure 1.3. Allotment Administration	7
Figure 2.1. Soil Susceptibility to Wind Erosion [NRCS, 2013]	12
Figure 2.2. Soil Susceptibly to Water Erosion [NRCS, 2013]	13
Figure 2.3. Fire Frequency in the Monument	17
Figure 2.4. Vegetation Types in the Monument	19
Figure 2.5. Greater Sage-Grouse Current Habitat Types on BLM Monument Lands	33
Figure 2.6. Greater Sage-Grouse Preliminary Habitat on BLM Monument Lands [Makela and Major, 2012]	35
Figure 2.7. Greater Sage-Grouse Breeding Habitat on BLM Monument Lands	37
Figure 2.8. Visual Resource Management Classes in Craters of the Moon National Monument & Preserve	43
Figure 2.9. Livestock Grazing Allotments (Current Management)	46
Figure 2.10. Monument and Preserve Five-County Socioeconomic Study Area	52
Figure 2.11. Cash Receipts from Agricultural Markets, 5–County Region	54

List of Tables

Table 1.1. Surface Management Responsibilities/Status	3
Table 1.2. Planning Area Livestock Grazing Administration	4
Table 2.1. Vegetation Types in the Monument (NatureServe, July 12, 2013) and BLM datasets .	20
Table 2.2. Noxious Weeds and Invasive Plant Species (NWIPS) in Craters of the Moon	24
Table 2.3. Sagebrush-Associated Species that Occur in the Monument	27
Table 2.4. Special Status Animal Species in the Monument Area	30
Table 2.5. Site-Scale Suitability Summary of Occupied Greater Sage-Grouse Habitats on BLM-Administered Lands in Craters of the Moon.	38
Table 2.6. Visual Resource Management Class Areas in Craters of the Moon National Monument & Preserve	42
Table 2.7. Summary of Wilderness Study Areas	44
Table 2.8. Standards and Guidelines Assessments in Monument Associated Allotments	48
Table 2.9. Craters of the Moon National Monument and Preserve Area by County (Acres)	52
Table 5.1. Scoping Meeting Locations, Dates, and Attendance	82
Table 6.1. List of Preparers	89
Table A.1. Common and Scientific Names of Plant and Animal Species Occurring at Craters of the Moon National Monument & Preserve	105
Table D.1. Breeding habitat life requisites, indicators, and suitability categories for site-scale habitat descriptions (adapted from Connelly et al. 2000, Sather-Blair et al. 2000, Hagen et al. 2007).	120
Table D.2. Summer habitat life requisites, indicators, and suitability categories for upland sagebrush site-scale habitat descriptions (adapted from Connelly et al. 2000, Sather-Blair et al. 2000, Hagen et al. 2007).	121
Table D.3. Winter habitat life requisites, indicators, and suitability categories for site-scale habitat descriptions (adapted from Connelly et al. 2000, Sather-Blair et al. 2000, Hagen et al. 2007).	122
Table E.1. Laws, Regulations, and Policies	123

This page intentionally
left blank

Chapter 1. Introduction

This page intentionally
left blank

1.1. Introduction

1.1.1. Purpose of and Need for the Monument Management Plan Amendment

The U.S. Department of the Interior, Bureau of Land Management (BLM), Shoshone Field Office and National Park Service (NPS) completed the Craters of the Moon National Monument and Preserve Management Plan in 2007. In 2008, Western Watersheds Project (WWP) filed a complaint in the United States District Court for the District of Idaho (Court) alleging the Secretary of the Interior and the BLM violated NEPA and FLPMA when the BLM issued Records of Decision on 16 RMPs between 2004 and 2008, including the Craters of the Moon MMP. In 2011, after briefing and oral argument, the Court noted that,

“...although grazing was deemed by the agency to be a major contributing factor to the decline of sage-grouse habitat, the MMP/EIS failed to adequately address the best science and the agency’s own policies designed to protect that habitat. Moreover, the MMP/EIS failed to discuss alternatives to the status quo regarding grazing.”

Specifically, the Court found that the EIS supporting the Management Plan violated NEPA and FLPMA by (1) failing to consider a no-grazing alternative, (2) failing to consider the recommendations for greater sage-grouse conservation contained within a 2004 Nature Conservancy Report and the 2004 Western Association of Fish and Wildlife Agencies (WAFWA) Conservation Assessment, (3) failing to fully discuss the agency’s Special Status Species Policy and National Sage Grouse Habitat Conservation Strategy, and (4) failing to consider any alternative that would have reduced grazing levels. In November 2012, the Court ordered the BLM to complete a plan amendment with an EIS for the 2007 Craters of the Moon Management Plan to analyze no grazing and reduced grazing alternatives for BLM managed lands within the Monument, and develop measures for greater sage-grouse conservation within Craters of the Moon.

It is important to note that the 2012 Court Order did not vacate the 2007 Craters of the Moon MMP; management direction found the existing plan will remain in effect until the amendment is completed. As such, alternatives developed for this planning effort are consistent with the management objectives found in the 2007 Craters of the Moon MMP.

The Idaho and Southwestern Montana Greater Sage-Grouse Planning Strategy EIS will address a number of deficiencies found by the Court with regard to greater sage-grouse conservation in Craters of the Moon and will amend the 2007 Craters of the Moon Management Plan. The scope of this planning effort is limited to curing the remaining deficiencies identified by the Court in 2012. The BLM will focus on analyzing a range of reasonable alternatives for grazing management, including reduced and no grazing alternatives.

1.1.2. Purpose

The purpose of this Plan Amendment is to consider a range of reasonable alternatives for livestock grazing, including no grazing and reduced grazing alternatives. The BLM will analyze grazing management alternatives consistent with the goals for greater sage-grouse outlined in the BLM’s current policies for greater sage-grouse, the existing objectives for vegetation and wildlife

resource management as identified in the desired future conditions in the 2007 Craters of the Moon Management Plan, Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management, as well as other relevant agency policies and guidance.

1.1.3. Need

The need for this planning effort is to cure deficiencies identified by the District Court. The Court found that BLM failed to adequately address the current science and the agency's own policies designed to protect greater sage-grouse habitat, primarily with regard to managing livestock grazing in Craters of the Moon. The Court also found that BLM failed to consider a range of alternatives related to livestock grazing, including consideration of a no-grazing alternative or any alternative that reduced grazing.

1.1.4. Purpose of the Analysis of the Management Situation

As a part of preparing an MMP Amendment, BLM must analyze inventory data and other information available to identify issues and opportunities. The Analysis of the Management Situation (AMS) provides BLM an understanding of resources and uses in the Planning Area. BLM will consider these preliminary and subsequent assessments of conditions, current management, and management opportunities in the MMP Environmental Impact Statement (EIS). All data, maps, and figures are based on preliminary analysis of datasets as of June 2014. As both the data and analysis are in draft form, any numbers, acreages, and maps are presented for illustrative and comparative purposes only and are not intended for use beyond this document. Prior to the publication of the Draft MMP Amendment, new data may be added and existing data may be refined. Specific analysis, uses, and displays of data may vary from those that appear in the Draft MMP Amendment/EIS as appropriate to the needs of that document. The AMS is not intended to be an exhaustive review of resources or uses within the Planning Area, nor does it provide specific details about the various resources. It is intended to provide a summary analysis of existing management practices, including direction from existing plans and agency policy; local resources and resource uses; and social and economic conditions.

1.1.5. Planning Area Description

National Conservation Lands

Craters of the Moon is a component of the BLM's National Landscape Conservation System (National Conservation Lands). The mission of the National Conservation Lands is to conserve, protect, and restore these nationally significant landscapes that are recognized for their outstanding cultural, ecological, and scientific values.

National Conservation Lands are part of an active, vibrant landscape where people live, work, and play. They offer exceptional opportunities for recreation, solitude, wildlife viewing, exploring history, scientific research, and a wide range of traditional uses. These are places that spark the imagination. Their spacious beauty has drawn people to the West for generations. The National Conservation Lands sustain for the future - and for everyone - these remarkable landscapes of the American spirit.

The Monument

Presidential Proclamation 7373 expanded the Craters of the Moon National Monument in November 2000 from approximately 50,000 acres to nearly 750,100 acres. Craters of the Moon is a geologic wonder cast in a wild and remote landscape. Its central focus is the Great Rift, a 52-mile long crack in the earth's crust. The Great Rift is the source of a remarkably preserved volcanic landscape with an array of exceptional features. Craters, cinder cones, lava tubes, deep cracks, and vast lava fields form a strangely beautiful volcanic sea on central Idaho's Snake River Plain.

Young (dominantly Holocene) lava flows and other features cover about 450,000 acres of Craters of the Moon. The remaining 300,000 acres in the Monument and Preserve are also volcanic in origin, but older in age and covered with a thicker mantle of soil. This older terrain supports a sagebrush steppe ecosystem consisting of diverse communities of grasses, sagebrush, and other shrubs and provides habitat for a variety of wildlife, including several BLM sensitive species, such as the greater sage-grouse.

Key management objectives were identified in the 2007 Craters of the Moon MMP. Specific management objectives related to this planning effort include:

- Proactively protect and restore sagebrush steppe communities.
- Emphasize protection of vegetation resources in North Laidlaw Park.
- Maintain a road network suitable for aggressive fire management within Craters of the Moon.
- Support a large and proactive integrated weed management program.

Land Ownership and Administration in the Planning Area (Shoshone, Burley, and Upper Snake Field Offices)

The 2000 Proclamation that designated the current Craters of the Moon National Monument and Preserve boundary incorporated lands from three BLM Field Offices: Shoshone, Burley, and Upper Snake, as well as National Park Service lands. Shoshone and Burley Field Offices lie within the Twin Falls District, while the Upper Snake Field Office is in the Idaho Falls District. Shoshone Field Office was named as the lead BLM office for Monument management, although management of livestock grazing remained with the Field Office that originally managed those allotments.

The current Craters of the Moon Planning Area refers to the 275,100 surface acres of public lands within the Monument boundary, excluding National Park Service lands. The 2007 Craters of the Moon MMP dictates management over National Monument and Preserve lands. The NPS Monument and Preserve lands are those administered by National Park Service and no grazing is permitted there. This plan amendment will only affect BLM Monument lands, which are those administered by the BLM.

Land ownership and management within the Planning Area boundary are comprised of public, private, State, and other federally managed lands (Table 1.1, Land Ownership within the Planning Area). Approximately 1% percent of the area is in private ownership.

Table 1.1. Surface Management Responsibilities/Status

Surface Management Responsibility/Status	Surface Acres	Percentage of the Planning Area
BLM	275,100	37%
NPS	463,300	62%

Private Lands	6,600	1%
State of Idaho	8,200	1%

Of the 275,100 acres managed by BLM, 273,900 are currently available for livestock grazing. Table 1.2, "Planning Area Livestock Grazing Administration," further summarizes the acres of BLM lands that are available to grazing by which Field Office administers them.

Table 1.2. Planning Area Livestock Grazing Administration

Livestock Grazing Administration	Acres	Percent
Shoshone Field Office	145,000	53%
Burley Field Office	53,400	19%
Upper Snake Field Office	75,500	28%

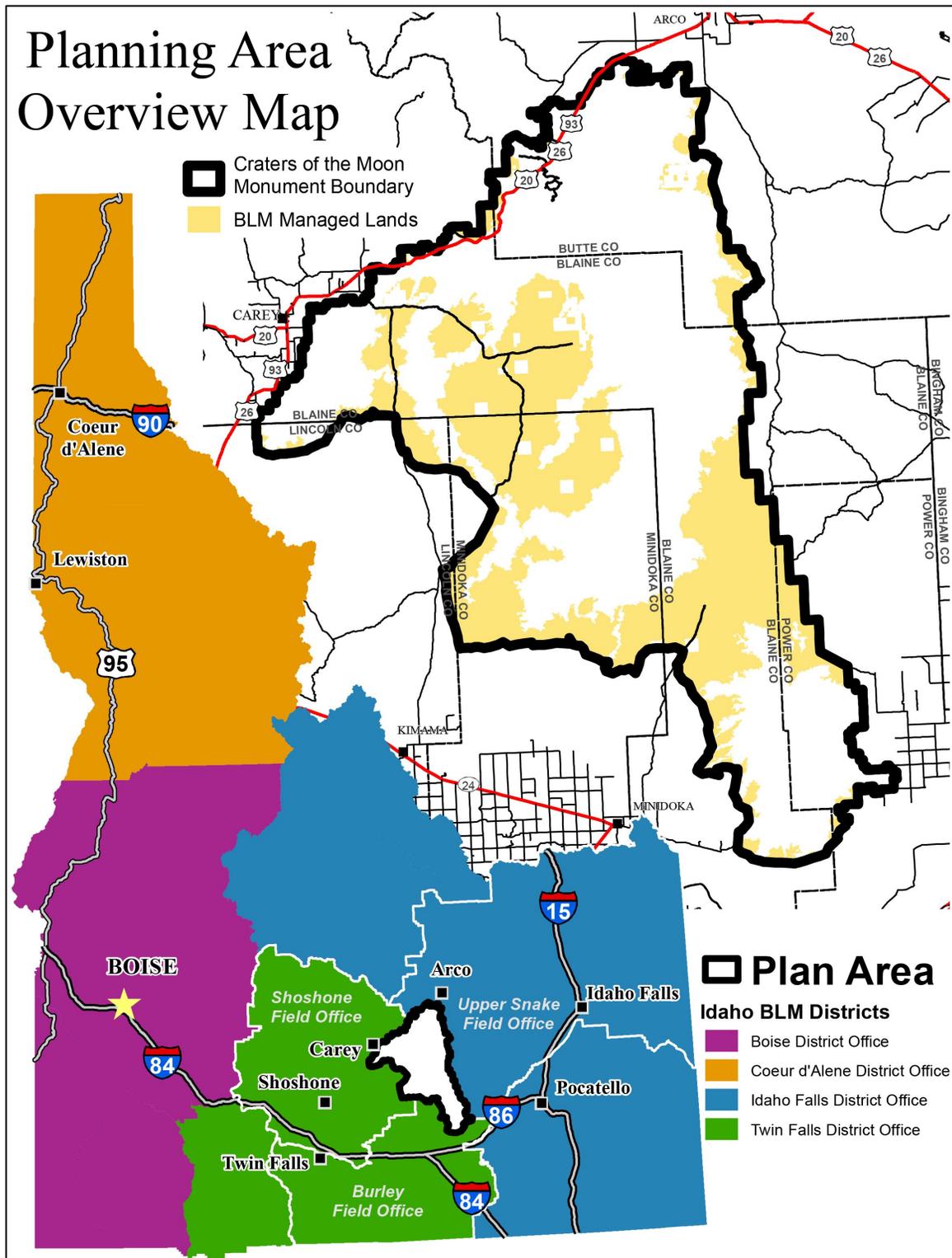


Figure 1.1. Planning Area Overview Map

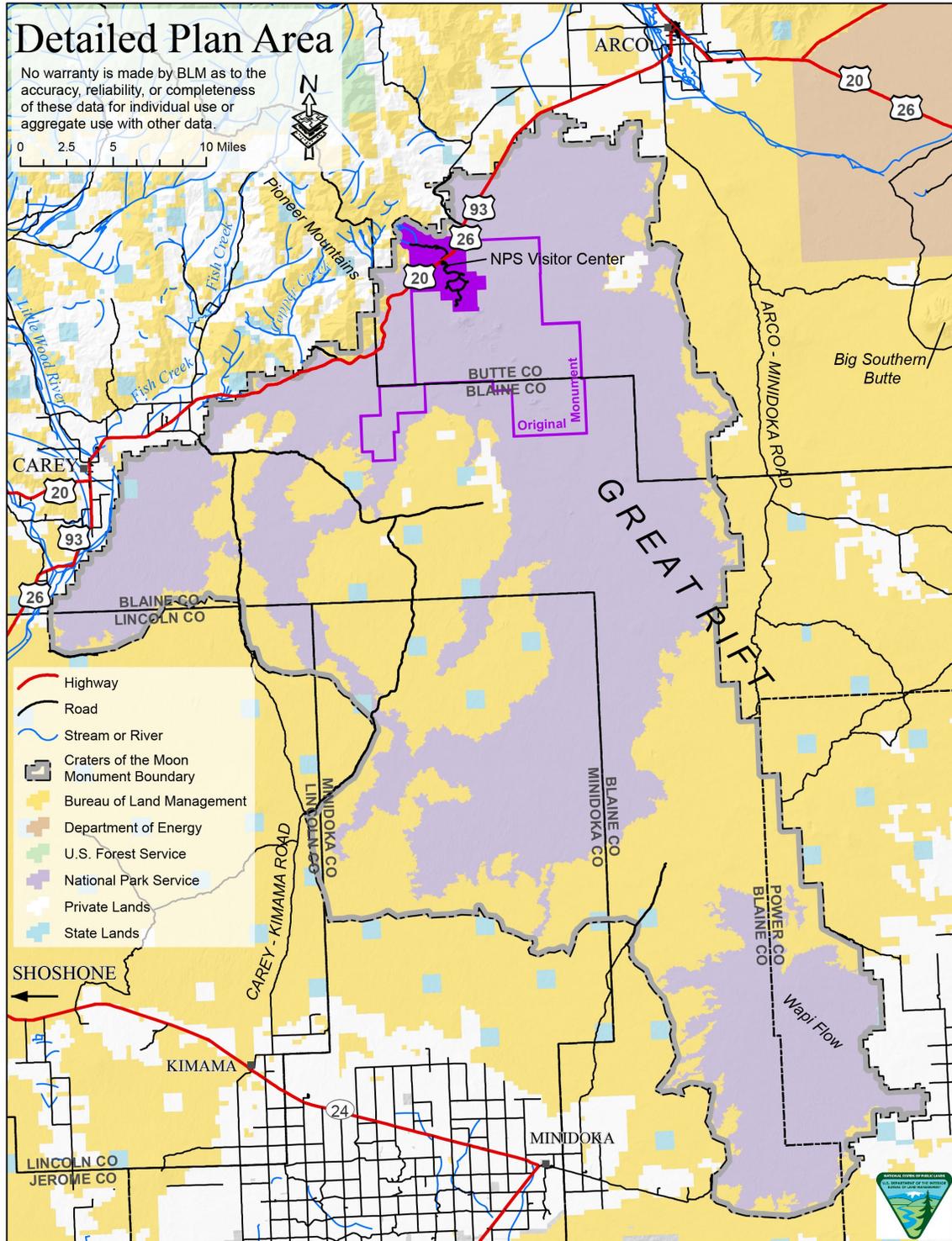


Figure 1.2. Detailed Plan Area Map

Chapter 1 Introduction
 Planning Area Description

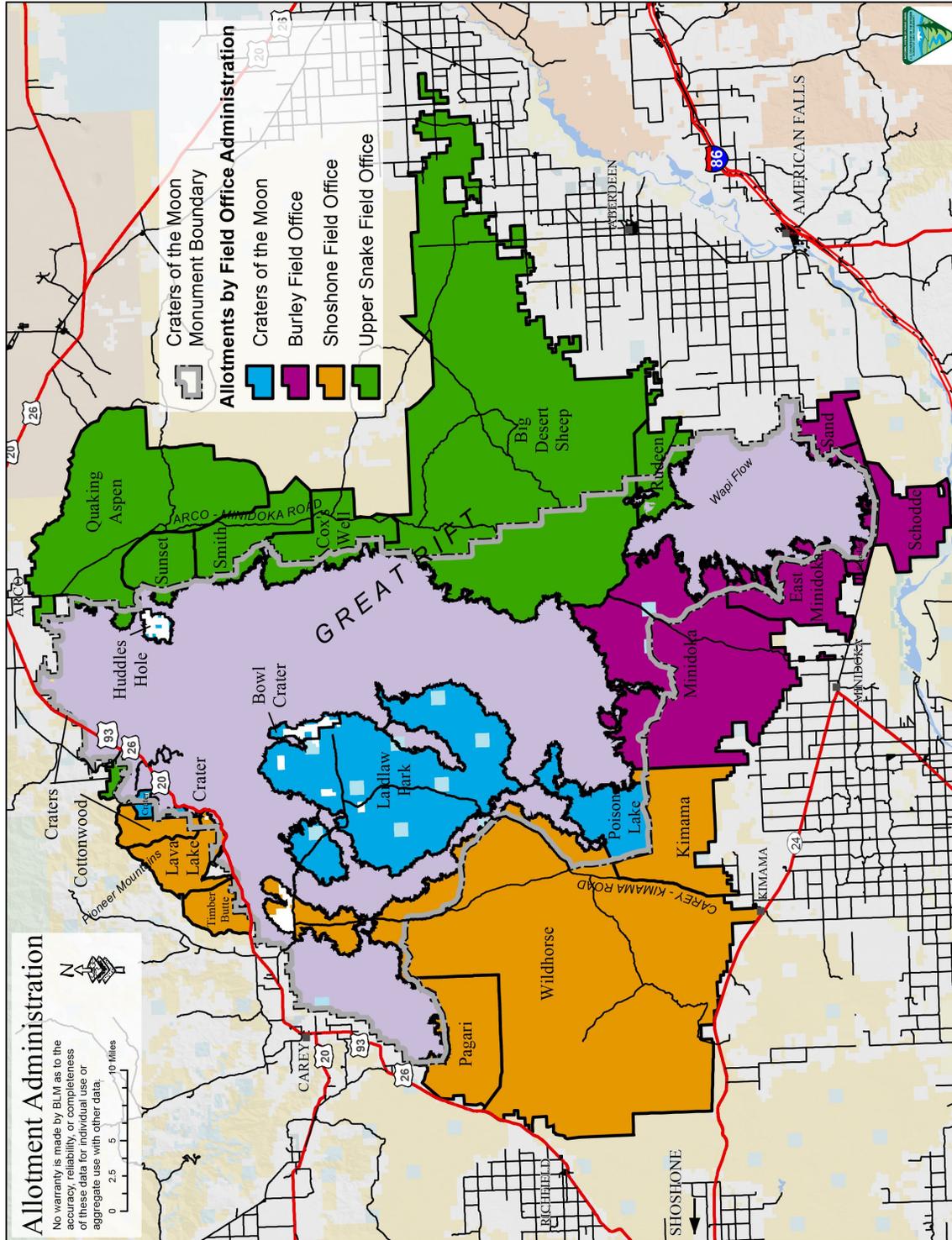


Figure 1.3. Allotment Administration

This page intentionally
left blank

Chapter 2. Planning Area Profile

This page intentionally
left blank

This chapter describes the planning area profile, which is the existing condition of the affected resources, resource uses, and other features in the Planning Area. The information will become the basis for the Affected Environment chapter of the Draft MMP Amendment/EIS.

2.1. Resources

2.1.1. Soil Resources

The soils within the Monument vary and reflect the differences and interactions between parent material, topography, vegetation, climate, and time. The most significant differences depend on the presence or absence of lava flows and the degree of soil development on volcanic substrates. The lava flows, which occupy two-thirds of the Monument, are made up of basalt lava rock. Soils on the younger basalt flows (lava that is visible on the surface) and cinder beds are limited to the initial decomposition of rock and cinders and deposition of windblown loess within crevices, cracks, and fissures. Plants can establish and grow in little to no soil. As time progresses, soil development continues and more vegetation establishes. Sagebrush steppe, mountain areas, and kipukas within the Monument have deeper, well-formed soils, which are those areas that are visibly vegetated.

The high desert environment of Craters of the Moon results in lighter-colored soils with low organic matter content. Most of the soils in the Monument are silt loam to sandy loam and vary in depth. They are moderately drained to well drained, except where clay horizons are present.

Playas are scattered throughout the Monument, and exhibit a much slower rate of percolation due to the soil composition remaining ephemerally moist late into the drier months. Soils that are disturbed, not properly vegetated, or located on steep slopes are susceptible to water and wind erosion.

Existing condition varies. Areas heavily impacted by uses, such as OHV's, roads, range improvements, and sheep bed-grounds exhibit more compaction and erosion than other areas where uses are more distributed or receive less use. Soil compaction leads to reduced quality of soil, infiltration of water, and impedes healthy root system development in plants. This can lead to the establishment or expansion of invasive and noxious weeds and decreases the ability of the site to support desirable vegetation. Typically, these uses are limited to a localized area.

Roads and trails were evaluated during the Craters of the Moon Travel Management Plan (TMP), and redundant, unused, or unneeded routes were identified for closure and subsequent rehabilitation. To date, several of these routes have been rehabilitated, and soil compaction issues associated with these is decreasing. As the rehabilitated areas continue to establish vegetation, soil erosion will diminish as well.

Figures 2.1 and 2.2 summarize soil susceptibility to wind and water erosion on BLM-managed land within the Monument. Wind erosion is detachment, transport and deposition of soil by wind, and water erosion is the removal of soil by water, such as through either rainfall or runoff. Water erosion is related to slope [Soil Conservation Service, 1993].

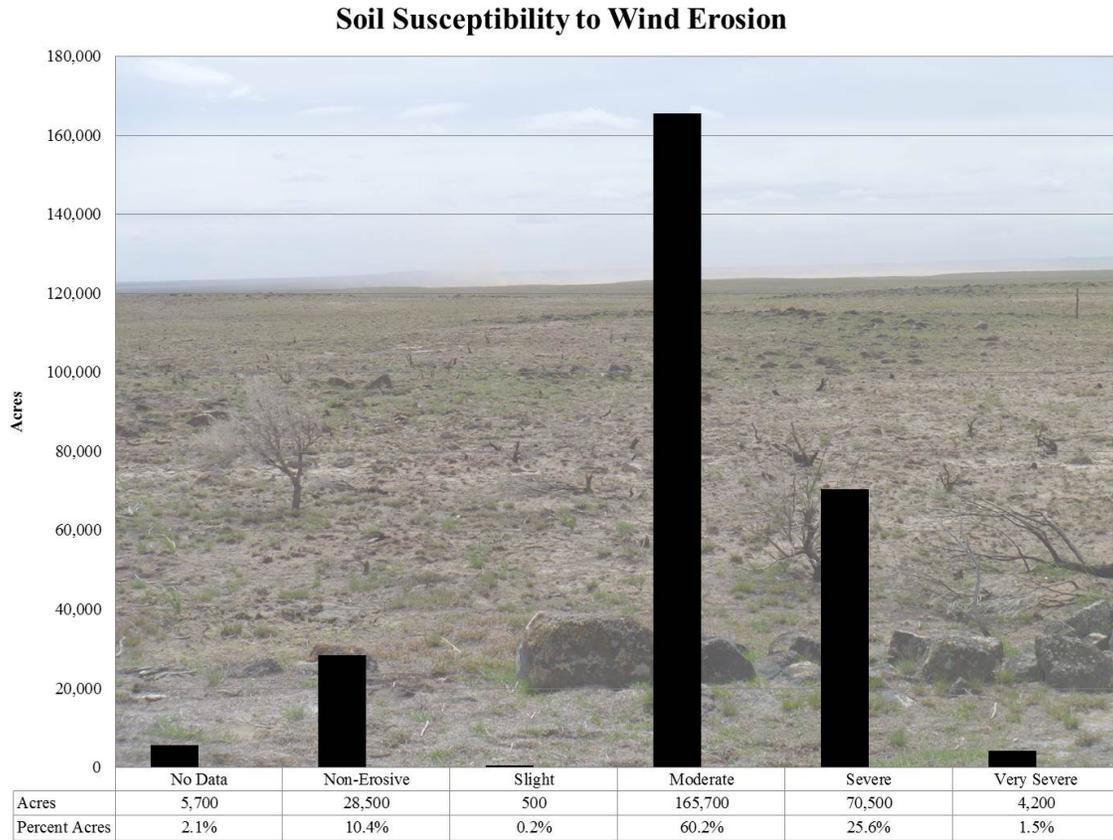


Figure 2.1. Soil Susceptibility to Wind Erosion [NRCS, 2013]

Soil Susceptibility to Water Erosion

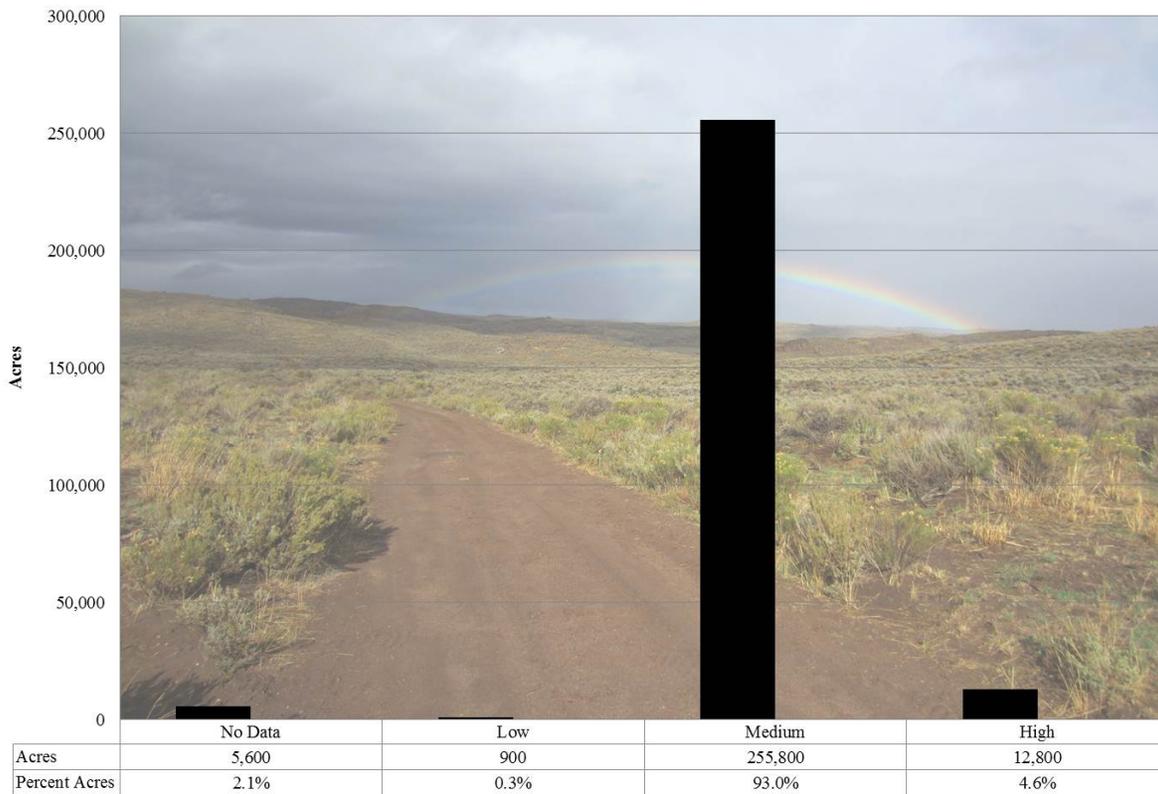


Figure 2.2. Soil Susceptibly to Water Erosion [NRCS, 2013]

2.1.2. Water Resources

Surface water resources are limited in the Monument. Stream channels are largely nonexistent within the exposed lava flows, and streams draining from the Pioneer Mountains rapidly become subterranean once they encounter the lava flows. Several small perennial streams occur in the Pioneer Mountains at the north end of the Monument. Very short segments of the Little Wood River and waterways associated with Fish Creek also fall just within the boundary, but are not influenced by activities on BLM lands because they are surrounded by extensive lava flows, making them inaccessible to livestock. The watersheds of Big Cottonwood and Copper Creeks span BLM lands immediately north of the Monument.

The slopes of the Pioneer Mountains contain numerous perennial and ephemeral springs that feed small creeks and marsh wetlands. Just north of the Craters of the Moon Lava Field is a small complex of hot springs. Parts of Lava Lake, Huff Lake, and Carey Lake Marsh also lie within Monument boundaries. Seasonal playa lakes are scattered throughout the sagebrush steppe desert. Many of these playas have been developed by BLM to create reservoirs, which increases their water-holding capacity and longevity. Numerous caves within the Monument lava flows contain year-round ice deposits, which become melt water during the summer.

Wetlands and Riparian Communities

Wetland and riparian communities are somewhat rare in the Monument. The cold-water springs, creeks, lakes, and marshes on lower slopes of the Pioneer Mountains support limited aquatic, wetland, and riparian habitat for numerous plant and animal species. Several species of water-loving (hydrophilic) plants, waterfowl and marsh birds, two frog types, several small mammals, beaver, and moose use these habitats. Many other species use the water sources these areas provide. Wetlands mapped by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) are limited to the northwest corner of the Monument. Most wetlands and wetland habitats are palustrine (non-tidal, inland wetlands dominated by terrestrial and emergent vegetation) and are only seasonally or temporarily flooded. Approximately half of the BLM-monitored streams, springs, and seeps within watersheds that span the Monument are rated as properly functioning, 38% are functioning-at-risk with no apparent trend, and 13% are nonfunctioning.

The Monument is mostly composed of a semiarid sagebrush steppe ecosystem. These areas generally receive 8 to 16 inches of precipitation a year. Given the lack of significant precipitation, snow runoff is the primary source of water in the Monument. The snow runoff accumulates in playas. They hold water long enough to allow some specialized aquatic organisms to grow and reproduce, but not long enough for a pond or marsh ecosystem to develop. Most of the playas dry up by July.

Water Rights/Water Use

The State of Idaho granted NPS federal reserved water rights within the NPS Monument boundaries in 1998. The priority dates of the rights range from 1924 to 1996, depending on the date when each area was added to the Monument. These rights grant diversions of 54.5-acre feet per year from all surface water and groundwater sources to provide for domestic, irrigation, or industrial use within the NPS Monument [Hurlbutt 1998]. The rights do not entitle the United States to maintain any specific water table elevation in the Snake River Aquifer beneath the Monument.

The BLM has 337 filed water right claims on 18 springs, 192 playa lakes, and 127 reservoirs within the Monument. The claims, primarily used for stock water and wildlife, are for 333.5 total acre-feet per year, and a minimal amount of 0.02 cubic feet per second on each source. Priority dates of the water rights claims start as early as 1926.

Water resources in the Monument are used in a variety of ways: drinking water for the NPS Monument Visitor Center, irrigation water for farms, livestock watering sites, and recreational opportunities like bird watching. Human use and activities sometimes alter water and associated resources. Playas and reservoirs developed by BLM are an integral part of this semiarid ecosystem, and they often are the only source of water for wildlife and livestock.

The aquatic and wetland habitat supported by Carey Hot Spring has historically been altered by concentrated livestock use and human recreation. In 2004, the perimeter of the spring was fenced to avoid further degradation by livestock. Conditions inside the enclosure have improved.

Water Quality

Steep-sided canyons with high gradient channels and a narrow floodplain characterize the watersheds of Big Cottonwood and Copper Creeks. These streams are very similar in geology consisting of sagebrush-covered hillsides in short valleys of sand- and clay-type surface soils. High discharge typically occurs in late spring and early summer due to snowmelt (< 5 cubic feet

per second); low discharge occurs in late summer or early fall (<1 - 2 cubic feet per second; [Falter and Freitag 1996], [Beneficial Use Reconnaissance Program (BURP) 2007]).

Mining activities in the Big Cottonwood Creek drainage north of the Monument boundary pre-date establishment of the NPS Monument in the 1920s. Outbuildings and tailing materials from the Paymaster Mine remain along the west fork of the creek; however, it is not likely that water quality is currently impacted by past mining activities.

Streamwater quality in Big Cottonwood Creek has been monitored and has generally been found to be good, with no violations of Idaho State standards for temperature [BURP 2007], dissolved oxygen, and/or turbidity [Falter and Freitag 1996]. Total dissolved solids content of the water, as indicated by electrical conductivity, has been found to be moderate to low [Falter and Freitag 1996], [BURP 2007]. The stream's waters are carbonate-based, of moderately low alkalinity and carbon dioxide, and neutral to slightly basic pH. Streamwater nutrient concentrations of total phosphorus have been shown to be moderately high with nitrogen limitation indicated, and streamwater concentrations of nitrate nitrogen are high [Falter and Freitag 1996].

Low to moderate levels of fecal coliform with high fecal streptococcus bacteria in streams suggest animal, rather than human, influence on the stream. Aquatic insect associations are relatively balanced; the community is predominantly comprised of Dipterans, Ephemeropterans, and Plecopterans. Stream bank and channel stability is good, with little indication of eroding or collapsing banks [Falter and Freitag 1996], [BURP 2007].

2.1.3. Vegetation Resources

Although some of the younger lava flows are devoid of vegetation, there is surprising diversity among plants and plant communities in the Monument (see Appendix A). The type and density of vegetation varies widely, depending on the availability of soil. Lava flow and kipukas show a full range of ecological succession – from pioneer plants, such as lichens and mosses on basalt surfaces, to complex plant communities in kipukas and rangelands bordering lava flows. Rough topography of the lava flows creates numerous microsites where soil and water accumulate to support plants that would normally occur in higher precipitation zones.

Limber pine stands occur on cinder cones and lava flows in the northern part of the Monument. The transition between limber pine and juniper vegetation types occurs between Blacktail Butte and the Craters of the Moon National Wilderness Area. This ecotone normally occurs in montane regions and is an unusual feature for the lava flows [USDI BLM 1980b]. Quaking aspen and Douglas-fir stands are found on some north-facing slopes in the northern portion of the Monument. Riparian and wetland habitats are limited to the northern periphery due to geology, topography, and climate of the area.

Early successional plant communities on the cinder cones produce diverse spring wildflower displays. Areas with greater soil development support the sagebrush steppe vegetation that typifies the Snake River Plain. Sagebrush steppe is found on approximately 60% of the Monument and covers the more developed soils of rangelands, kipukas, cinder cones, older lava flows, and the Pioneer Mountain foothills. Sagebrush steppe vegetation type was once common throughout the Snake River Plain, as well as in the Intermountain West and Upper Columbia River Basin. However, fire, agriculture, and livestock management practices have modified composition and reduced the extent of this vegetation type throughout these regions [Blaisdell et al. 1982]; [Whisenant 1990]; [Bunting et al. 2002]; [Strand et al. 2013].

Some portions of the Monument, such as isolated kipukas on NPS lands, have seen little grazing use by domestic livestock and have seen little in the way of other human-related disturbances. Consequently, these areas, which are protected by newer, rough lavas, offer some of the best remaining examples of native sagebrush steppe in the Snake River Plain. They are valuable as examples of range conditions before European-American settlement and the introduction of domestic livestock. These areas offer a unique opportunity to observe climax vegetation, as well as successional processes associated with natural disturbances, such as fire, and weeds introduced by wildlife, recreation, or airborne means.

Fire and Vegetation Management

Between 1970 and 2013, approximately 310,000 acres have burned in wildfires within the boundary of the expanded Monument, primarily on BLM-administered land. About two-thirds of this acreage has burned two or more times (Figure 2.3).

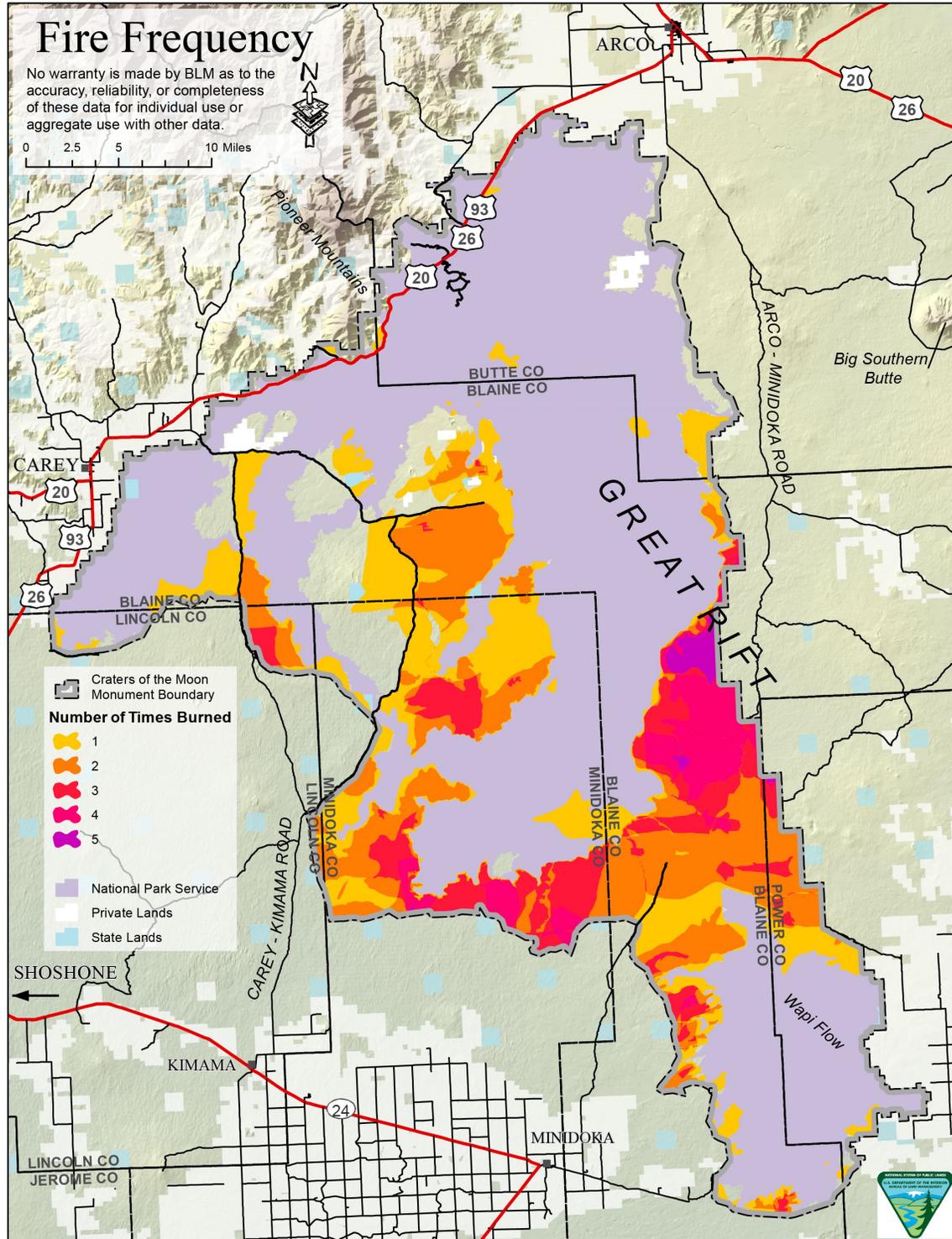


Figure 2.3. Fire Frequency in the Monument

Peak fire years occurred in 1992 (61,000 acres), 1999 (87,000 acres), 2005 (56,000 acres), and 2006 (65,000 acres). Extensive acreages outside of and adjacent to the Monument also burned during this period. About half of Laidlaw Park and Paddelford Flat and nearly all of Little Park have remained unburned in the last decade. Relatively small fires have burned on vegetated lava and in kipukas, notably Little Prairie in 1992 (1,900 acres) and Echo Crater in 2000 (600 acres).

Fire plays a key role in determining the diversity and condition of vegetation communities. Large tracts of sagebrush have been lost due to extensive wildfires, and fires have perpetuated exotic annual grasslands. However, fire also plays an important role in the maintenance of some vegetation types, including aspen and mountain shrub. Please refer to the 2007 Craters of the Moon Management Plan, Chapter 2, *Natural Resources, Vegetation, including Special Status Species and Fire Management*(pp. 22–23) for more details about wildland fires in the Monument.

Vegetation in the original Monument and parts of the expanded Monument has been inventoried and mapped through various efforts [Day and Wright 1985]; [Whipple 1992]; [Jurs and Sands 2004]. A 2003 vascular plant inventory effort estimated the presence of more than 600 plant species within the Monument [NPS, unpubl. data].

The most current vegetation map of the Monument was created with the use of Landsat imagery. Data from various vegetation studies, as well as inventory and monitoring points, were used to define spectral signatures detectable from the Landsat satellite. Vegetation inventory and ground-truthing of the map are ongoing; the vegetation map is a dynamic resource. This map, which is relatively broad in scale, is intended to provide a frame of reference for vegetation distribution and diversity within the Monument. The following discussion describes complexes that group and define the various vegetation types illustrated on the map (Figure 2.4).

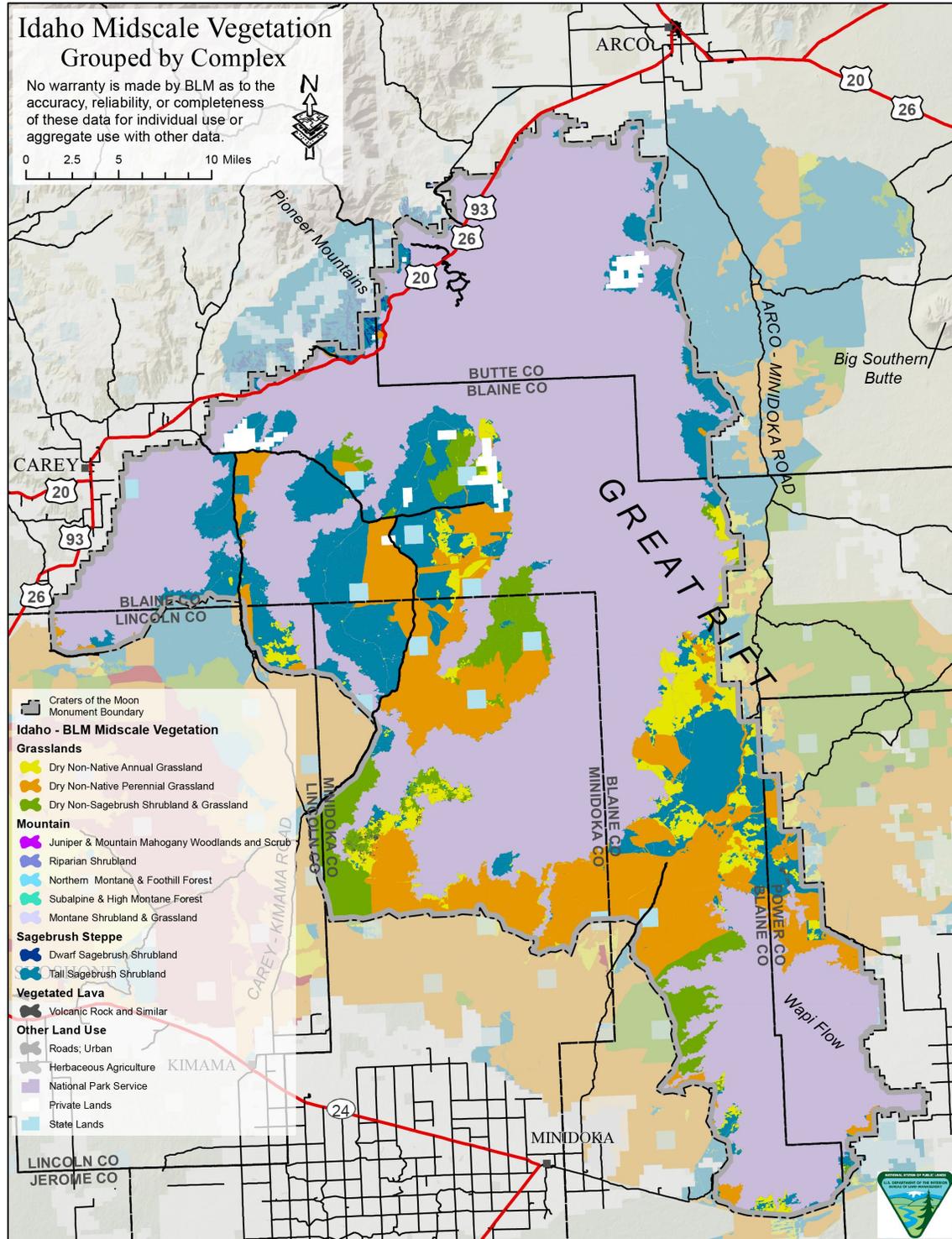


Figure 2.4. Vegetation Types in the Monument

Vegetation Types in the Monument

The Monument is part of the Snake River Plain ecoregion [NatureServe, 2013]. The National Vegetation Classification Standard (NVCS) has been set as the standardized vegetation classification system for BLM land use planning efforts. IM 2013-111 defines the strategies and levels to use for consistent mapping and classification efforts across the BLM. RMP amendments are directed to use Macrogroups to define cover types for general existing vegetation. Table 2.1 lists the Macrogroups found in the Monument, as well as their corresponding BLM Midscale description, and a more general Complex grouping. The following vegetation types are found in the Monument:

Table 2.1. Vegetation Types in the Monument (NatureServe, July 12, 2013) and BLM datasets

Complex	BLM Midscale	Macrogroup
Grasslands	Dry Non-Sagebrush Shrubland & Grassland	Great Basin & Intermountain Dry Shrubland & Grassland
		Intermountain Basins Semi-Desert Grassland
	Dry Non-Native Perennial Grassland	Introduced & Semi Natural Vegetation
	Dry Non-Native Annual Grassland	Introduced & Semi Natural Vegetation
Mountain	Northern Montane & Foothill Forest	Northern Rocky Mountain Lower Montane & Foothill Forest
	Subalpine & High Montane Forest	Rocky Mountain Subalpine & High Montane Conifer Forest
	Juniper & Mountain Mahogany Woodlands and Scrub	Intermountain Singleleaf Pinyon - Western Juniper Woodland
	Montane Shrubland & Grassland	Great Plains Mixedgrass Prairie & Shrubland
		Northern Great Plains Woodland
Riparian Shrubland	Western North American Montane Wet Meadow & Low Shrubland	
Sagebrush Steppe	Tall Sagebrush Shrubland	Great Basin & Intermountain Tall Sagebrush Shrubland & Steppe
	Dwarf Sagebrush Shrubland	Great Basin & Intermountain Dwarf Sage Shrubland & Steppe
Vegetated Lava	Unconsolidated Materials, Volcanic Rock, Bedrock, Scree, Cliff and Canyon	Intermountain Basins Cliff, Scree & Badland Sparse Vegetation
Other Land Use	Urban	Developed & Urban
	Herbaceous Agriculture	Herbaceous Agricultural Vegetation
	Roads	Roads

Mountain Shrub Complex

The mountain vegetation complex occurs at the north end of the Monument in the Pioneer Mountains. This complex covers about 4% (<10,000 acres) of the BLM portions in the Monument, but it includes vastly different and important habitat types that contribute to the diversity of the complex.

Four vegetation types are included in this complex. The Northern Montane & Foothill Forest and Subalpine & High Montane Forest types are found on relatively steep, north-facing slopes of older cinder cones. The Riparian Shrubland type, which can be found along Little Cottonwood Creek, is characterized by dense woody vegetation such as black cottonwood, chokecherry, willow, alder, and a dense layer of tall forbs near permanent watercourses. The Montane Shrubland & Grassland

vegetation type includes communities dominated by mountain big sagebrush, low sagebrush, and mountain snowberry that occupy slopes and ridges of the Pioneer Mountains.

Sagebrush Steppe Complex

Sagebrush steppe is the dominant vegetation in the Monument, and includes areas where adequate soil deposition or development has occurred to allow sagebrush taxa and associated shrubs with a bunchgrass understory to dominate. The sagebrush steppe complex and associated midscale classifications comprise 35% of BLM portions of the Monument (97,000 acres). Due to the drastic reduction of sagebrush steppe in southern Idaho by cultivation, fire, and weed invasion [Hironaka, Fosberg, & Winward, 1983], some of the sagebrush communities in the Monument are the best remaining examples of this vegetation type on the Snake River Plain.

The sagebrush steppe appears to be a monotonous landscape; however, there is a remarkable diversity of plant and community types. Many factors influence the diversity, density, cover, distribution, and health of this high desert sagebrush steppe. Factors include differences in soil depth and development, precipitation gradient (ranging from 8 to 14 inches), elevation gradient (ranging from 4,000 to 7,500 feet between the southern and northern ends of the Monument), historical and current land management, invasive species, and fire frequency. In turn, vegetation structure and composition influence the ability of the community to resist invasive species infestation, as well as recover from fire.

Sagebrush steppe vegetation in the Monument is dominated by three subspecies of big sagebrush—mountain big sagebrush, basin big sagebrush, and Wyoming big sagebrush, as well as inclusions of threetip sagebrush. Midscale classifications include Tall Sagebrush Shrubland and Dwarf Sagebrush Shrubland, but can be further broken down into Mid- to High-Elevation Sagebrush Steppe and Low-Elevation Sagebrush Steppe because of elevation and precipitation gradients.

The Mid- to High-Elevation Sagebrush Steppe vegetation type is generally defined by the presence of mountain big sagebrush and antelope bitterbrush, which occur in higher-elevation areas that are colder and receive more precipitation found in the northern end of the Monument. Low sagebrush is also found in this vegetation type, occurring as a mosaic with mountain big sagebrush.

The Low-Elevation Sagebrush Steppe vegetation type is defined by basin and Wyoming big sagebrush and threetip sagebrush, although these may overlap to some extent with the mid-elevations. Both basin and Wyoming big sagebrush are adapted to the hot, seasonally dry conditions of the Snake River Plain. Basin big sagebrush communities occur in pockets of deeper, more fertile soils. Wyoming big sagebrush communities tend to be found in shallower soils and can be found intermixed with basin big sagebrush.

Threetip sagebrush is widespread throughout the Monument, particularly in areas that burned within the last 20 years. Threetip sagebrush is the only sagebrush found in the Monument that re-sprouts following fire. The Low- and Mid- to High-Elevation Sagebrush Steppe vegetation types contain other common shrubs such as antelope bitterbrush, rubber rabbitbrush, and green rabbitbrush.

Understory components in the sagebrush steppe complex vary widely in type and abundance, but common species include Sandberg bluegrass, Idaho fescue, needle-grasses, bluebunch wheatgrass, and the exotic annual cheatgrass. Forbs such as buckwheats, arrowleaf balsamroot, lupine, phlox, and milkvetches are also commonly found growing in these vegetation types.

Both diversity and abundance of herbaceous plants increase with rising elevation and moisture throughout the Monument.

The reduction of large tracts of sagebrush through increased size and frequency of wildfires is a concern in the area. Less obvious is the loss of native understory plants, particularly native bunchgrasses that are valuable components to the ecosystem. Plants such as bluebunch wheatgrass and Idaho fescue may not be resilient under conditions of closed shrub communities, frequent fire regimes, cheatgrass invasion, altered climate or site conditions, or excessive grazing. The reduction in these native species by one factor increases their susceptibility to other factors. Once native understory species are excluded, they are very difficult to reestablish [Hironaka et al. 1983].

The variation of sagebrush steppe communities influences the multiple values and uses of this landscape in the Monument. These areas are valued as crucial winter range habitat for mule deer and pronghorn, essential habitat for sagebrush-obligate wildlife like greater sage-grouse, important watersheds, sources of livestock forage, and recreational use. Conditions of the sagebrush steppe community in the Monument vary greatly, primarily due to relative isolation and past and present land uses.

The Monument contains more than 500 kipukas, many of which contain native sagebrush steppe communities. Fire, livestock grazing, recreation, or cheatgrass invasion have altered some of the kipukas; however, other kipukas in the Monument have been protected from access and buffered by rough lavas. The abundance and condition of resources within most of these kipukas is undocumented and relatively unknown. Nevertheless, those kipukas that have been documented and studied make it clear that these unique islands of native vegetation are important rangeland and scientific benchmarks [Henderson and Murie 1958]; [Yingst and Handy 1961]; [Tisdale et al. 1965]; [Caicco and Wellner 1983a, 1983b, 1983c].

Laidlaw Park, Paddelford Flat, Larkspur Park and Little Park technically meet the definition of a kipuka, but are referred to as “parks” due to their larger size, accessibility, and land use. There is road access to and within these parks, and livestock grazing is a current and historical use. All three parks contain the sagebrush steppe vegetation type, as well as areas dominated by annual and perennial grasslands. The abundance of native species and the quality of these sagebrush steppe communities depends mainly on management practices and cumulative effects of environmental responses. For example, the northern parts of Laidlaw Park retain sufficient native understory and sagebrush. Conversely, historic grazing practices, frequent wildfires, Aroga moth infestations, cheatgrass invasion, and noxious weeds have negatively affected the southern portions of Laidlaw Park. In addition, the southern part of Laidlaw Park receives slightly less rainfall than the northern part, making it less resilient to disturbance [Jurs and Sands 2004].

Grasslands Complex

The Dry Non-Native Perennial Grassland and Dry Non-Sagebrush Shrubland & Grassland vegetation type is dominated by native or introduced perennial grasses. The grasslands complex covers 60% of the BLM portions of the Monument (166,000 acres). Historically, Dry Non-Sagebrush Shrubland & Grasslands were part of the sagebrush steppe complex and formed because of disturbance, primarily through fire. Shrubs would eventually reinvade perennial grasslands if they remained unburned for several decades. In most cases, fire is the main cause of shrub removal. Some shrubs such as threetip sagebrush, rubber rabbitbrush, and green rabbitbrush are able to re-sprout, and mountain big sagebrush is able to reestablish more rapidly (roughly 10 years). However, Wyoming and basin big sagebrush must regenerate from seed and can be slow to reestablish after fire.

Dry Non-Native Perennial Grasslands typically lack a shrub component, such as sagebrush, and possibly have reduced forb diversity. Established, non-native perennial seedings function to reduce soil movement from both water and wind erosion, and limit invasive species expansion and establishment. They are resilient to disturbances, requiring little input to maintain a stable system following natural disturbance events like wildfires, and are more able to withstand repeat moderate to heavy grazing than mid-size native perennial bunchgrasses. Crested wheatgrass is a key component of Dry Non-Native Perennial Grass communities in the Monument. Peak production of crested wheatgrass typically occurs in April-June, tapering off in July. An initial leaf height of at least 4 inches prior to grazing is recommended to sustain productivity and vigor of grazed plants [Meays, Laliberte, & Doescher, 2000].

The Dry Non-Native Annual Grassland vegetation type is the result of altered disturbance regimes, such as soil surface disturbance or frequent fires in areas with longer natural fire return intervals. Cheatgrass is the primary component and is an exotic species that perpetuates short fire-return intervals and conditions that maintain its dominance.

In many cases, microsite conditions have often been altered to the extent that native grasses are unable to effectively compete with cheatgrass and noxious weeds. Under these conditions, burned areas are revegetated by seeding perennial vegetation to prevent the establishment of annual grasslands. In areas where altered site conditions and high competition from exotic species exist, select cultivars of introduced and native perennial grasses and forbs are used to rehabilitate burned areas. Some of the species seeded in rehabilitated areas are crested or Siberian wheatgrass, Snake River wheatgrass, tall wheatgrass, bluebunch wheatgrass, big bluegrass, and Sandberg bluegrass. Forbs such as blue flax, sainfoin, scarlet globemallow, and alfalfa have also been seeded. Exclusively native plant seedings have also been completed in Wilderness Study Areas. Both the NPS and BLM encourage the use of native species for restoration and rehabilitation efforts.

Vegetated Lava Complex

This system is limited to basalt lava, and cinder cones or fields. Scattered occurrences of buckwheats, limber pine, and juniper may be present.

Exposed lava flows are the newest lava flows or rough a'a flows that are mostly devoid of vascular plants; however, lichens and mosses are frequently present. Vegetated lava is defined as lava fields with greater than 5% total vegetative cover, with plants occurring as islands, pockets, or clustered individuals in the lava flow. This complex covers less than 1% of the BLM portions of the Monument (roughly 1,100 acres). The vegetated lava complex mainly consists of early successional and adaptable plants that grow in limited soil that blows into the cracks and fractures on young basalt rock.

The type of lava and the amount of soil determine the type and density of vegetation. Penstemon and gland cinquefoil grow in shallow soils, while fern-bush, rock spirea, and syringa are present in deeper crevices. Trees, such as limber pine in the north end of the Monument and juniper in the south end, also grow in crevices and cracks where sufficient moisture is funneled and retained. These trees may grow as scattered individuals or as small woodlands. Antelope bitterbrush, rabbitbrush, and sagebrush can also be found (up to 15% of vegetative cover) where more soil development or deposition has occurred.

Nonvascular Plants

Mosses, liverworts, lichens, fungi — biological soil crusts — are vegetative life forms that have been historically overlooked in the Monument flora due to their inconspicuous nature.

These organisms occur to some extent in every vegetation type in the Monument and are commonly observed on exposed lava. This large group of organisms has been studied to some degree in other areas, but limited information exists for the Monument area specifically. Nonvascular plants perform a number of ecologically important functions; they actively decompose detritus, break down rock, and add structure and nutrients to the soil. They are important components of the functioning ecosystem and serve as environmental quality indicators.

Noxious Weeds and Invasive Plant Species (NWIPS)

Eleven species of weeds designated as noxious by Idaho State Law [State of Idaho 2001] have been identified in the Monument: spotted knapweed, diffuse knapweed, Russian knapweed, rush skeletonweed, leafy spurge, Canada thistle, musk thistle, Scotch thistle, Dalmatian toadflax, Dyer's woad and field bindweed. Disturbed areas such as road rights-of-way, intensively grazed areas, and burns are particularly susceptible to invasion by exotics; consequently, most of the noxious weeds are found specifically in these areas.

Table 2.2. Noxious Weeds and Invasive Plant Species (NWIPS) in Craters of the Moon

Common Name	Scientific Name	Statewide List Type
Russian knapweed	<i>Acroptilon repens</i>	Control
Diffuse knapweed	<i>Centaurea diffusa</i>	Containment
Spotted knapweed	<i>Centaurea stoebe</i>	Containment
Rush skeletonweed	<i>Chondrilla juncea</i>	Containment
Canada thistle	<i>Cirsium arvense</i>	Containment
Leafy spurge	<i>Euphorbia esula</i>	Containment
Dalmatian toadflax	<i>Linaria dalmatica dalmatica</i>	Containment
Scotch thistle	<i>Onopordum acanthium</i>	Containment
Musk thistle	<i>Carduus nutans</i>	Control
Dyer's woad	<i>Isatis tinctoria</i>	Control
Field bindweed	<i>Convolvulus arvensis</i>	Containment

Note

“Control” means to obtain control through any or all of the following: prevention, rehabilitation, eradication, or modified treatments.

“Containment” means halting the spread of a weed infestation beyond specified boundaries. [Idaho Code Title 22 Agriculture and Horticulture, Chapter 24 Noxious Weeds, Idaho State Department of Agriculture]

Spotted knapweed and diffuse knapweed have been documented extensively along U.S. Highway 20/26/93 through the northern extent of the Monument. More than 200 infestations of knapweed occurs along the highway within Monument boundaries. NPS mapped and treated these locations in 2001 and 2003. Spotted and diffuse knapweeds have also been documented and treated in Paddelford Flat and Laidlaw Park, along the west and east edges of the Monument, respectively.

Rush skeletonweed has been reported in various locations in Laidlaw Park and the west side of the Monument; it is also found in the vicinity of Bear Trap Cave and Kings Bowl on the east side of the Monument. Many observations of this species have not been officially documented, but incidental observations suggest that it is much more widespread than any current mapping effort

shows. For instance, from data collected for habitat assessments in 2012 and 2013, 24% of transects had at least one occurrence of rush skeletonweed. This weed also takes advantage of disturbed soil and spreads primarily by seed.

Leafy spurge has been documented in the west part of the Monument as small, scattered sites within the sagebrush steppe and vegetated lava vegetation types (Carey Lava Field). It has also been recently documented in the group campsite north of the highway. Large infestations are known to exist along the west edge of the Monument in the Carey area and in the Monument Butte and Sand Butte vicinities. These large infestations have increased potential for further introduction and spread onto the Monument by way of birds, deer, livestock, and vehicles. BLM is continuing a control program specifically developed to address infestations on lava-based terrain.

Thistles are scattered throughout the Monument. Nearly 100 total locales have been documented for all three noxious thistles.

Dyer's woad has been found and treated near Brigham Point. Other scattered occurrences have been treated along the east and west sides of the Wapi Flow. Dyer's woad is known to occur across the Wapi Flow.

Both BLM and NPS have initiated integrated noxious weed programs. Efforts to control these species are in effect, including the use of mechanical and spray techniques, as well as limited use of biological control agents. The priority species discussed have been targeted specifically for mapping, treatment, and prevention programs. Education and public awareness are emphasized by both agencies. Involvement in Cooperative Weed Management Areas has resulted in strong community commitment and cost-effective management of noxious weeds.

Other invasive, exotic species, such as cheatgrass, are as much of a concern as state-listed noxious weeds. Cheatgrass, a common and widespread invader throughout the West, is extremely competitive and readily invades and dominates disturbed land. It can be a component of undisturbed or otherwise healthy sagebrush. For example, cheatgrass has been documented in several kipukas that lack a history of common human disturbances such as livestock grazing. This annual grass out-competes native vegetation and perpetuates a frequent fire regime, which further discourages the regrowth of native species and encourages more cheatgrass. This has been a key management concern for BLM and has driven the development of more effective disturbed land rehabilitation and restoration techniques. Approximately 28,000 acres of BLM-managed lands in the Monument have cheatgrass and other invasive annuals as a dominant component.

BLM and NPS have implemented nationwide policies against invasive and harmful exotic species. All the species mentioned in this discussion have been targeted for eradication or control.

Special Status Plants

The Monument also provides habitat for two State- and BLM-designated special status plants. Special status plants are those listed under the federal Endangered Species Act (ESA), plus species recognized by Idaho and BLM as sensitive. All species identified as sensitive by BLM must be managed proactively by BLM to protect these species, and NPS strives to manage its land to protect any federally listed, state-listed, or special status species. The most current list will always be the applicable special status species list.

The Idaho Native Plant Society (INPS) and Idaho Department of Fish and Game (IDFG) Natural Heritage Program (INHP) meet annually with state and federal agencies to review the status of

plants considered to be globally, state, or locally rare. The resulting list is used to determine which species, if they lack federal protection under the ESA, require or would benefit from protection at a local or regional level.

Two BLM sensitive plants are known to occur within the Monument. Areas within and surrounding the Monument have been systematically surveyed for both obscure phacelia and Picabo milkvetch, and population information is documented in status and monitoring reports [Mosley and Popovich 1995; Murphy 2002b].

Obscure phacelia (*Phacelia inconspicua*) is one of Idaho's most rare plants, with only six occurrences (population areas) known statewide. Obscure phacelia is an erect-stemmed annual that grows primarily on moderately steep, north and east facing slopes of volcanic-based mountains and buttes at approximately 5,390 to 6,200 feet elevation. It often grows in dark-colored, well-drained silt-loams with varying amounts of sand, gravel, cobble, stone, and boulder colluvium intermixed. Soils are derived from and overlay volcanic substrates. Areas supporting obscure phacelia usually lack litter accumulation, are always relatively loose or scarified (due to animal and erosion disturbance), and lack dense perennial vegetation. The soil depth varies from shallow (over boulders) to moderately deep. The range of obscure phacelia in Idaho is from the eastern side of the Great Rift of the Upper Snake River Plain and in the foothills of the Pioneer Mountains [Mosley, 1995].

Picabo milkvetch (*Astragalus oniciformis*) is narrowly endemic to stable, sandy soils in the north-central portion of the eastern Snake River Plain, near the foothills of the Pioneer Mountains and Picabo Hills. Picabo milkvetch is frequently found in open grassy areas (often in previously burned patches within sagebrush shrubland) and is rarely found in the understory of late-seral sagebrush stands [Mosley and Popovich 1995; Alexander 2001].

One location for meadow pussytoes (*Antennaria arcuata*), which is rare in Idaho, but not a BLM sensitive species, has been documented directly outside of Monument boundaries in moist meadows associated with Huff Creek. There is a small amount of potential habitat at the northern edge of the Monument.

Mourning milkvetch (*Astragalus atratus* var. *inseptus*), a BLM Type 4 sensitive species, was recorded in a plant inventory of Brass Cap Kipuka RNA [Caicco and Wellner 1983b]. However, a plant survey conducted by INHP and BLM in the late 1980s did not confirm the occurrence of the milkvetch [Popovich 2003].

2.1.4. Wildlife and Fish, Including Special Status Species

During a single year, about 200 species of birds, 60 mammals, ten reptiles, and at least three types of amphibians occupy the Monument (Appendix A). Late 1960s surveys identified more than 2,000 species of insects in a very small portion of the northernmost part of the Monument (Horning and Barr 1970).

Wildlife and Fish Habitats and Common Monument Animal Species

Sagebrush steppe communities comprise much of the wildlife habitat within the Monument. Numerous species are found in sagebrush habitats (Braun et al. 1976, Trimble 1989). Some of these are sagebrush obligates (restricted to sagebrush habitats during breeding season or year-round) or near obligates (occurring in both sagebrush and grassland habitats, Paige and Ritter 1999). Sagebrush obligates that occur in the Monument include the sagebrush sparrow,

black-throated sparrow, Brewer’s sparrow, sage thrasher, greater sage-grouse, pygmy rabbit, sagebrush vole, and sagebrush lizard. Table 3.3 lists some sagebrush-associated species that can be found in the Monument.

Table 2.3. Sagebrush-Associated Species that Occur in the Monument

MAMMALS		
Badger	Black-tailed jackrabbit	Bobcat
Coyote	Deer mouse	Elk
Fringed myotis	Great Basin pocket mouse	Kit fox
Least chipmunk	Long-eared bat	Long-legged bat
Long-tailed vole	Merriam’s shrew	Montane vole
Mule deer	Northern grasshopper mouse	Northern pocket gopher
Nuttall’s cottontail	Ord’s kangaroo rat	Piute ground squirrel
Pronghorn	Pygmy rabbit	Raccoon
Red fox	Sagebrush vole	Small-footed myotis
Spotted bat	Townsend’s big-eared bat	White-tailed jackrabbit
Yellow-bellied marmot	Yuma bat	
BIRDS		
American crow	American kestrel	Ash-throated flycatcher
Black-throated sparrow	Bobolink	Brewer’s blackbird
Brewer’s sparrow	Brown-headed cowbird	Burrowing owl
Chukar	Common nighthawk	Common poorwill
Common raven	Ferruginous hawk	Golden eagle
Grasshopper sparrow	Gray flycatcher	Gray partridge
Great horned owl	Greater sage-grouse	Green-tailed towhee
Gyr Falcon	Horned lark	Lark sparrow
Lazuli bunting	Loggerhead shrike	Long-billed curlew
Mourning dove	Northern harrier	Peregrine falcon
Prairie falcon	Red-tailed hawk	Ring-necked pheasant
Rough-legged hawk	Sagebrush sparrow	Sage thrasher
Savannah sparrow	Say’s phoebe	Short-eared owl
Spotted towhee	Swainson’s hawk	Turkey vulture
Vesper sparrow	Western meadowlark	White-crowned sparrow
REPTILES & AMPHIBIANS		
Desert-horned lizard	Gopher snake	Great Basin spadefoot toad
Long-nosed leopard lizard	Night snake	Rubber boa
Sagebrush lizard	Short-horned lizard	Western rattlesnake
Western skink	Western terrestrial garter snake	Western yellow-bellied racer

Sagebrush and the native perennial grasses and forbs of the sagebrush steppe are important sources of food and cover for wildlife [Dealy et al. 1981]. During winter, the evergreen foliage of sagebrush often provides the only available green vegetation, and its protein level and digestibility are higher than that of most other shrubs and grasses [Peterson 1995]. Pronghorn, pygmy rabbits, and sage-grouse may exclusively eat sagebrush in winter, and it also becomes a major portion of mule deer and elk diets. Taller sagebrush provides cover for mule deer and sage-grouse [Dealy et al. 1981], and the crowns of sagebrush break up hard-packed snow, making it easier for animals to forage on the grasses beneath [Peterson 1995].

Throughout the rest of the year, sagebrush provides food for pygmy rabbits and sage-grouse; protective cover for fawns, calves, rabbits, and grouse broods; and nesting sites for many shrub-nesting birds. The sage thrasher, Brewer’s sparrow, sagebrush sparrow, and greater sage-grouse most frequently nest in or beneath sagebrush.

The Monument encompasses some lower slopes of the Pioneer Mountains, which contain both perennial and ephemeral springs. Several of these springs feed small creeks and marshes. A number of species of waterfowl and marsh birds, two frog species, several small mammals, beaver, and moose use these habitats exclusively, along with several other species. Numerous species of birds use these areas as primary habitat in the area.

Inland redband trout, a subspecies of rainbow trout, may also be present in the isolated cold-water creeks just north of the Monument. Current range-wide abundance of redband trout is unknown; however, resident populations of the species persist at some level in all major areas of their historical distribution in Idaho [IDFG 2005].

Fairy and tadpole shrimp, two types of freshwater crustacean, can be found in almost every seasonal water pool [Bratton 1990] in more arid regions of the Monument. Fairy shrimp serve as a valuable food source for migratory waterfowl that use playas as resting areas along their long trek north in spring and early summer.

The Monument contains some scattered stands of trees, including riparian stands of black cottonwood, willows, alders, and quaking aspen; upland stands of quaking aspen or Douglas fir; and lava- or cinder-based stands of limber pine and junipers. These forested sites are used by more than 110 species of birds, at least four species of reptiles, and at least 37 mammals [USDI NPS 2003]. Migrant forest birds are highly selective of stopover habitat [Kerlinger 1995], and these forest stands are important to birds traveling from the Northern Rocky Mountains, across the open habitat of the basin. Many resident species, including Clark's nutcracker, chickadees, nuthatches, woodpeckers, and others, use them exclusively. Forested sites also provide critical thermal cover for deer, elk, and moose in the foothills of the Pioneer Mountains [Griffith 1983].

Extensive lava flows serve as habitat for numerous animal species. At least seven species of bats, several species of rodents, and several species of cave invertebrates use lava tubes and flows in the Monument. The flow surfaces are also used by many species of vertebrates and invertebrates, and several species are dependent on the lava structures. Species such as pika, woodrats, skinks, and rock wrens are found primarily on the rock surfaces. Several snake and bat species are dependent on cavities in the lava for hibernation sites.

Subspecies of the Great Basin pocket mouse, the pika, and the yellow-pine chipmunk are endemic to the lavas of the Great Rift. Darker fur characterizes these subspecies, which may be an adaptation to the black lava rock. Pikas are known primarily as residents of high-elevation alpine regions, and those living on the Craters of the Moon Lava Field occupy lower elevations and the highest mean temperatures within the species' range [Beever 2002].

Several species of birds are also dependent on the lava structures. The Monument has a large population of rock wrens that nest almost exclusively on basalt formations. Many cavity-nesting species nest in rock cavities on the flows. Chickadees and swallows are typically associated with woodlands but will use rock crevices when these features occur near limber pine or juniper stands. Mountain bluebirds and violet-green swallows nest primarily in tree cavities but are known to use rock crevices for nesting. Both species have been documented nesting in crevices and bubbles in flow surfaces in the Monument [Rich 1984]; [USDI NPS 2003].

Both western and mountain bluebirds have experienced major range-wide declines as result of habitat loss and competition from introduced European starlings. Bluebirds nest in high densities in the north part of the Monument, but are seen far less frequently in southern areas, where substantial flocks of starlings now breed.

Numerous bird species, such as sagebrush sparrows, sage thrashers, and long-billed curlews are protected under the Migratory Bird Treaty Act (USC Title 16, Chapter 7, Subchapter II; Appendix A) and have been documented in the Monument, occupying all habitat types. The migrant patterns include permanent residents, summer residents, migrants only using resting areas a few days a year, and winter-only residents.

Reptiles in the Monument also occupy a wide range of habitats. Ten species of reptiles have been identified in the Monument, including five snakes and five lizards. Several hibernating sites for snakes have been identified in the Monument [Lee 2002]. These hibernacula may contain animals from several square miles of summer habitat both inside and outside the Monument. Garter snakes and rubber boas are predominantly riparian species, and skinks and gopher snakes usually use rocky habitats with sparse vegetation. Night snakes may occupy the area but are rare and difficult to survey [Peterson 2003].

Two frog species occur in the Monument, Boreal chorus frog and Pacific tree frog. Two toad species may exist in the Monument as well. One, the Great Basin spadefoot toad, has been detected only once in recent inventory work, but it can remain dormant for several years and is not readily detected while in burrows. Western toads have not been detected in surveys since 1987; they may have been locally extirpated.

Six species of large mammals are known to inhabit the Monument: mule deer, elk, pronghorn, moose, cougar, and black bear. Most are widespread throughout the Snake River Plain and Pioneer Mountains and regularly can be found in or near the Monument.

Mule deer are scattered throughout most of the vegetated areas year-round; the south part of the Monument contains substantial winter range for deer [IDFG 2003]. Mule deer occupy the northern areas in spring and summer, with two distinct herds migrating into the Pioneer Mountains by autumn [Griffith 1983]. One of these herds comes from lands to the north and west of the Monument. The other herd winters in the desert area south of the Craters of the Moon Lava Field. This herd slowly migrates to the northwest as vegetation dries out throughout the summer. By late summer or early fall this herd has merged with the herd from the northwest. Upon reaching the riparian areas, they have access to water and browse that is still fresh. NPS monitoring since 1988 in the northwest part of the Monument indicates a very dynamic population that fluctuates greatly with varying annual conditions. This may even include shifting migration routes out of the area in some years [IDFG 2003].

Elk summer in the riparian areas in the northwest part of the Monument [USDI NPS 2003]. They occupy widely scattered areas, with recorded sightings from both immediately east and west of the Craters of the Moon Lava Field and in larger kipukas like Laidlaw Park. Larger numbers of elk winter in the Pioneer Mountains along the northwest part of the Monument. Two distinct groups of more than 100 animals each were recorded moving back and forth across the west boundary during early 2003 [IDFG 2003]. In summer, most of these elk move to summer range west and north of the Monument, with only a few animals remaining in the Monument.

Pronghorn are found within much of the Monument and are common throughout the year in Laidlaw Park [IDFG 2003], [USDI NPS 2003]. A migrant herd of pronghorn uses the west part of the Monument as a migratory corridor and birthing area [IDFG 2003], [USDI NPS 2003]. Occasional use during winter has also been recorded in this area [USDI NPS 2003]. Smaller numbers of animals can be found along the east boundary and near the Great Rift. Winter range has been identified in the southern areas and near the Great Rift [IDFG 2003].

Moose colonized the riparian areas of the Monument in 1999 and are common in both the Big and Little Cottonwood Creek watersheds of the Pioneer Mountains. Suitable habitat is limited in the Monument, so further expansion is not likely.

Cougar and black bear are also found in the Pioneer Mountains area of the Monument. In recent decades, documented observations have been confined to the north part of the Monument in or adjacent to the Pioneer Mountains. Sightings of these two species are rare, and little is known about their status in the Monument.

Bighorn sheep occur in the Pioneer Bighorn Population Management Unit (PMU), approximately ten miles north of the Monument. The IDFG does not manage to maintain a population of bighorn sheep in the Pioneers PMU; however, individual sheep occur sporadically throughout the area. Management focuses on minimizing potential contact between bighorn sheep and domestic sheep and preventing bighorn sheep that contact domestic sheep in this area from returning to an established population of bighorn sheep. The IDFG has agreed to BMPs with all of the known domestic sheep producers who operate within this PMU. These BMPs focus on prompt communication of bighorn sightings and minimizing the likelihood of contact between domestic and bighorn sheep. Furthermore, the BMPs outline tools IDFG may use when a bighorn sheep is sighted. These tools include monitoring, deploying a radio collar on, or euthanizing the bighorn sheep (IDFG 2010).

Four species of large mammals and one small mammal were extirpated from the Monument during the twentieth century. The North American bison, Rocky Mountain bighorn sheep, gray wolf, and grizzly bear were last documented in the early twentieth century [Smithsonian Institute 2003]. One previously extirpated species, the porcupine, has recently reoccupied historical habitat within the Monument [USDI NPS 2003.] Wolves from the reintroduced Central Idaho packs occupy territory immediately north of the Monument.

Special Status Wildlife and Fish

Special status species are those listed as endangered or threatened under the Endangered Species Act (ESA), candidates or species proposed for listing under the ESA, and/or species listed by BLM as sensitive. The BLM manages all species identified as sensitive to minimize the need for future listing as threatened or endangered under the ESA. The NPS strives to manage its lands to protect any federal-, state-, or BLM-listed species.

Table 2.4 lists the special status animal species that are known or reported in the Monument area. The table is a representation of a dynamic list that is expected to change over the life of the Plan. The most current list will always be the applicable special status species list.

Table 2.4. Special Status Animal Species in the Monument Area

MAMMALS		
Pygmy rabbit (<i>Brachylagus idahoensis</i>)	Gray wolf (<i>Canis lupus</i>)	Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)
Fringed myotis (<i>Myotis thysanodes</i>)	Piute ground squirrel (<i>Spermophilus mollis</i>)	Kit fox (<i>Vulpes macrotis</i>)
BIRDS		
Northern goshawk (<i>Accipiter gentilis</i>)	Sagebrush sparrow (<i>Amphispiza belli</i>)	Black-throated sparrow (<i>Amphispiza bilineata</i>)
Ferruginous hawk (<i>Buteo regalis</i>)	Greater sage-grouse (<i>Centrocercus urophasianus</i>)*	Black tern (<i>Chlidonias niger</i>)

Olive-sided flycatcher (<i>Contopus borealis</i>)	Hammond's flycatcher (<i>Empidonax hammondi</i>)	Willow flycatcher (<i>Empidonax traillii</i>)
Prairie falcon (<i>Falco mexicanus</i>)	Peregrine falcon (<i>Falco peregrinus</i>)	Bald eagle (<i>Haliaeetus leucocephalus</i>)
Loggerhead shrike (<i>Lanius ludovicianus</i>)	Lewis's woodpecker (<i>Melanerpes lewis</i>)	White-faced ibis (<i>Plegadis chihi</i>)
Williamson's sapsucker (<i>Sphyrapicus thyroideus</i>)	Brewer's sparrow (<i>Spizella breweri</i>)	Calliope hummingbird (<i>Stellula calliope</i>)
Columbian sharp-tailed grouse (<i>Tympanuchus phasianellus columbianus</i>)		
REPTILES & AMPHIBIANS		
Western toad (<i>Bufo boreas</i>)		
FISH		
Inland redband trout (<i>Oncorhynchus mykiss gairdneri</i>)		
INVERTEBRATES		
Idaho point-headed grasshopper (<i>Acrolophius pulchellus</i>)	Idaho dunes tiger beetle (<i>Cicindela arenicola</i>)	Blind cave leiodid beetle (<i>Glacivicola bathyscioides</i>)

* USFWS-designated Federal candidate for listing as threatened or endangered

The United States Fish and Wildlife Service (USFWS) has provided a list of endangered, threatened, proposed, and/or candidate species that may be present in the five-county area surrounding the Monument. According to this list, threatened and endangered animal species that could potentially occur in counties that span the Monument are Canada lynx (*Lynx canadensis*), bull trout (*Salvelinus confluentus*), Bliss Rapids snail (*Taylorconcha serpenticola*), Snake River Physa snail (*Physa natricina*), and Banbury Springs limpet (*Lanx* sp.). However, habitat for these species is not available in the Monument. Craters of the Moon is not in a Lynx Analysis Unit and is not considered to contain critical habitat for Canada lynx. Surface water conditions are not adequate for the survival of bull trout or the snails, all of which require substantial riverine or cold-water spring habitat. There are several small perennial streams in the Pioneer Mountains at the north end of the Monument, but these streams rapidly become subterranean once they encounter the lava flows.

Animal species proposed for listing as threatened that could potentially occur in the five-county area surrounding the Monument include the yellow-billed cuckoo (*Coccyzus americanus*) and the North American wolverine (*Gulo gulo luscus*). The Monument lacks suitable habitat for the yellow-billed cuckoo. Individuals could occur in the vicinity of the Monument during migration but require relatively large (≥ 20 ha) stands of cottonwood with a dense shrub understory for nesting. Cuckoos have been observed 10 - 20 miles south and west of the Monument in the Big Wood River and Snake River corridors.

Wolverines have been documented as close as four miles to the Monument on rare occasion; however, most sightings of the species have occurred more than 20 miles northwest of the Monument in the Pioneer Mountains where there is suitable habitat. Den sites in Idaho typically occur $> 8,000$ feet above sea level where there is persistent snow at least five feet deep [Magoun and Copeland 1998], [Copeland et al. 2010].

Animal species that were formerly federally listed but are now considered to be recovered include the gray wolf and bald eagle. The gray wolf was delisted on May 5, 2011. Wolves are known to occur in the vicinity of the Monument [Williams 2002], [IDFG and Nez Perce Tribe 2014] and were observed and tracked just north of the Monument in spring and winter of 2001. The pack

was thought to have followed migrating elk and deer. Individual wolves have also been observed near the boundary of the Monument, with several confirmed sightings in this area since 2000.

The bald eagle was delisted as a federally threatened species on August 8, 2007. There is a bald eagle breeding territory just west of the Monument near Carey Lake Marsh. Transient, wintering bald eagles might be found anywhere throughout Blaine, Butte, Lincoln, Minidoka, and Power Counties, including parts of the Monument.

Greater sage-grouse is a candidate for federal listing and is a BLM sensitive species. Sage-grouse occur throughout the sagebrush steppe ecosystem and are commonly found on the Monument and adjacent lands.

The BLM and IDFG have classified sage-grouse habitat in southern Idaho into four groups: Key, Restoration 1 (R1), Restoration 2 (R2), and Restoration 3 (R3).

- Key habitat areas are generally large-scale, intact sagebrush steppe areas that provide sage-grouse habitat.
- R1 lands are sagebrush-limited areas with acceptable understory conditions in terms of grass species composition.
- R2 lands are areas with existing sagebrush cover that may or may not be adequate to meet the needs of sage-grouse, but the understory herbaceous conditions are poor.
- R3 lands are areas where junipers are encroaching into sage-grouse habitat.

Within the Monument, there are approximately 266,000 acres of sage-grouse habitat, of which 29% is Key habitat, 62% is R1 habitat, and 2% is R2 habitat.

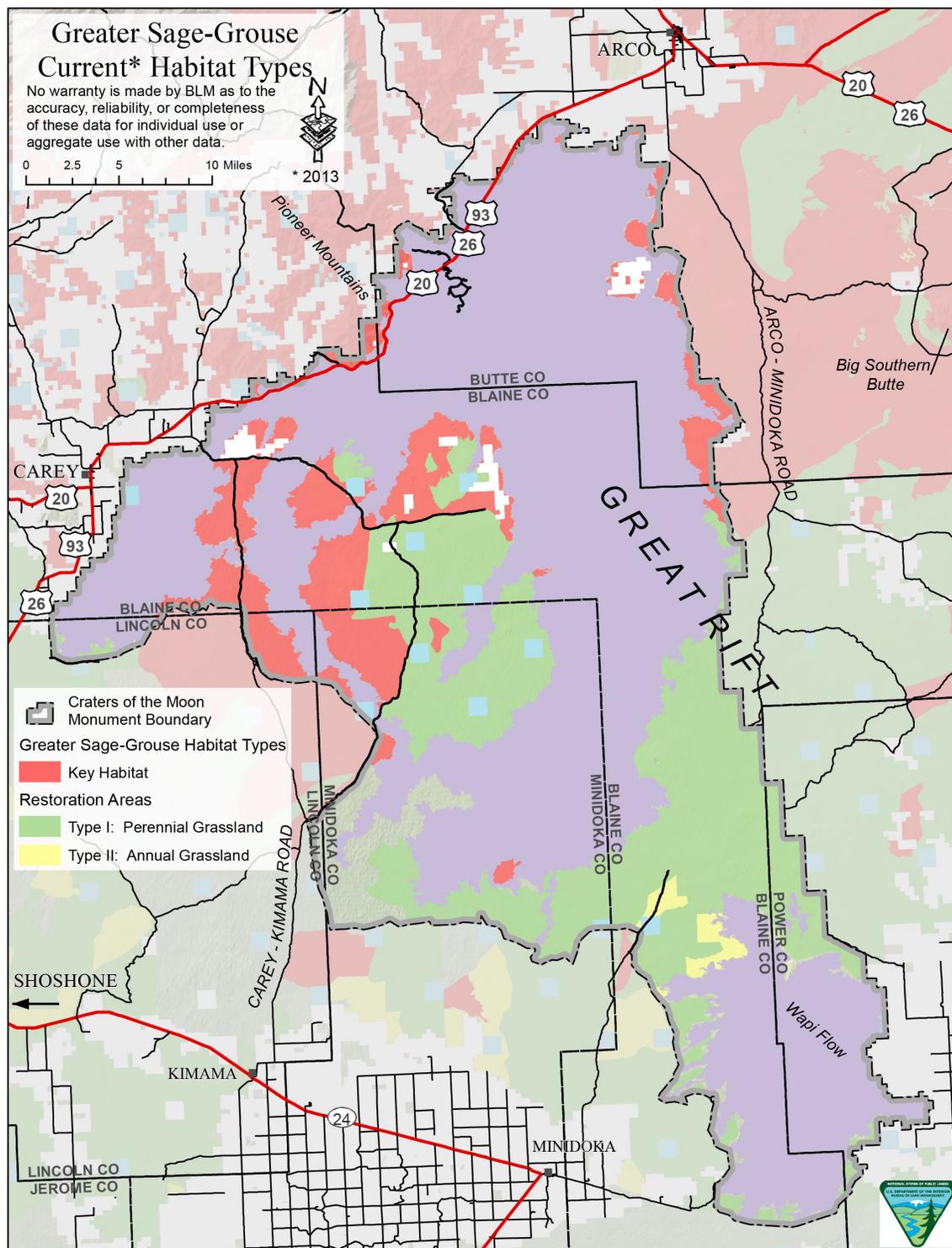


Figure 2.5. Greater Sage-Grouse Current Habitat Types on BLM Monument Lands

Additionally, the BLM has tentatively identified some areas as priority and general habitat. Priority areas are generally described as having the highest conservation value to maintaining sustainable populations of greater sage-grouse. General habitat comprises areas of occupied seasonal or year-round habitat outside of priority habitat. In the Monument, 92% of BLM-administered lands are classified as priority habitat; 4% of the Monument is classified as general habitat.

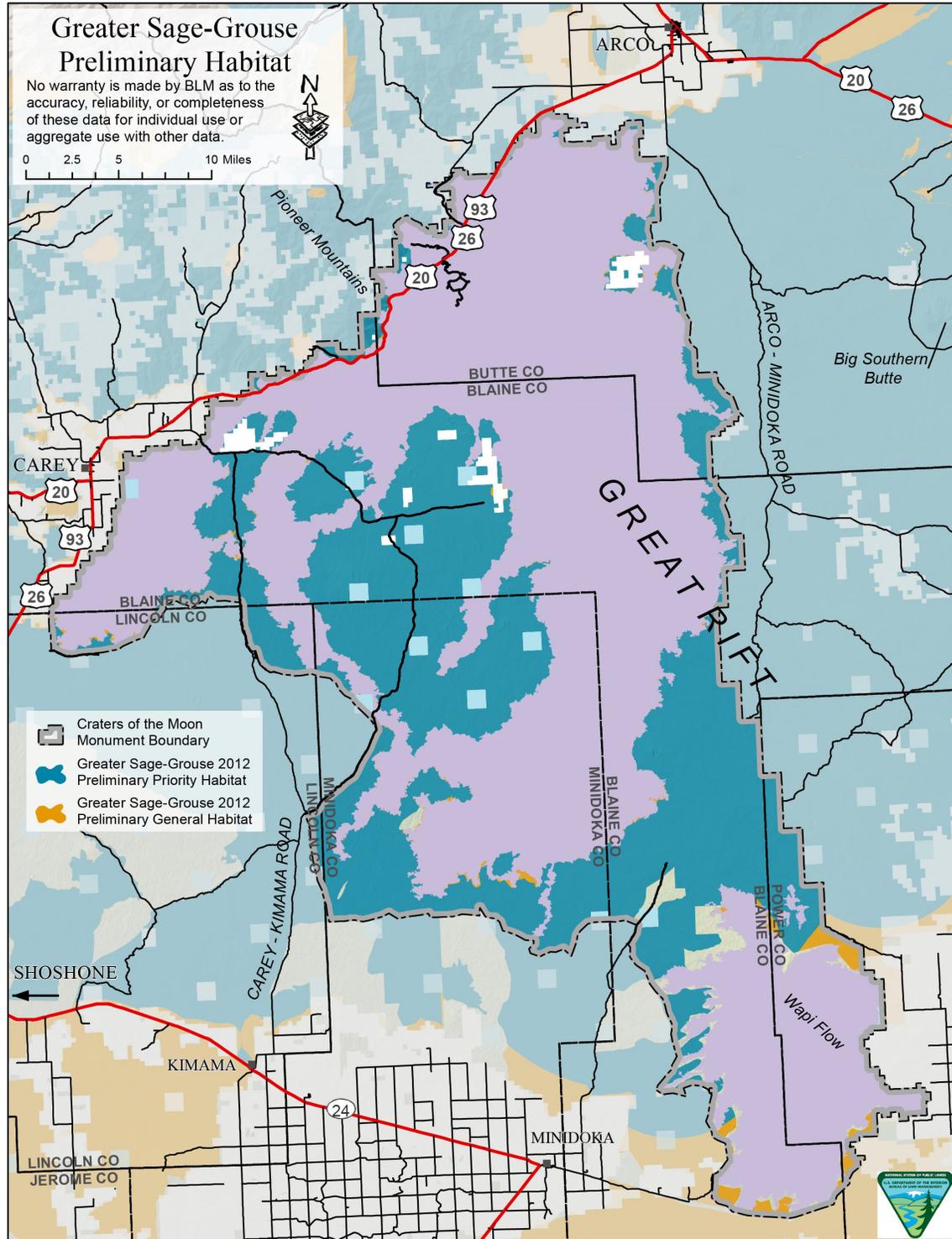


Figure 2.6. Greater Sage-Grouse Preliminary Habitat on BLM Monument Lands [Makela and Major, 2012]

Greater sage-grouse within the Monument area are a part of the Snake-Salmon Beaverhead population, which extends from central Idaho to southwestern Montana [Garton et al. 2011]. Sub-populations include Upper Snake, Lemhi-Birch, Little Lost, Big Lost, and North Side Snake. The Snake-Salmon Beaverhead population is considered to be at low risk, meaning that sage-grouse are common or uncommon, but not rare, and are usually widespread throughout the area [USDI USFWS 2012, 2013]. The population has fluctuated around 5,000 males since 1992 and was considered stable to increasing from 2007 to 2010; however, the population has markedly declined from historical levels [Garton et al. 2011]. Population abundance, as indicated by the average number of males per lek, declined by over half from 1965 to 2007 [Garton et al. 2011]. Observations made by IDFG in the Monument also indicate a significant decline in sage-grouse lek activity over the past half century. There are 121 known historic and current leks on BLM lands in the Monument, and 18 out of the 57 surveyed leks were documented as active in 2013.

Loss and fragmentation of sagebrush habitats has been cited as a primary cause of the decline of greater sage-grouse populations [Connelly et al. 2004], [Schroeder et al. 2004], [Leu and Hanser 2011]. Potential and current threats to sage-grouse in the Monument include wildfire and the change in wildfire frequency, incursion of invasive plants, infrastructure, livestock grazing, and drought [USDI USFWS 2010, 2013].

Occupied breeding habitats for greater sage-grouse were mapped in the Monument using current data and knowledge by local sage-grouse experts. Sources used to identify breeding areas included: observations by Local Working Groups and agency personnel, observations in land management and wildlife agency files, telemetry data, lek survey data, and vegetation maps. The extent of breeding habitat was delineated based largely on the presence of sagebrush, occupied leks, and/or breeding sage-grouse observation data (primarily from telemetry studies). In general, areas within 3.1 miles of occupied leks were mapped as breeding habitat. Breeding habitat was also delineated in areas highly suspected of supporting sage-grouse nesting outside of the 3.1 mile lek buffer. Approximately 211,700 acres of BLM Monument lands were mapped as breeding habitat (Appendix C).

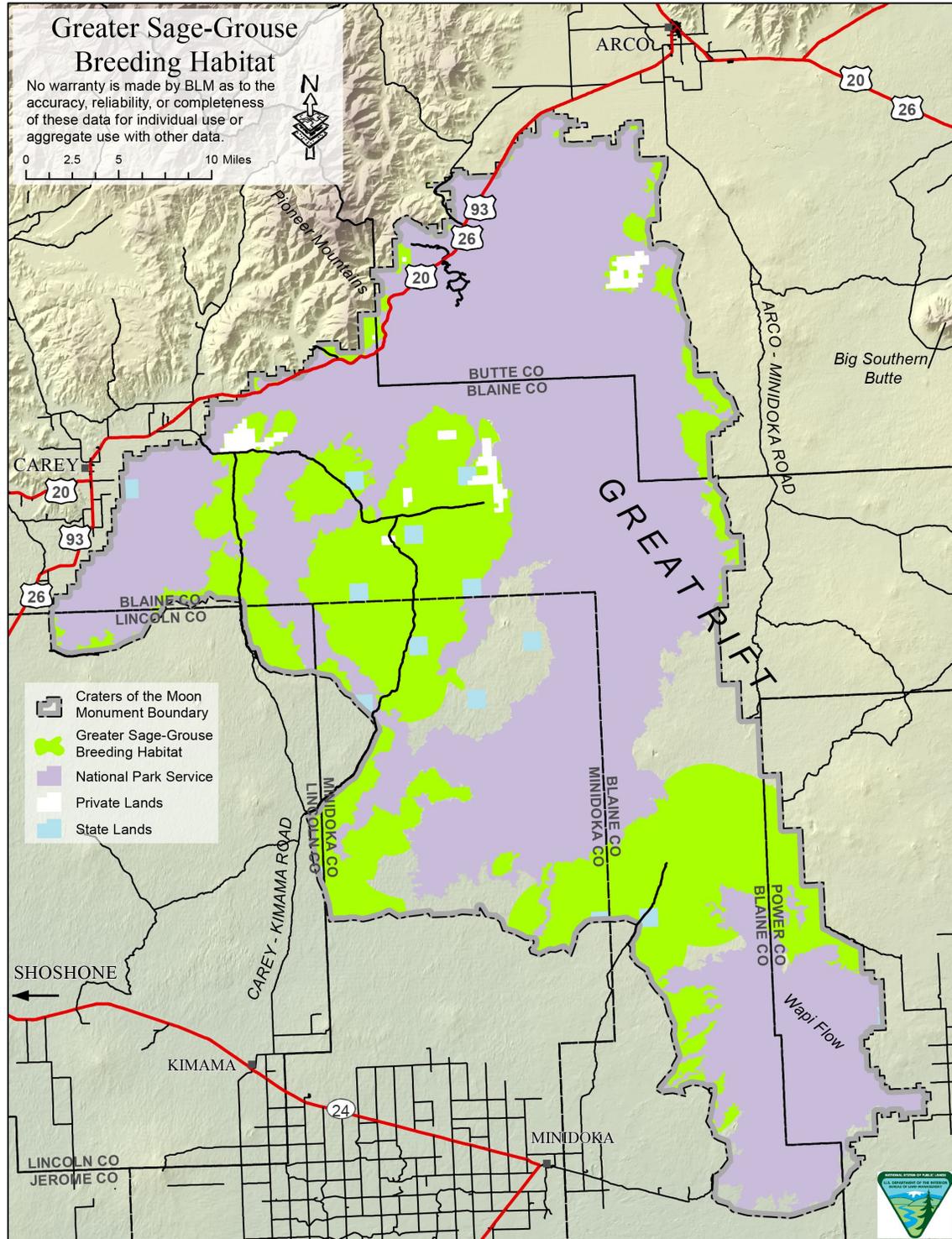


Figure 2.7. Greater Sage-Grouse Breeding Habitat on BLM Monument Lands

Habitat assessments conducted in 2012 and 2013 in Craters of the Moon revealed that approximately 16% of surveyed habitats currently known to be occupied by greater sage-grouse during the breeding season (March 15 - June 15; Appendix C) possessed the vegetative characteristics important for successful nesting and chick survival to sustain stable populations (Table 2.5). Approximately 30% of known, surveyed brood-rearing areas (occupied from June 16 - October 15) were determined to provide suitable habitat; whereas, 37% of known, surveyed wintering areas (occupied from October 16 - March 14) met the habitat guidelines (Appendix D, Stiver et al. 2010). Ecologically limited areas (e.g., sparsely vegetated, rocky inclusions) that would not have the potential to support plant communities that provide suitable habitat for greater sage-grouse given their edaphic and climatic potential (Habich 2001) were not identified but are known to exist in localized areas throughout the Monument. Similarly, areas on the north end of the Monument that possess slopes in excess of 40% would not have the potential to provide suitable breeding habitat for sage-grouse (Idaho Sage-grouse Advisory Committee (ISAC) 2006), although the sites are likely used by birds for foraging year-round.

Table 2.5. Site-Scale Suitability Summary of Occupied Greater Sage-Grouse Habitats on BLM-Administered Lands in Craters of the Moon.

Suitability Rankings	Suitability Acreages for Greater Sage-grouse Seasonal Habitat Areas		
	Breeding	Summer	Winter
Suitable Areas	20,766 (16%)*	47,819 (30%)	48,735 (37%)
Marginal Areas	59,432 (44%)	77,972 (50%)	20,163 (16%)
Unsuitable Areas	53,975 (40%)	31,066 (20%)	61,212 (47%)
Total Surveyed Areas	134,173	156,858	130,110

* Percentages represent the percentage of ranked seasonal habitat within the total known occupied seasonal area.

Wildland fire has resulted in a lack of shrub cover, and is largely responsible for habitats not meeting the seasonal requirements for greater sage-grouse in many areas of Craters of the Moon. However, a lack of perennial grass and forb height, cover of mid-height native perennial bunchgrasses, and a low availability of forbs have also detracted from the ability of areas to provide for the life-cycle needs of greater sage-grouse in the Planning Area. Excessive grazing by domestic livestock during the late 1800s and early 1900s, along with severe drought, has significantly impacted sagebrush ecosystems [Knick et al., 2003]. Long-term effects from this overgrazing, including changes in plant communities and soils, persist today [Knick et al., 2003]. Degradation continues to occur in localized areas where livestock congregate, including near water sources, supplements, corrals, and sheep bedding grounds [Jurs and Sands, 2004]. These areas are not large (generally 5 - 10 acres), but they are present throughout the Monument and increase the potential for the establishment and spread of noxious and invasive plants (Jurs and Sands 2004).

Habitat suitability rankings for other sensitive Monument wildlife have not been assessed specifically. However, within their range, sage-grouse are dispersed into wide-ranging populations that utilize a diversity of habitats during each life stage (e.g., higher-elevation wet meadows and lower-elevation sagebrush flats). These factors make sage-grouse an appropriate focal species [Mills, 2007] for broader conservation of sagebrush habitats [Hanser and Knick, 2011].

Managing for sage-grouse will generally benefit other sagebrush-obligate species such as pygmy rabbit, sagebrush sparrow, and sage thrasher, as well as generalist species such as mule deer and pronghorn antelope. However, on finer scales, habitat guidelines for greater sage-grouse may not capture the needs of other species that utilize the sagebrush steppe. For example, some avian species require more or less sagebrush or herbaceous cover as compared to sage-grouse (Kaltenecker et al. 2006). In addition to managing for greater sage-grouse habitat, maintaining a resilient mosaic of vegetation communities that reflect the various transitional states of sagebrush steppe will be important over the Craters of the Moon landscape.

The pygmy rabbit, a BLM sensitive species, has been documented in several areas of the Monument. Records ranging from the 1930s through 2013 indicate locations from the southernmost areas to the NPS Monument lands [Hoffman, 1988]. Pygmy rabbit populations have experienced severe declines throughout their range, including Idaho. The rabbits generally prefer mature sagebrush stands with a dense canopy cover [Gabler et. al., 2001] and relatively deep, friable soils. However, there are few surveys for the species in southern Idaho, and the distribution and status of the species is not well understood.

The Monument contains numerous caves and several cave-related species of concern, including seven species of bats that are USFWS species of concern, Idaho species of special concern, and/or BLM sensitive species. Only two maternity colonies of Townsend's big-eared bat have been confirmed in Idaho, and both sites are found in the Monument [IDFG, 2005]. Numerous hibernacula have been identified in the Monument for this and other bat species. Six other cave roosting bats that are classified as sensitive or of concern are found in the Plan Area [Keller and Saathoff, 1996]. In addition to bats, other cave species are of concern, including the blind cave leiodid beetle. Two of the five known worldwide sites for this species are in the Monument [IDFG, 2005].

Two additional insects listed as sensitive by BLM have been documented on lands adjacent to the Monument. One, the Idaho point-headed grasshopper, is found in the Lost River drainage. Two of the five known sites are near the northeast perimeter of the Monument. Their preferred habitat is relatively level or rolling terrain with gravelly to rocky soil having low sparse vegetative cover between 4,800 and 7,000 feet in elevation [IDFG ,2005].

The Idaho dunes tiger beetle is found only in sand dunes in south central and southeast Idaho. Beetles have been documented at several sites near the southeast corner of the Wapi Lava Field [Idaho State Conservation Effort, 1996]. More potential habitat for this beetle may exist within the Monument in sandy areas, such as near Monument Butte in the Pagari Allotment.

2.1.5. Native American Rights and Interests

Native American Indians inhabited southern Idaho, including the present day BLM lands, for thousands of years prior to European contact. This ancient way of life was dismantled by settlement of America when large numbers of immigrants seeking land sought to displace the tribes. During the 1850's and 1860's treaties were negotiated with the tribes in the northwestern United States in order to acquire Indian lands for homesteading. The settlement of the northwestern United States by non-Indians led to the collapse of the Tribal Nations as they were previously known, including their economic, social, cultural, religious, and governmental systems.

The Federal government has a special trust responsibility to American Indian Tribes that is defined by treaties, statutes, and executive orders. According to the Department of the Interior

Secretarial Order 321, the trust responsibility covers lands, natural resources, money, or other assets held by the Federal government in trust or that are restricted against alienation for Indian Tribes and Indian individuals. Proper discharge of the trust responsibility requires BLM to protect treaty-based fishing, hunting, gathering, and similar rights of access and resource use on traditional Tribal lands.

Within the planning area, the Shoshone-Bannock Tribes of the Fort Hall Reservation have rights to hunt (and by extension, to fish and gather plant foods) on the unoccupied lands of the United States; these rights are reserved in the Fort Bridger Treaty of 1868. The BLM is also responsible under statute, regulation and executive order to consult with Tribes, with or without treaties, whose interests might be affected by land use decisions. Ongoing consultation with the Shoshone-Paiute Tribes of the Duck Valley Reservation and the Shoshone-Bannock Tribes of the Fort Hall Reservation indicates that Tribal interests include a wide range of natural and cultural resources. Effective collaboration and coordination, including government-to-government consultation, throughout the planning process are the keys to achieving the management goals of the BLM, while preserving Tribal rights and interests in public land resources.

The BLM conducts government-to-government consultation with the Shoshone-Paiute and Shoshone-Bannock Tribes in accordance with the National Historic Preservation Act, the Native American Graves Protection and Repatriation Act, the Archaeological Resource Protection Act, the American Indian Religious Freedom Act, Executive Order 13007, BLM Manual 8120 and Manual Handbook H-8120-1.8.

2.1.6. Cultural Resources

The term cultural resources refers to all physical traces of past human activity on the landscape. They are a fragile, non-renewable resource, subject to impacts and degradation from many sources, both natural and human caused. The National Historic Preservation Act outlines the methods by which Federal agencies are to determine cultural resource significance and preservation requirements. The Craters of the Moon National Monument contains a wide variety of cultural resources. Native American Tribes used this region continuously for at least the last 12,000 years. They crossed the Monument on their seasonal route to Camas Prairie to harvest camas lilies, making use of the natural resources along the way. Euro-American trappers and explorers first entered the region in the early 1800's, followed by thousands of immigrants on the Oregon Trail between 1845 and 1865, many of which took the Goodale's Cutoff through the northern end of the Monument.

The discovery of gold and other valuable minerals brought many more people to Idaho, including Chinese immigrants in the 1880's. The resulting conflict between Native Americans and the newcomers precipitated the removal of Native Americans to reservations at Fort Hall and Duck Valley. Several key events in the Bannock War over Camas Prairie took place within the region. Railroads, such as the Oregon Short Line, were built and towns were founded across the area, but little development took place within the Monument. After the mining boom faded in the early 1900's, agricultural projects were built across the region, such as Magic Dam, Milner Dam, along with their many associated irrigation canals. Livestock grazing also became more prevalent. Numerous Basque immigrated to Idaho to work in the sheep industry and settled in Idaho. Early ranchers discovered Indian and game trails across the lava flows into the large kipukas of the Monument and began grazing livestock there. Later, roads were constructed across the lava flows to facilitate grazing in these kipukas. Traces of all these activities still remain on

the landscape. [David Louter, 1992] completed an Historic Context Statement for the Monument that details the history of the Monument.

Cultural Resources within the Monument consist of Native American and Euro-American historic sites, as well as traditional cultural properties. Segments of the Goodale's Cutoff of the Oregon Trail still serve as primitive routes on the north end of the Monument. Recent cultural resource overviews completed for the Monument [Henrikson et. al., 2006] and the Shoshone Field Office BLM [Henrikson et. al., 2009] document Native American use of the area. Geospatial studies have illustrated a strong correlation between site occurrence and lava edges within the Monument [Henrikson, 2005].

Currently, the main impacts on cultural resources are wildfires and wildfire suppression, human vandalism/looting, and livestock grazing concentration areas, such as water and mineral locations. Fires destabilize site surfaces by removing vegetation, which allows wind erosion to occur. Suppression activities and livestock trampling can have similar effects on site surfaces.

2.1.7. Visual Resources

Perpetuating scenic vistas and open western landscapes for future generations is one of the purposes identified for Craters of the Moon National Monument and Preserve. The visual resources of Craters of the Moon represent a remnant of the undeveloped American West and one of the few remaining great expanses of sagebrush steppe. The contrasting lava flows were described in the 1924 Presidential Proclamation originally establishing the Monument as a "weird and scenic landscape peculiar to itself." These lava flows create a unique viewscape in North America.

Gray-green sagebrush steppe and black lava fields about the high Pioneer Mountains to the north. Across the Monument, 3,500 feet of vertical relief presents visitors with enormous panoramic views to the south. On a clear day, the Grand Tetons, 140 miles to the east, can be seen from the Monument. One of the nation's clearest airsheds enhances these long, uninterrupted vistas.

The Monument contains numerous striking volcanic features such as pahoehoe and a'ala lava flows, cinder cones, spatter ramparts, and enormous lava fields. Low shield volcanoes and cinder cones (known locally as "buttes") rise up throughout the entire landscape. The exposed lava varies in color, while shapes and textures of flows add scenic variety on a smaller scale. Nearly barren of vegetation, the most recent lavas at times flowed around kipukas, which offer some visual relief from the continuous lava. Expansive sagebrush steppe and grasslands, as well as the different ages and types of lava surfaces, support a remarkable variety of plant and animal communities that add to the visual diversity of the Monument.

Visual Resource Management (VRM) is a standard tool used by the BLM to identify and protect visual values on public lands (8400-Visual Resource Handbook and Manual Series).

All BLM lands in Craters of the Moon are classified under one of four VRM management class designations:

- Class I – The objective of this class is to preserve the existing character of the landscape. Any contrast created within the characteristic landscape must not attract attention. This classification is applied to Visual ACECs, wilderness and WSAs, Wild and Scenic Rivers, and other similar situations.

- Class II – The objective of this class is to retain the existing character of the landscape. Changes in any of the basic visual elements caused by management activity should not be evident in the landscape. A contrast may be seen but should not attract attention.
- Class III – The objective of this class is to partially retain the existing character of the landscape. Contrasts to the basic elements caused by a management activity may be evident and begin to attract attention in the landscape. The changes, however, should remain subordinate in the existing landscape.
- Class IV – The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. Contrasts may attract attention and be a dominant feature in the landscape in terms of scale. However, the change should repeat the basic element of the landscape.

The VRM inventory of the Monument area was completed in 1989, including an evaluation of scenic quality, identification of viewsheds, and key observation points for visitors. This inventory data was analyzed and presented as visual resource classes. The Resource Management Plan placed all public land within Craters of the Moon National Monument as either Class I or Class II management classes. There are currently no Class III or IV designations within the Monument. Generally, all BLM lands located within the Pristine Zone, Wilderness, and Wilderness Study Areas are designated Class I, while the rest of the Monument is designated Class II. The VRM classes provide standards for planning, designing, and evaluating future management projects.

Table 2.6. Visual Resource Management Class Areas in Craters of the Moon National Monument & Preserve

VRM Class	BLM Managed Acres	Percent of BLM Managed Acres in the Monument
Class I	73,500	27%
Class II	201,600	73%

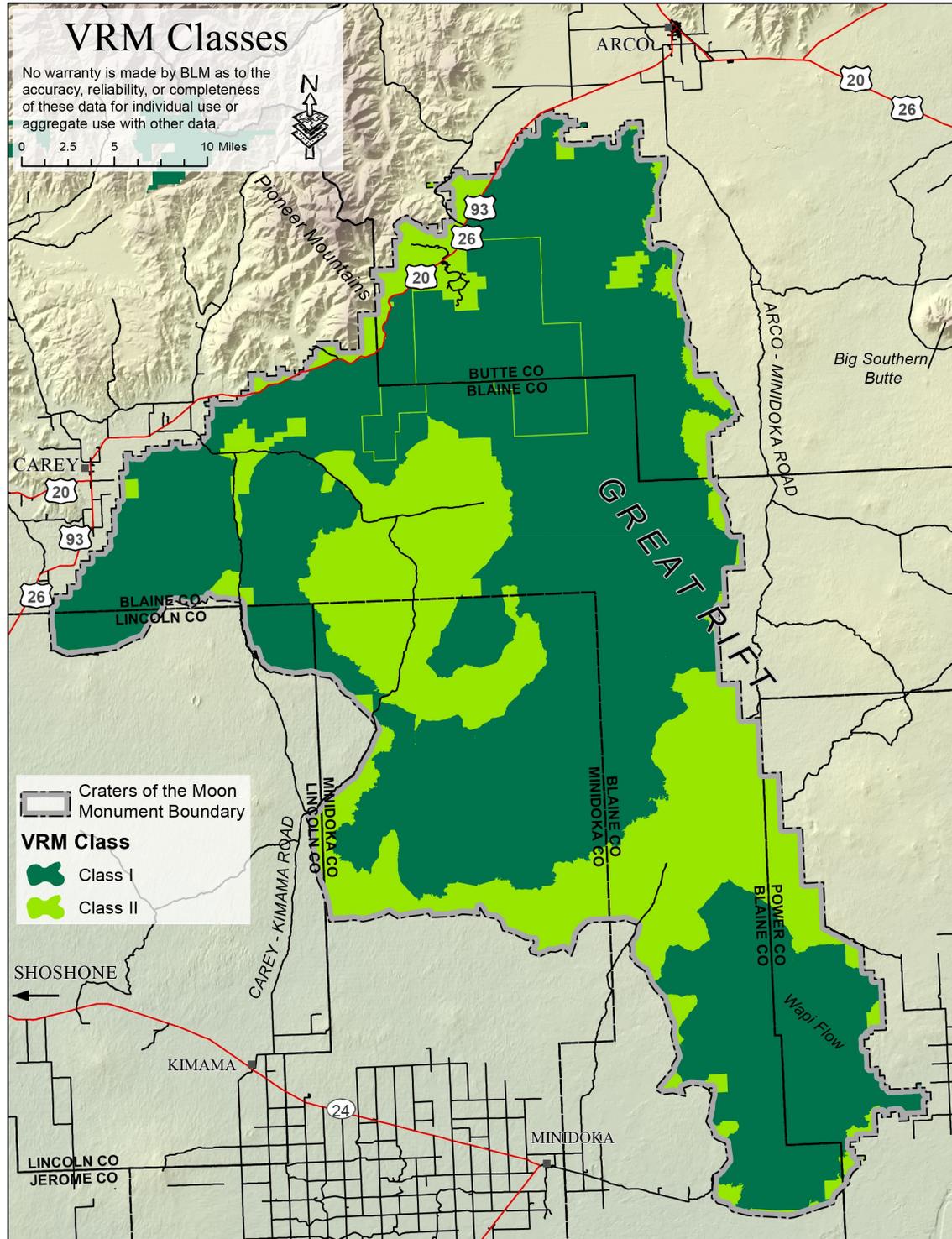


Figure 2.8. Visual Resource Management Classes in Craters of the Moon National Monument & Preserve

2.1.8. Wilderness Study Areas

According to BLM Manual 6330, *Management of Wilderness Study Areas*, BLM's objectives are, consistent with relevant law, to manage and protect wilderness study areas (WSA) to preserve wilderness characteristics so as not to impair the suitability of such areas for designation by Congress as wilderness and to provide policy guidance for prolonged stewardship of WSAs until Congress makes a final determination on the management of WSAs.

The Monument contains all or part of four wilderness study areas including Raven's Eye, Great Rift, Bear Den Butte, and Little Deer. The total WSA acreage within the Monument and Preserve is approximately 471,300. Of those acres, 389,600 have been recommended by BLM as "suitable" for designation as wilderness.

Some human-made facilities in the WSAs include wildlife guzzlers, sheep bed grounds, fences, and watering structures associated with livestock use. The sights and sounds of roads adjacent to the WSAs are visible and audible from within limited portions of the WSAs. Communication towers near Arco and Lava Lake are visible from portions of the Great Rift WSA. Refer to pages 166-168 in the 2007 Craters of the Moon Monument Management Plan for a more in depth description of the Monument's WSAs.

Table 2.7. Summary of Wilderness Study Areas

WILDERNESS STUDY AREA	AREA WITHIN MONUMENT (ACRES*)	NPS AREA (ACRES*)	BLM AREA (ACRES*)	TOTAL WSA AREA (ACRES)	AREA WITHIN MONUMENT RECOMMENDED SUITABLE BY BLM (ACRES)
Great Rift	381,100	335,000	46,000	381,800	322,450
Raven's Eye	45,400	37,000	8,400	68,300	67,110
Little Deer	35,100	21,300	13,800	35,200	0
Bear Den Butte	9,700	4,300	5,400	9,700	0

2.1.9. Lands with Wilderness Characteristics

Section 201 of FLPMA requires the BLM to maintain on a continuing basis an inventory of all public lands and their resources and other values, which includes wilderness characteristics. It also provides that the preparation and maintenance of the inventory shall not, of itself, change or prevent change of the management or use of public lands. Regardless of past inventory, the BLM must maintain and update as necessary, its inventory of wilderness resources on public lands. The primary function of an inventory is to determine the presence or absence of wilderness characteristics (p.2 of Manual 6310).

According to BLM Manual 6310, *Conducting Wilderness Characteristics Inventory on BLM lands*, "Managing the wilderness resource is part of the BLM's multiple use mission. Lands with wilderness characteristics provide a range of uses and benefits in addition to their value as settings for solitude or primitive and unconfined recreation."

Since the initial inventories conducted in the 1980s, the Shoshone Field Office has not maintained an ongoing inventory of wilderness characteristics within the Monument. There has been some inventory conducted in isolated areas in the Monument for various projects.

The Monument's lands with wilderness characteristics inventory will be completed in 2014.

2.2. Resource Uses

2.2.1. Livestock Grazing

The Craters of the Moon National Monument and Preserve is cooperatively managed by the NPS and the BLM. NPS administers 463,300 acres, or 61%, of the Monument and preserve, and that area is not available for livestock use. These areas consist primarily of exposed lava flows, which are mostly devoid of available forage and/or inaccessible to livestock; therefore, prohibiting grazing in these areas had little to no impact on the livestock industry. There are 274,000 acres that are allocated for grazing. This land is divided into 22 allotments that are administered by three field offices in two BLM districts (Figure 1.3).

Proclamation 7373 states, “Laws, regulations, and policies followed by the Bureau of Land Management in issuing and administering grazing permits or leases on all lands under its jurisdiction shall continue to apply with regard to the lands in the Monument administered by the Bureau of Land Management.”

The Craters of the Moon planning area is unique in its grazing management due to the overlapping of the Monument boundary with allotments managed by several field offices. The planning area includes portions of 18 allotments along with four allotments that lie wholly within the Monument. This boundary overlap often does not occur along any other administrative boundary or other barrier to livestock movement. Consequently, in this discussion of grazing allotments, all figures (acres and percentages) will be based on the amount of each allotment that lies within the Monument and is administered by the BLM unless otherwise specified.

Existing grazing allotments include 6,600 acres of private land and 8,300 acres of State land within both the allotment and Monument boundaries. Some of the land controlled by permittees is offered for exchange-of-use and is managed in conjunction with the public lands; the rest is informally managed as part of the allotments. Unallotted tracts total 1,200 acres, consisting primarily of isolated parcels of public land.

Presently 86 permittees in the planning area are allocated 36,963 animal unit months (AUMs) of livestock preference. Of the total active preference, 15,936 AUMs are cattle AUMs and 21,027 AUMs are sheep AUMs. Since 1997, livestock use has averaged 11,791 AUMs within the Monument, 32% of the permitted use. The lower use levels have primarily been in from sheep permittees leaving allotments as forage matures and dries out, moving on to other BLM allotments or Forest Service allotments. Some cattle permittees have also used fewer AUMs, either as a result of their own operational fluctuations or due to changing forage conditions. There are two allotments that are solely allocated sheep preference, 13 allotments that are solely allocated cattle preference, and seven allotments that are allocated both sheep and cattle preference. In nine allotments, several operators run livestock in common, while the other 13 allotments are reserved for single operators.

Grazing systems, or acceptable grazing practices, for allotments are detailed in Allotment Management Plans (AMPs). AMPs in the Monument range in date of establishment from 1991 to 2011. Grazing systems are developed by the BLM in conjunction with livestock operators and other interested parties. AMPs are subject to Standards for Rangeland Health (Appendix B), as are adjustments made to stocking rates. The Standards for Rangeland Health in the State of Idaho are, “the Bureau of Land Management’s management goals for the betterment of the environment, protection of cultural resources, and sustained productivity of the range.” [USDI BLM, 1997].

Rangeland Health evaluations have been conducted on 20 out of 22 Monument allotments, as is shown in Table 2.8. These evaluations begin with consultation between BLM staff, interested publics, and resource users. Field assessments and evaluations are then conducted to determine the achievement or non-achievement for each standard. If a Standard is not being met, is not making significant progress towards being met, then the cause for non-achievement must be determined. If livestock grazing practices are determined to be the cause, then a plan to meet each Standard is typically developed through an environmental assessment (EA). These plans identify changes necessary for allotments to meet, or to make significant progress toward meeting, all standards. Those allotments listed in Table 2.9 where all Standards were not being met and livestock was the cause have already had changes to management to lead towards uniform achievement of all Standards.

Table 2.8. Standards and Guidelines Assessments in Monument Associated Allotments

Allotment	Year Evaluated	Standard 1–Water-sheds	Standard 2–Riparian Areas and Wetlands	Standard 3–Stream Channel/ Floodplain	Standard 4–Native Plant Communities	Standard 5–Seedings	Standard 6–Exotic Plant Communities, other than Seedings	Standard 7–Water Quality	Standard 8–Threatened and Endangered Plants & Animals
Big Desert Sheep	2011	Meeting	NA	NA	Not Meeting but Making Significant Progress	Meeting	NA	NA	Not Meeting but Making Significant Progress
Bowl Crater	2004	Meeting	NA	NA	Meeting	NA	NA	NA	Not Meeting (Fire)
Cottonwood	1999	Meeting	Not Meeting (Livestock)	Not Meeting (Livestock)	Meeting	NA	NA	Meeting	Meeting
Cox’s Well	2004	Meeting	NA	NA	Not Meeting but Making Significant Progress	NA	NA	NA	Not Meeting but Making Significant Progress
Crater	1999	Meeting	Not Meeting (Livestock)	Not Meeting (Livestock)	Meeting	Meeting	NA	Meeting	Meeting
Craters	2011	Meeting	NA	NA	Meeting	NA	NA	NA	Meeting
East Minidoka	1999	Meeting	NA	NA	Meeting	Meeting	NA	NA	Not Meeting (Fire)
Huddle’s Hole	1999	Meeting	NA	NA	Meeting	Meeting	NA	NA	Meeting
Kimama	1999	Meeting	NA	NA	Not Meeting (Livestock)	Not Meeting	Not Meeting	NA	Not Meeting
Laidlaw Park	2002	Meeting	NA	NA	Not Meeting	Meeting	NA	NA	Not Meeting
Lava Lake	2007	Meeting	Meeting	Meeting	Meeting	Meeting	NA	Meeting	Meeting
Minidoka	2004	Meeting	NA	NA	Not Meeting (Fire)	Meeting	NA	NA	Not Meeting (Fire)
Pagari	2007	Meeting	Not Meeting but Making Significant Progress	Not Meeting but Making Significant Progress	Not Meeting (Fire)	Meeting	NA	Not Meeting	Not Meeting but Making Significant Progress
Poison Lake	Not Yet Evaluated								

Allotment	Year Evaluated	Standard 1–Water-sheds	Standard 2–Riparian Areas and Wetlands	Standard 3–Stream Channel/ Floodplain	Standard 4–Native Plant Communities	Standard 5–Seedings	Standard 6–Exotic Plant Communities, other than Seedings	Standard 7–Water Quality	Standard 8–Threatened and Endangered Plants & Animals
Quaking Aspen	2010	Meeting	NA	NA	Meeting	NA	NA	NA	Meeting
Rudeen	2004	Meeting	NA	NA	Not Meeting but Making Significant Progress	Not Meeting but Making Significant Progress	NA	NA	Not Meeting but Making Significant Progress
Sand	2004	Meeting	NA	NA	Meeting	Meeting	NA	NA	Meeting
Schodde	1999	Meeting	NA	NA	Meeting	Meeting	NA	NA	Not Meeting (Fire)
Smith	2012	Meeting	NA	NA	Not Meeting but Making Significant Progress	Not Meeting but Making Significant Progress	NA	NA	Not Meeting (Livestock)
Sunset	2010	Meeting	NA	NA	Meeting	NA	NA	NA	Meeting
Timber Butte	Not Yet Evaluated	Meeting							
Wildhorse	1999	Meeting	Not Meeting but Making Significant Progress	Meeting	Not Meeting (Livestock)	Not Meeting but Making Significant Progress	Meeting	Not Meeting	Not Meeting but Making Significant Progress

Structural range improvements in the Monument include fences, cattle guards, riparian enclosures, reservoirs, water gap structures, wildlife guzzlers, corrals, wells, and pipelines with associated water troughs. Non-structural range improvements within the Monument include seedings, fire rehabilitation and restoration projects, fuel breaks, and road rehabilitations. Rangeland improvements are used in the Monument to improve livestock distribution, provide livestock forage, restore degraded areas, protect sensitive sites, improve wildlife habitat, and facilitate management of livestock. Many of these are also closely associated with the road system in the Monument. Structural range improvements in the Monument include fences, cattle guards, riparian enclosures, reservoirs, water gap structures, wildlife guzzlers, corrals, wells, and pipelines with associated water troughs. Non-structural range improvements within the Monument include seedings, fire rehabilitation and restoration projects, fuel breaks, and road rehabilitations.

Trailing of livestock between allotments is another common practice in the livestock industry, and historical trail routes are still used today in many areas of the Monument. The majority of this trailing occurs along existing roads. These corridors were designated for primary management by the BLM to allow for continued livestock trailing and other authorized uses in these corridors. Trailing is a separately authorized use and the effects are analyzed as part of a different project that is also subject to NEPA requirements.

2.2.2. Travel and Transportation

The amount and types of travel allowed within the Monument were determined by the Monument Management Plan and subsequent Craters of the Moon Comprehensive Travel Management Plan.

All routes are designated open, limited, or closed as depicted on the Craters of the Moon National Monument and Preserve Travel Map.

Off-highway vehicle (OHV) use in the Monument includes off-highway motorcycles, all-terrain and utility vehicles, snowmobiles, and other motorized or mechanized vehicles. Most OHV use in the Monument occurs during hunting seasons or in association with other land uses such as livestock operations.

The amount of OHV-specific recreation on the BLM portions of the Monument is small. Recreation Management Information System (RMIS) data estimates an average of less than 3,500 visits per year. Most OHV activity takes place on the route network, since no trails have been designated for motorized use. The primary use periods are spring and fall. A small amount of mountain biking occurs in the expanded Monument.

According to the comprehensive travel management plan, livestock operators use the existing route network for a variety of livestock management activities such as trailing livestock, hauling water, moving sheep camps, and maintenance of existing facilities. Combining the cattle and sheep use together yields an estimated 1,575 vehicles using the route network per year for all grazing-related activities. For a more detailed description of how livestock operations utilize the transportation network, refer to page 45 in the Craters of the Moon National Monument and Preserve Comprehensive Travel Management Plan Environmental Assessment.

2.2.3. Recreation and Visitor Use

The project area is classified as an Extensive Recreation Management Area (ERMA). ERMAs are identified areas where recreation is planned for and actively managed on an interdisciplinary-basis

in concert with other resources/resource programs. ERMAs offer recreation opportunities that facilitate visitors' freedom to pursue a variety of outdoor recreation activities and attain a variety of outcomes.

Visitation to the expanded part of the Monument was estimated at 3,276 visits in 2013, according to BLM's RMIS data. Monument recreation pursuits requiring access include: hunting, driving for pleasure, geologic exploration (including caving, lava hiking, and sightseeing), hiking, primitive camping, photography, horseback riding, and mountain biking. Most recreational access to the expanded Monument area is for the purpose of visiting destination locations in the Monument such as Snowdrift Crater, Wapi Park, Kings Bowl, and Bear Trap Cave. A small number of visitors travel to lesser known locations within the Monument for a variety of recreation purposes. A more in depth description of each recreation opportunity can be found on pages 171-177 of the Monument Management Plan EIS.

2.2.4. Socioeconomic Values

The Craters of the Moon National Monument and Preserve falls within a five-county area in Idaho. The counties in which the Monument boundaries lie are Blaine, Butte, Lincoln, Minidoka, and Power (Figure 2.10). For all socioeconomic sections in this document, the term, "Study Area," refers to this five-county area. Due to data availability and the way socioeconomic information is collected and organized, the county level is the smallest quantifiable unit for analysis. The Monument and Preserve inhabit only about 14% of the Study Area (Table 2.9, "Craters of the Moon National Monument and Preserve Area by County (Acres)" (p. 52)).

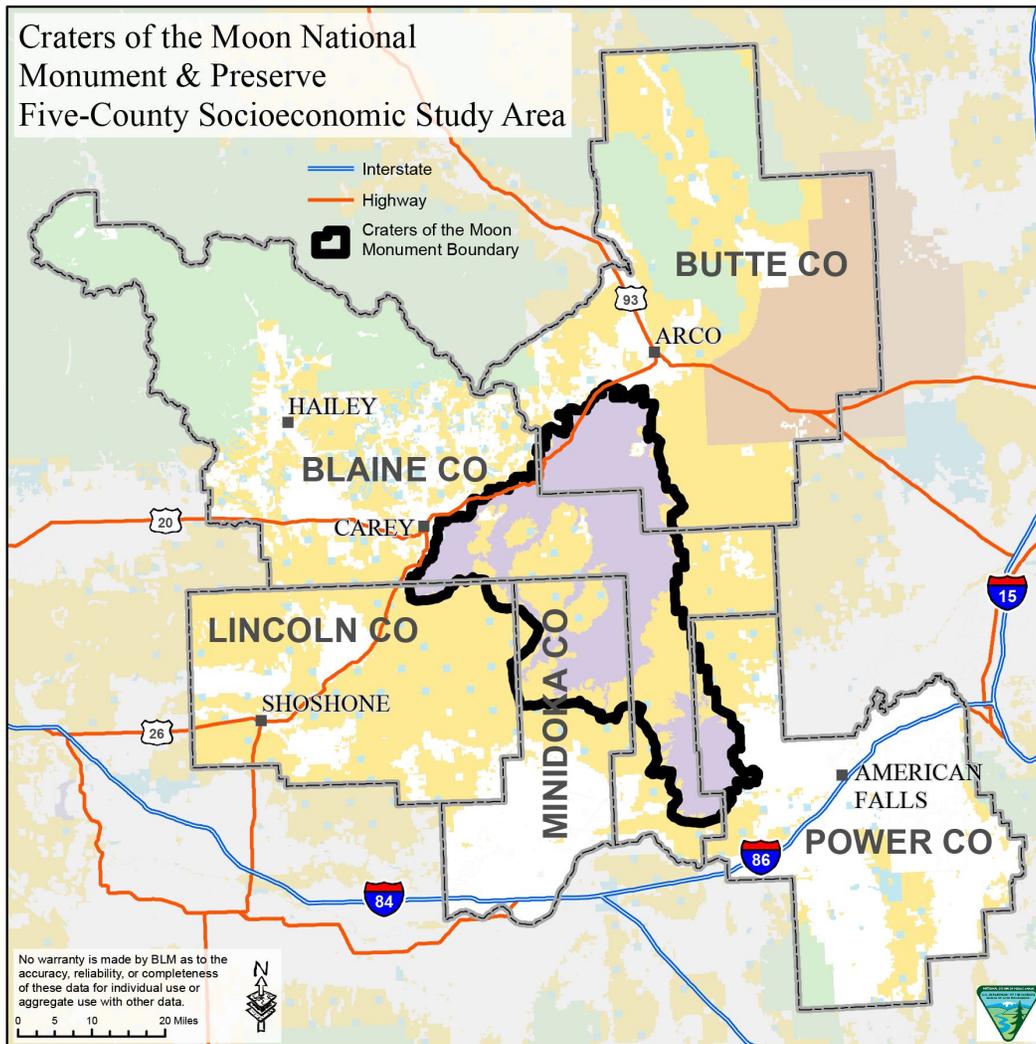


Figure 2.10. Monument and Preserve Five-County Socioeconomic Study Area

Table 2.9. Craters of the Moon National Monument and Preserve Area by County (Acres)

County	County Total Acres	Monument Acres per County	% of Monument per County
Blaine	1,700,338	383,322	23%
Butte	1,435,061	136,632	10%
Lincoln	772,219	17,190	2%
Minidoka	488,427	164,014	34%
Power	924,874	52,085	6%
TOTAL	5,320,918	753,244	14% of the 5 counties is in the Monument

Socioeconomic conditions in these counties have followed roughly the same pattern as the rest of the U.S. in recent years: A long upward trajectory in economic variables such as personal income, employment, and so on was interrupted by the 2007-2009 recession. Although growth

has resumed, the growth rate has slowed from what it was prior to the onset of the recession. In contrast with many other parts of the U.S. and Idaho, the five-county region has experienced net out-migration. In other words, more residents have moved away from the area than have moved to the area. In spite of this out-flow of residents, total population has increased due to local births.

Over time, unearned income (income from investments, rental properties, retirement accounts, etc.) has become an increasingly large source of total income within the five counties, reaching a high of around 45% of all income as of 2009. This implies that the local economy could be enjoying benefits of stability that come with income that is not dependent on the labor market, and it corresponds with an aging population. Ups and downs in employment are less likely to translate into ups and downs in demand for consumer goods and services within the study area. On the other hand, market disruptions that negatively impact asset values at the national level could disproportionately affect the wealth and economic stability of local residents.

From 1970 to 2000, job growth in services, construction, and retail-related industries outpaced growth in every other economic sector in the region. Services industry jobs increased by a much larger number than did jobs in any other industry during those same years, but since 2000, most sectors' employment numbers have remained fairly steady. Personal income in the area has followed the same pattern as that exhibited in the job market: large gains from 1970 to 2000 in the services industry has been followed by more stability in that and other industries since the year 2000. It is important to note that in previous recession and recovery cycles, the region experienced positive job growth during the recovery period. Since the end of the 2007-2009 recession, the five-county region has continued to experience job losses, losing at twice the percentage since 2009 as during the recession itself (5.1% in comparison with 2.5% during the recession). This is rather unusual. In spite of those negative job growth figures, per capita income and average income per job have both performed well in comparison with the State of Idaho, with per capita income growing at more than 12% from 2000 to 2011, compared with 2% for Idaho as a whole.

More than 25% of residents within the five-county region self-identify as Hispanic. This is almost ten percentage points higher than for the U.S. as a whole. The Native American population in the study area is also larger as a proportion of the overall population as compared with the U.S. Poverty rates within the study area are lower than for the U.S. as a whole, another indication that the local economy is somewhat more stable and healthier than the nation's economy.

At 12.5% in 2012, farm earnings as a percentage of total earnings are quite a bit higher in the five-county region than in the U.S., for which the percentage was 1% in the same year. This indicates that agriculture plays a much larger role in the economy in the study area than in the rest of the U.S. Total gross revenue to agriculture has shown strong growth in the past decade, with growth in both crop and livestock-related revenue. In 2007, beef cattle operations comprised nearly 30% of all farm enterprises in the study area.

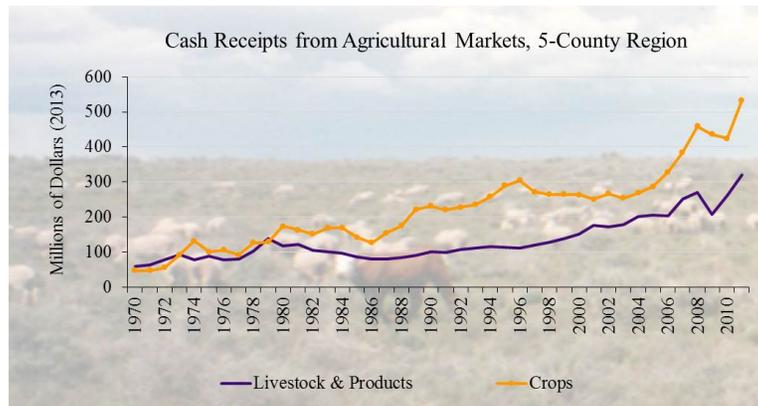


Figure 2.11. Cash Receipts from Agricultural Markets, 5-County Region

2.2.5. Climate Change

The science on predicting future climate conditions is continuously evolving. Land management actions might contribute to changes in atmospheric greenhouse gas levels, which can affect global climate. Addressing effects on greenhouse gas (GHG) levels within the scope of NEPA is difficult due to the lack of explicit regulatory guidance on how to meaningfully apply existing NEPA regulations to this evolving issue, and due to the continuously evolving science available at varying levels.

Agencies apply the rule of reason to ensure that their discussion pertains to the issues that deserve study and de-emphasizes issues that are less useful to the decision regarding the proposal, its alternatives, and mitigation options [40 CFR 1500.4(f), (g), 1501.7, 1508.25]. In addressing GHG emissions, the BLM ensures that such description is commensurate with the importance of the GHG emissions of the proposed action, avoiding useless bulk and boilerplate documentation, so that the NEPA document may concentrate attention on important issues [40 CFR 1502.5, 1502.24].

The BLM's 2008 NEPA Handbook, H-1790-1, explains that a topic must have a cause-and-effect relationship with the proposed action or alternatives to be considered an issue [H-1790-1, p. 40]. Climate change does not have a clear cause-and effect-relationship with the proposed action or alternatives. It is currently beyond the scope of existing science to identify a specific source of greenhouse gas emissions or sequestration and designate it as the cause of specific climate or resource impacts at a specific location.

Chapter 3. Specific Mandates and Coordination/Consistency with Other Plans

This page intentionally
left blank

3.1. Specific Mandates and Legislative Constraints

Land use plan decisions are changed through either a plan amendment or a plan revision. The process for conducting plan amendments is basically the same as the land use planning process used in creating RMPs. Plan amendments (see 43 CFR 1610.5-5) change one or more of the terms, conditions, or decisions of an approved land use plan. These decisions may include those relating to desired outcomes; measures to achieve desired outcomes, including resource restrictions; or land tenure decisions. Plan amendments are most often prompted by the need to:

1. Consider a proposal or action that does not conform to the plan,
2. Implement new or revised policy that changes land use plan decisions, such as an approved conservation agreement between the BLM and the U.S. Fish and Wildlife Service (USFWS)
3. Respond to new, intensified, or changed uses on public land, and
4. Consider significant new information from resource assessments, monitoring, or scientific studies that change land use plan decisions.

The BLM regulations set out in the Code of Federal Regulations 43 CFR 1600 and the NEPA process detailed in the CEQ regulations in 40 CFR 1500 guide preparation of plan amendments.

The regulations ensure that plan amendments are tailored to the identified issues and that unnecessary data collection and analyses are avoided. Planning criteria are based primarily on standards prescribed by applicable laws, regulations, and agency guidance, and consultation with Native American Tribes. They are also based on consultation and coordination with public, other Federal, State, and local agencies and government entities. Planning criteria serves to keep analysis of information pertinent to the Planning Area.

Below are the planning criteria and laws, regulations, and policies that form the basis for these criteria and are relevant to each of the resource topics discussed in this Draft EIS. The Craters of the Moon MMP Amendment and process will:

- Comply with NEPA, FLPMA, and all other applicable laws, regulations, and policies;
- Comply with the Court's November 2012 order.
- Consider reasonable alternatives in accordance with regulations at 43 CFR part 1610 and 40 CFR part 1500;
- Only apply to public lands and the mineral estate managed by the BLM in Craters of the Moon;
- Follow the BLM Land Use Planning Handbook H-1601-1 and the BLM NEPA Handbook H-1790-1 where appropriate;
- Comply with guidance found in the BLM Manual 6220 - National Monuments, National Conservation Areas, and Similar Designations;
- Comply with guidance found in the BLM Manual 6840 – Special Status Species Management and other policies related to Special Status Species;

- Comply with guidance found in the BLM Manual 6310 – Conducting Wilderness Characteristics Inventory on BLM Lands;
- Comply with guidance found in the BLM Manual 6320 — Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process;
- Comply with guidance found in the BLM Manual 6330 — Management of Wilderness Study Areas;
- Include broad-based public participation;
- Include coordination with state, local, and tribal governments to ensure that BLM considers provisions of pertinent plans; seeks to resolve any inconsistencies among state, local, and tribal plans; and provides ample opportunities for state, local, and tribal governments to comment on the development of the Plan amendment;
- Rely on available inventories of the lands and resources as well as data gathered during the planning process, including, but not limited to, Habitat Assessment Framework data collected in 2012 and 2013;
- Follow requirements to address greater sage-grouse habitat and conservation as outlined in the National Sage-Grouse Habitat Conservation Strategy;
- Consider actions that will ensure BLM lands in Craters of the Moon meet or make significant progress toward meeting Idaho’s Standards for Rangeland Health;
- Use Geographic Information Systems (GIS) and incorporate geospatial data to the extent practicable and Federal Geographic Data Committee standards and other applicable BLM data standards will be followed;
- Incorporate and observe the principles of multiple use and sustained yield;
- Involve consultation with Native American tribal governments;
- Recognize valid existing rights; and
- Use analysis in the 2007 Craters of the Moon Final EIS to the extent possible and practicable.

3.2. Planning Process

The process for the development, approval, maintenance, and amendment or revision of RMPs is initiated under Section 202(f) of FLPMA and Section 202(c) of NEPA. When developing a land use plan, BLM uses a multi-step process, some of which may happen concurrently. Where more detailed management direction is required, BLM will prepare and analyze activity plans after the MMP Amendment’s completion.

The steps in this process are:

- **Issues Identification.** The BLM identifies issues and concerns through the scoping process, which includes the public, State and local governments, and other Federal agencies. Issues are also identified through consultation with Native American tribes.

- **Criteria Development.** Planning criteria are drafted to ensure decisions are made to address issues pertinent to the planning effort. They are derived from a variety of sources, including applicable laws and regulations, existing management plans, other agencies' programs, tribal consultation, and public scoping.
- **Data and Information Collection.** Data and information on the natural and cultural resources in the Planning Area are collected based on the planning criteria and issues developed during scoping.
- **Alternatives Formulation.** A range of reasonable management alternatives are developed that address issues identified during scoping and the criteria development phase.
- **Alternatives Assessment.** The effects of each alternative are analyzed, including the No Action Alternative.
- **Preferred Alternative Selection.** The alternative that best resolves planning issues is identified as the Preferred Alternative.
- **Management Plan Selection.** First, the Draft MMP Amendment and Draft EIS are made available for public review for at least 90 days. After comments have been received and analyzed, the document is modified as necessary. The Final EIS and Proposed MMP Amendment would be published and made available for a 30-day protest period concurrent with a 60-day Governor's consistency review. Land use plan decisions are subject to protest in accordance with planning guidance, and any protest would be decided by the National BLM Director. If the Idaho BLM Director approves a Final MMP Amendment then a Record of Decision would be signed by the Director to approve it.
- **Implementation and Monitoring.** The management measures outlined in the approved MMP would be implemented on the ground, and future monitoring conducted to test their effectiveness.

The Craters of the Moon MMP Plan Amendment is based on a concept of adaptive management, which is a continuing process of planning, implementation, monitoring, and evaluation to adjust management strategies to meet goals and objectives of ecosystem-based management. It uses site-specific information/data and monitoring to select strategies most likely to meet goals and objectives. The concept also acknowledges the need to manage resources under variable condition, as well as to adjust for new information.

3.3. Relationship to BLM Policies, Plans, and Programs

According to FLPMA (Section 209 (9)), "...the Secretary shall, to the extent he finds practical, keep apprised of State, local, and tribal land use plans; assure that consideration is given to those State, local, and tribal plans that are germane in the development of land use plans for public lands; assist in resolving, to the extent practical, inconsistencies between Federal and non-Federal Government plans, and shall provide for meaningful public involvement of State and local government officials, both elected and appointed, in the development of land use programs, land use regulations, and land use decisions for public lands, including early public notice of proposed decisions which may have a significant impact on non-federal lands."

If these entities do not have officially approved or adopted resource-related plans, then RMPs and their Amendments must, to the extent practical, be consistent with those entities' officially

approved and adopted resource-related policies and programs. This consistency will be accomplished so long as BLM RMPs and Amendments incorporated the policies, programs, and provisions of public land laws and regulations.

As previously described, the Craters of the Moon MMP Amendment will amend the existing 2007 Management Plan. The 2007 Management Plan covers a broad area, addresses a wide range of programs, concerns, and resources; and must, therefore, function at a general level. Decisions still valid in the 2007 MMP have been carried forward.

The BLM is required to manage lands in accordance with the Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration (43 CFR 4180). These Fundamentals are minimum standards for watersheds, ecological processes, water quality, and wildlife habitat. They also dictate that if it is determined that livestock grazing management needs to be changed to meet the Fundamentals of Rangeland Health that it must be done within one year of the determination. Each State has implemented its own specific standards related to these fundamentals. Idaho's Standards for Rangeland Health and Guidelines for Livestock Grazing Management are listed in Appendix B.

The more specific actions required to attain the goals and desired future conditions (DFCs) defined in the 2007 Plan and carried forward in this EIS are accomplished through monitoring and implementation plans. These plans apply to specific program areas, projects, or operational and development strategies for specific areas of the Planning Area. Because planning is an ongoing and continuous process, this MMP Amendment must be viewed as a dynamic document. Future, site-specific implementation plans would use the goals and DFCs defined in the 2007 MMP as their starting point. Implementation plans for actions with potential environmental effects would require formal alternatives analysis in compliance with NEPA and related legislation. All such documents would be prepared with the appropriate level of public input.

3.3.1. Data Summary

The interdisciplinary planning team used the most accurate and current data available when analyzing the impacts of alternatives, so it was essential that data was from reliable and reputable scientific sources. In addition to the BLM, federal agencies such as the U.S. Geological Survey, U.S. Fish and Wildlife Service, National Park Service, and Department of Energy, and State of Idaho agencies, including Fish and Game, Department of Lands, Office of Species Conservation, Department of Commerce, and Department of Agriculture, have provided high-quality geographic information systems (GIS) data that was used in the analysis.

Data collection efforts throughout 2012 and 2013 included Habitat Assessment Framework data collection for allotments within Craters of the Moon. Data were collected at nearly 400 sites and the information has been used to determine seasonal greater sage-grouse habitat suitability within the Monument. In addition, a number of telemetry studies have been initiated in the Twin Falls District over the last several years. Data collected from those studies regarding the movement of greater sage-grouse within and in the vicinity of the Monument will be used in this Plan Amendment/EIS.

New and existing resource information in the Shoshone Field Office, including existing GIS thematic maps (i.e. fire history, range improvements, vegetation treatments, land status, etc.), monitoring data, and grazing files, were used in formulating alternatives and in decision analysis for the Plan Amendment/EIS.

The interdisciplinary planning team has reviewed, updated, and evaluated its data collection and has no additional data needs. They have compiled the data and put it into a digital format for use during the planning process and to develop resource maps for the Plan Amendment/EIS.

Pre-existing digital data has been updated to the same standards required for new data where practical. The process of reviewing and updating data is important to the adequacy of the planning process, as the data is needed to quantify resources, create updated maps, and analyze information during alternative formulation. New data generated as part of the Plan Amendment/EIS process will meet applicable established standards and will be available to the public upon request at the completion of the project.

Metadata must be created and appropriately maintained for GIS data to be used in NEPA planning. Metadata is information about data and/or geospatial services, such as content, source, vintage, spatial scale, accuracy, projection, responsible party, contact information, method of collection, and other descriptions. Reliable metadata development, structured in a standardized manner, is essential to ensuring that data are used appropriately and any resulting analysis is creditable.

The ID Team did not receive any new data from sources outside of the BLM, the Forest Service, and Idaho Fish and Game during scoping.

3.3.2. Collaboration

The BLM approaches planning based on collaboration, in which interested groups and people, often with varied or opposing interests, work together to seek solutions for managing BLM lands. Collaboration mandates methods, not outcomes; and does not imply that parties will achieve consensus. Collaboration implies that Tribal, State, and local governments, other federal agencies, and the public will be involved well before the planning process is underway, rather than only at specific points stipulated by regulation and policy. Cooperating local, state, and federal agencies have been a part of the MMP Amendment effort to the fullest extent possible. During plan implementation, BLM will continue partnerships with those entities to select high priority projects and resolve emerging issues.

3.3.2.1. Intergovernmental, interagency, and Tribal relationships

Section 202(c)(9) of FLPMA requires BLM to provide for public involvement of other federal agencies and State and local government officials in developing land use decisions for public lands, including early public notice of proposed decisions that may have a significant effect on lands other than BLM. It also requires, to the extent practical, that BLM keeps itself informed of other Federal, State, and local plans; assures that consideration is given to those plans germane to the development of BLM land use plan decisions; and assists in resolving inconsistencies between Federal and non-Federal plans, if possible.

The CEQ regulations require an early and open process for identifying significant issues related to a proposed action and obtaining input from the affected public prior to making a decision that could significantly affect the environment. These regulations specify public involvement at various junctures in the development of an EIS. The BLM designed an iterative review process in order to capture issues from numerous public sources and to satisfy CEQ and FLPMA requirements. These reviews consisted of:

- ID Team product development and internal agency review;

- Formal government-to-government consultation with Native American Tribes;
- Review from the Resource Advisory Council (RAC) and Cooperating Agencies;
- Review from Federal, State, and local agencies;
- Review and comment from the general public; and
- ID Team revisions based on this feedback.

3.3.2.2. Cooperating Agencies

The CEQ defines a cooperating agency as any agency that has jurisdiction, by law or special expertise, with respect to any environmental impact involved in a proposal governed by NEPA (40 CFR 1501.6). Any Federal, State, or local government authority with such qualifications may become a cooperating agency by agreement with the lead agency. Agencies cooperating formally for this plan include the Idaho State Department of Agriculture, Blaine County, Power County, and the City of American Falls.

3.3.2.3. Tribes

Consultation with the Shoshone-Bannock and Shoshone-Paiute Tribes and participation in the planning process began with publication of the Federal Register Notice of Intent (NOI). Throughout the development of this document, the Tribes have played an active role, understanding that this involvement will result in an amendment to the Craters of the Moon MMP that provides for better, more responsive land stewardship.

Consultation with the Shoshone-Paiute Tribes is conducted through the Wings and Roots Native American Campfire, an established government-to-government consultation process. The plans for the Draft EIS and MMP Amendment was first presented to the Tribes at a Wings and Roots meeting in August 2013. The Shoshone-Paiute Tribe has indicated that they are interested in any action that would result in ground disturbances or impacts to sage-grouse. Government-to-government consultation with the Shoshone-Bannock Tribes was initiated through correspondence in September 2013 and in person on November 13, 2013. No formal comments have been received to-date from the Shoshone-Bannock Tribe, but they did informally indicate they were most concerned with management actions that might effect Tribal access, native plants, and sagebrush obligates. The BLM will continue to collaborate with the Tribes during the ongoing planning process.

3.3.2.4. Other Federal Agencies

Other Federal agencies contributed to the planning process through comments and cooperation throughout the planning process. We have received written comments from the Environmental Protection Agency (EPA) and NPS; we have been in contact with U.S. Fish and Wildlife Service.

3.3.2.5. Other stakeholder relationships

The Twin Falls Resource Advisory Committee (RAC) is a 15-member advisory panel which provides advice and recommendation to the BLM on resources and land management issues. Membership includes a cross section of Idahoans representing energy, tourism and commercial

recreation, environmental, and archaeological or historic interests, as well as elected officials, a tribal representative, and the public-at-large. Council members are selected for their ability to provide informed, objective advice on a broad array of public land issues, and their commitment to collaboration in seeking solutions to those issues. RAC members are updated and coordinated with throughout the planning process.

3.3.3. Related Plans

The Craters of the Moon MMP Amendment will strive for consistency, with plans and their revisions, pertaining to lands included in and surrounding the Planning Area, including, but not limited to, the following:

- County Comprehensive Plans for Blaine, Butte, Minidoka and Power counties
- State Agency Plans and Comprehensive Wildlife Conservation Strategies
 - Idaho Comprehensive Wildlife Conservation Strategy, 2005
 - Idaho State Water Plan, 1996
 - Idaho Transportation Plan, 2004
 - Working for Recreation: The 2007-2010 IDPR Strategic Plan
 - Idaho Statewide Comprehensive Outdoor Recreation and Tourism Plan (SCORP), 2007-2010
- Federal Agency Plans
 - Craters of the Moon National Monument and Preserve MMP, 2007
 - Craters of the Moon National Monument and Preserve Comprehensive Transportation and Travel Plan, 2009

This page intentionally
left blank

Chapter 4. Current Management Direction

This page intentionally
left blank

4.1. Introduction

The current management direction for the Craters of the Moon National Monument and Preserve is described in the 2007 Craters of the Moon National Monument and Preserve Management Plan and the 2009 Craters of the Moon National Monument and Preserve Travel Management Plan. This chapter outlines the current management direction from those plans, which will form the basis of the No Action Alternative.

4.1.1. Desired Future Conditions

Goals or Desired Future Conditions (DFCs) are the primary focal points for implementing the MMP, and should reflect the values of the management agency and general public by expressing a desired condition for the area's natural and cultural resources in the foreseeable future. DFCs are very broad statements used to describe the most desirable future condition of resources and/or land uses within the Planning Area. DFCs aid BLM in identifying actions that will most effectively address unsatisfactory resource conditions, as required by laws and regulations, national policy (e.g., BLM Strategic Plan Goals), State Director guidance, and resource or social considerations.

DFCs do not describe specific actions needed to attain those conditions, but rather are the future vision used to develop a course of action. They result from a collaborative process involving the ID Team, and include concepts from existing planning document decisions. DFCs are also developed through consultation with Native American Tribes. In order to achieve a range of reasonable alternatives, DFCs remain constant across all alternatives. The following were developed during the original 2007 planning process from issues or concerns raised by the public and the ID Team during scoping. The DFCs from the 2007 Craters of the Moon MMP DFCs form the basis of this EIS as well. A complete list of DFCs for Craters of the Moon National Monument and Preserve can be found in the 2007 Monument Management Plan. The pertinent DFCs for this planning effort are as follows:

4.1.1.1. Soil and Water Resources

Soils are stable and functional. The amount of bare mineral soil and cover of perennial vegetation, litter, and biological soil crust are within 10% of that expected for the ecological site.

Riparian areas and wetlands within the planning area are maintained, restored, or enhanced so that they provide diverse and healthy habitat and water quality conditions for riparian— and wetland— obligates and other wildlife species.

4.1.1.2. Vegetation Resources

The high ecological condition of the vegetation of North Laidlaw Park and Bowl Crater is maintained.

There is no net loss, and preferably a net gain, of sagebrush steppe communities over the life of the plan.

Native plant communities sustain biodiversity and provide habitat for native wildlife.

Woodland communities are maintained as healthy mixed-age communities within their natural range and distribution.

Natural ecological processes are the dominant factor in determining the composition and distribution of plant communities in the Preserve and Wilderness areas.

Continuity of habitat for special status species and general wildlife are emphasized.

Preventing or limiting the spread of noxious weeds using integrated weed management perpetuates the natural condition and biodiversity of the planning area.

The areas dominated by invasive annual species are minimized.

Kipukas in the Pristine Zone are free of noxious weeds.

Sustainable forage is available for livestock and wildlife.

All plant communities are in or making progress toward Fire condition Class 1.

4.1.1.3. Fish and Wildlife

Habitat within the planning area supports a diverse range of native wildlife species and gives the public high-quality opportunities for wildlife-based recreation.

Habitat for migratory birds, including forage, water, cover, structure, and security is available within the Monument to support healthy populations of resident and migrant species.

Greater sage-grouse restoration habitat (R1 & R2) will achieve significant progress toward reclassification as Key habitat.

High-quality habitats for sagebrush-obligate species are provided.

Species composition in key greater sage-grouse habitat will reflect site potential.

4.1.1.4. Wildfire Ecology and Fuels Management

Fire is allowed to function as a natural process in the Wilderness and Preserve.

4.1.1.5. Native American Rights and Interests

Traditional cultural properties of Native American tribes and access to those properties are preserved within the Monument for the use and benefit of current and future tribal members.

For Native American tribes that have ties to this land as part of their ancestral homeland, the Monument holds meaning and value and is a place where treaty rights and religious/sacred traditions may be practiced in a manner supportive of the purpose of the Monument.

Agencies and tribes maintain a government-to-government relationship, and the agencies routinely consult on matters involving the treaty interests and/or rights of tribes.

Tribal oral history will be considered and incorporated into interpretive materials, as well as resource management.

4.1.1.6. Cultural Resources

The extent and condition of cultural resources and traditional cultural properties are documented and adverse effects are avoided.

The agencies maintain a single, consolidated cultural resource database.

Archaeological resources either listed in or eligible to be listed on the National Register of Historic Places are protected in an undisturbed condition unless it is determined through appropriate consultation with the State Historic Preservation Office (SHPO) that disturbance or natural deterioration is unavoidable.

The qualities that contribute to the eligibility for listing or listing of prehistoric/historic structures and historic trails on the National Register are preserved and protected in accordance with the Secretary of the Interior's Standards, unless it is determined through appropriate consultation that disturbance or natural deterioration is unavoidable.

4.1.1.7. Visual Resources

Existing opportunities to experience solitude, dark night sky, and views of landscapes remain substantially free of human intrusions.

A primitive and natural visual setting is retained.

The visual integrity of Goodale's Cutoff historic trail corridor remains protected.

Management activities meet or exceed adopted Visual Resource Management (VRM) classes.

4.1.1.8. Wilderness and Wilderness Study Areas

Natural conditions in Wilderness and Wilderness Study Areas (WSA), including air quality, dark night skies, and natural quiet, are substantially free of human influences.

Air quality degradation and adverse impacts to air quality related values, particularly visibility, within the Class I air quality Craters of the Moon Wilderness Area do not occur.

Future generations enjoy the enduring wilderness resources of the Craters of the Moon Wilderness, including its conservation, scientific, cultural, educational, and recreational benefits.

Wilderness Study Areas retain the wilderness values identified in the wilderness inventory and study process.

4.1.1.9. Livestock Grazing

Sustainable rangeland ecosystems are healthy; public rangelands are maintained or restored to meet Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management (USDI BLM 1997).

Livestock forage is provided on a sustainable basis for the life of the plan, consistent with other resource objectives and with public land use allocations.

Livestock developments are consistent with desired future conditions for natural, cultural, and visual resources.

4.1.1.10. Transportation and Travel Management

There is a net decrease of road mileage within the Monument.

The road system in the planning area provides access for visitors, permittees, non-federal landowners, and administrative needs while protecting those resources and values the Monument was established to preserve.

The agencies coordinate road management inside and outside of the Monument in a cooperative fashion with local government agencies so that the transportation system is managed in a comprehensive, logical manner.

The agencies also work cooperatively with local government agencies to provide appropriate access to the Monument and private lands within the Monument.

The road system within the planning area supports efficient response time for fire suppression activities.

Most management direction related to travel and access is covered by management zone allocation.

4.1.1.11. Recreation and Visitor Experience

The Monument builds and maintains positive relationships with visitor user groups and education organizations.

The public perceives the Monument as a single entity, and its management as a model of public service.

The public understands and appreciates the area's natural and cultural resources, including its history and uses.

The public has access to Monument information and learning opportunities, both on- and off-site.

Information/orientation materials such as travel maps, safety bulletins, resource information, and recreation information are available.

Visitors are offered a variety of interpretive media within the Frontcountry Zone.

4.1.1.12. Social and Economic Conditions

Gateway and other nearby communities benefit economically and socially from the presence of the Monument.

4.1.2. Management Actions to be Carried forward from the 2007 Craters of the Moon MMP

Much of the Management Guidance in the 2007 Plan is carried forward and will continue to apply regardless of alternatives. The actions described here would be common to all alternatives and implemented regardless of which alternative is ultimately selected.

Soil Resources Management Actions

SOIL-1: Soils would be protected from accelerated or unnatural erosion from ground disturbing activities.

SOIL-2: The potential for, or presence, extent and condition of, biological soil crusts would be investigated to provide specific management guidance.

SOIL-3: Biological soil crusts would be considered in management decisions where appropriate.

Water Resources Management Actions

WATER-1: No additional playas would be modified or developed.

WATER-2: Playas would be evaluated for restoration on a case-by-case basis.

WATER-3: The agencies would work with appropriate State of Idaho authorities to obtain water resources needed for Monument purposes.

Vegetation, Including Special Status Species, and Fire Management Actions

VEG-1: To protect vegetation resources, no new livestock developments will be permitted in North Laidlaw Park pasture and Bowl Crater allotment unless they result in a net benefit to those resources identified as needing improvement or protection.

VEG-2: Existing sagebrush steppe communities will be protected to prevent loss of shrub cover and managed to promote a diverse, desirable grass and forb understory .

VEG-3: Annual grasslands and highly degraded sagebrush steppe communities will be restored to achieve a mosaic of shrubs, forbs, and grasses capable of sustaining native animal populations.

VEG-4: Restoration projects will be prioritized relative to locations of key greater sage-grouse habitat and population strongholds. Emphasis will be on projects that restore annual grasslands and degraded sagebrush steppe communities, as well as enlarging and connecting habitats in good condition.

VEG-5: National and Idaho state habitat guidelines for greater sage-grouse and sagebrush steppe obligates developed by interagency working groups regarding composition and structure of sagebrush habitats on a landscape scale will be adopted to guide sagebrush steppe management.

VEG-6: Current science and best available technologies and plant material will be considered in analysis and implementation of all restoration projects. Restoration treatments may be active or passive and may include, but are not limited to, the following: prescribed fire, thinning, mowing, herbicide treatment, seeding, temporary removal of livestock and/or changes in grazing regimes or facilities, and road closures.

VEG-7: Areas classified as poor to fair biotic integrity will be highest priority for restoration treatments.

VEG-8: Aggressive protection of existing sagebrush steppe communities and proactive restoration of areas with poor to fair biotic integrity through both active and passive means will be emphasized.

VEG-9: Approximately 80,000 acres of BLM-administered land will be restored. About 31,000 acres of annual grassland and 49,000 acres of highly degraded low elevation sagebrush steppe (poor to fair biotic integrity) will be treated to control cheatgrass and restore big sagebrush cover.

VEG-10: All special status species in the Monument will be inventoried with monitoring plans established, particularly when and where, adverse impacts may occur.

VEG-11: Actions and stipulations necessary to protect special status species and their habitats will be made part of land use authorizations (e.g., limiting fragmentation of special status species populations when considering road maintenance) and fire planning.

VEG-12: Use of native plants will be emphasized in rehabilitation and restoration projects, and only native plants will be used for rehabilitation or restoration projects within the Pristine Zone. Integrated weed management principles will be used to:

- Detect and eradicate all new infestations of noxious weeds;
- Control existing infestations; and
- Prevent the establishment and spread of weeds within and adjacent to the planning area.

VEG-13: Weed infestations in wilderness areas will be controlled by methods consistent with minimum tool requirements and integrated weed management principles, including prevention of disturbance activities, use of chemical and mechanical methods to control or physically remove noxious weeds, and selective application of herbicides and possibly biological controls.

VEG-14: Integrated weed management principles will be applied proactively throughout all zones. This program will emphasize protection of weed-free areas and aggressive detection and control of noxious or highly invasive exotic weeds and will include an analysis of the trade-offs involved in herbicide use versus non-chemical methods of weed control.

VEG-15: Only certified weed-free hay, straw, and mulch will be permitted within the Monument.

VEG-16: Wildland fires will be suppressed to protect life and property, healthy sagebrush steppe communities, recent rehabilitation and restoration projects, cultural sites, and the Little Cottonwood Creek watershed.

VEG-17: Fire will be managed to maximize protection and restoration of sagebrush steppe in the Passage and Primitive Zones.

VEG-18: Wildland fire use will be allowed in the Wilderness and Preserve except when incompatible with resource management objectives or there is danger to life or property.

VEG-19: Limited prescribed fire (<500 acres) will be used in the aspen, conifer, and mountain shrub vegetation types to improve wildlife habitat and invigorate plant communities while protecting the Little Cottonwood watershed.

VEG-20: In the event of wildland fire, burned areas will be rehabilitated when necessary to restore the appropriate mosaic of sagebrush species and subspecies, along with a diverse perennial understory, and to suppress invasive and noxious weeds.

VEG-21: The cooperative arrangement between the Bureau of Land Management and the National Park Service related to fire management will continue, including cooperative agreements with local fire departments and rural fire districts.

VEG-22: The Bureau of Land Management and the National Park Service will develop a joint fire management implementation plan for the Monument.

VEG-23: The network of main arterial roads will be managed to support access for wildland fire suppression.

Wildlife Management Actions

WLIFE-1: Inventory and monitoring of wildlife will emphasize species that are regionally or nationally important.

WLIFE-2: A monitoring program will be established to detect species populations in decline and species as indicators of the health of the ecosystem, and to record the presence of species of special concern.

WLIFE-3: The NPS, in consultation with the State and Tribes, will designate areas within the Preserve and periods of time when no hunting will be permitted for protection of the area's resources.

WLIFE-4: On all NPS-administered lands, predator control will not be authorized by the Park Service except on a case-by-case basis.

WLIFE-5: Native animal species identified as pests will be managed in accordance with the applicable BLM or NPS management policies depending upon the administrative area in which the pest occurs.

WLIFE-6: All special status species in the Monument will be inventoried with monitoring plans established, particularly when and where adverse impacts may occur.

WLIFE-7: Actions and stipulations necessary to protect special status species and their habitats will be made part of land use authorizations (e.g. limiting fragmentation of special status species populations when considering road maintenance) and fire planning.

WLIFE-8: Active and historic leks will be protected from disturbance during the greater sage-grouse breeding season. Some examples of potential protection measures as presented in the Idaho Sage-grouse Advisory Committee's 2006 Conservation Plan for the Greater Sage-grouse in Idaho include:

- Apply use restrictions where needed and appropriate on existing roads or trails near occupied leks to minimize nonessential activity between 6 PM and 9 AM (in general this guideline should be applied from approximately March 15 through May 1).
- Avoid human activities such as fence maintenance or construction or any project or related work at or near (1 km or 0.6 mile) occupied leks that results in or will likely result in

disturbance to lekking birds, between 6 PM and 9 AM (in general this guideline should be applied from approximately March 15 through May 1).

- Avoid creating unnecessary disturbance related to livestock management activities near occupied leks whenever possible.
- Improve the dissemination of information to elementary and high school students, hunters, resource user-groups, and other to increase their understanding of greater sage-grouse and sagebrush steppe conservation issues.
- Monitor leks in a manner that minimizes disturbance to greater sage-grouse following established protocol (Idaho Sage-grouse Advisory Committee 2006, Sections 5.2.1.1 and 5.2.1.2).

WLIFE-9: Consistent with Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management (USDI BLM 1997) determinations, livestock grazing management will be modified as necessary to ensure key greater sage-grouse habitat achieves site potential.

WLIFE-10: The BLM will continue to hold annual meetings and coordinate closely with U.S. Department of Agriculture, Wildlife Services Program, and livestock lessees to reduce livestock losses. The BLM will encourage non-lethal methods, education, and the targeting of specific offending animals for lethal methods. These procedures will be implemented to protect both public safety and the natural resources for which the Monument was designated.

Livestock Grazing Management Actions (To be revisited in this amendment)

GRAZ-1: Nine allotment boundaries will be altered to accurately reflect the NPS/BLM boundary. There will be no change in AUM preferences actually available for grazing.

GRAZ-2: BLM land available for livestock use totals approximately 273,900 acres. BLM land not available for livestock use totals approximately 1,200 acres. NPS land not available or livestock use totals approximately 463,300 acres. (These acre values were updated using the best available information and GIS data; however, this statement has the same intent as GRAZ-2 of the 2007 Plan.)

GRAZ-3: Permitted livestock use totals 36,965 animal unit months. The current livestock use authorizations will be maintained until Idaho Standards for Rangeland Health evaluations or similar NEPA-compliance decisions identify the need for adjustments in livestock use to meet standards, vegetation, livestock, or resource objectives.

GRAZ-4: Use of existing livestock developments in Primitive and Pristine Zones may continue. The BLM may remove developments if they are no longer serving a useful purpose or resource objectives warrant their removal. Sites will be restored.

GRAZ-6: There will be no new livestock developments permitted in North Laidlaw Park Pasture and Bowl Crater Allotment unless they result in a new benefit to those resources identified as needing improvement or protection.

Cultural Resources Management Actions

CULT-1: A comprehensive Archaeological Overview and Assessment of known and potential archaeological resources (baseline research report) within the planning area will be completed.

*Chapter 4 Current Management Direction
Management Actions to be Carried forward from the
2007 Craters of the Moon MMP*

CULT-2: A Cultural Resource Management Plan that describes how specific sites will be managed, defines what areas need additional inventory, and designates potential use categories for sites will be completed for the Monument.

CULT-3: Measures such as access limitations and periodic monitoring will be identified to proactively manage and protect cultural resources, including traditional cultural properties.

CULT-4: Projects will be planned and designed so as to avoid adversely impacting cultural resources where possible. The BLM and the NPS will consult with Tribes and the Idaho State Historic Preservation Officer (SHPO) to develop alternatives to avoid, minimize, or mitigate any potential adverse effects.

CULT-5: Through consultation with the Idaho SHPO, areas for Section 110 cultural resource inventories will be prioritized.

CULT-6: A proactive Section 110 inventory will be conducted as funding allows, expanding the cultural resource database for the Monument.

CULT-7: A minimum of 10% of the Monument will be inventoried for cultural resources over the life of the plan. The focus of the Section 110 Inventory will be in the Primitive and Passage Zones.

CULT-8: The significance of known archaeological and historic resources, structures, and landscapes will be evaluated and documented, in conjunction with the Idaho SHPO, for listing on the National Register.

CULT-9: Activities that may affect the Goodale's Cutoff of the Oregon Trail, the NPS headquarters/visitor center Mission 66-era, or other properties listed or eligible for the National Register will be undertaken in consultation with the Idaho SHPO.

CULT-10: At-risk National Register eligible sites will be monitored for vandalism or other disturbances and protected/stabilized as necessary.

CULT-11: National Register eligible properties will be monitored periodically and steps will be taken to stabilize any property found to be deteriorating and to limit access as needed.

CULT-12: The agencies will pursue more public education and interpretation off site, with increased monitoring and protection for those sites at risk.

Native American Rights and Interests Management Actions

NAAM-1: Native American Tribes that have expressed an interest in traditional cultural properties within the Monument will be consulted on a regular basis regarding the management of those properties.

NAAM-2: Handling of Native American Graves Protection and Repatriation Act materials will be addressed as a component of a Cultural Resources Management Plan.

NAAM-3: Should any Native American Graves Protection and Repatriation Act material ever be inadvertently discovered within the Monument, the agencies will follow the tribal consultations procedures outlined in the Act regarding their treatment.

NAAM-4: The agencies in consultation with the Tribes will identify protection measures for any places of traditional cultural importance to Native Americans to preserve the integrity and use of those areas as described in National Register Bulletin 38.

NAAM-5: Agencies will consult with associated Native American tribes to develop and accomplish the programs of the Monument in a way that respects their beliefs, traditions, and other cultural values.

NAAM-6: Agencies will consult with Native American tribes prior to taking actions that will affect natural and cultural resources that are of interest and concern to them.

NAAM-7: Hunting, gathering, and the use of certain natural resources as sacred objects for religious use will continue on the Preserve and the expanded areas of the Monument.

Visual Resources Management Actions

VRM-1: BLM and NPS managers should seek the cooperation of visitors, neighbors, and local government agencies to prevent or minimize impacts and prevent the loss of western landscape vistas and natural dark conditions.

VRM-2: Existing waste dumps will be inventoried and cleaned up.

VRM-3: VRM inventory classes will be designated as management classes.

Wilderness and Wilderness Study Areas Management Actions

WILD-1: NPS and BLM will develop a joint Wilderness/Wilderness Study Area (WSA) Management Plan following the completion of this plan. No additional wildlife water developments or other habitat manipulations will be undertaken to manage wildlife populations in Wilderness, Wilderness Study Areas, or the Preserve.

WILD-2: As part of the joint Wilderness/WSA Management Plan, and consistent with current guidance on inventorying for and management to protect or enhance wilderness characteristics, the agencies may conduct additional inventory, consider citizen proposals, and consider protections of lands with wilderness characteristics.

WILD-3: Minimum requirement analysis will precede any proposed management activities within designated wilderness areas and WSAs will continue to be managed under the guidance of the Interim Management Policy for Lands under Wilderness Review.

WILD-4: Use of aircraft to survey and monitor wildlife populations could be continued, but flights will be scheduled to avoid high visitor use periods. Any landing of aircraft or dropping of supplies from aircraft in wilderness or WSAs will be consistent with a minimum requirement and minimum analysis.

WILD-5: Ways or travel routes within WSAs not identified during wilderness inventories will be closed to motorized vehicles and rehabilitated.

WILD-6: Should Congress release any Wilderness Study Area from WSA status, then the area will be managed under the direction of this land use plan.

Travel and Transportation Management Actions

*Chapter 4 Current Management Direction
Management Actions to be Carried forward from the
2007 Craters of the Moon MMP*

Eighteen travel and transportation management actions were established in the 2007 Monument Management Plan. The 2007 Plan directed that a comprehensive travel management plan be written as an implementation-level plan. The management zones, road and trail classification system, and other provisions of the Monument Management Plan provided the framework for developing the Comprehensive Travel Plan, which was completed in 2009. It is now the most current management specific to travel and transportation in the Monument.

Actions specific to the Comprehensive Travel Plan include:

- Maintain roads, as defined on page 2 of the travel plan, to a consistent standard to support wildfire operations,
- Seasonally close routes in big game winter habitat when needed,
- Seasonally close and limit routes to protect greater sage-grouse,
- Restrict occupancy in areas of known active sage-grouse leks during the breeding season,
- Limit some Primitive Roads to administrative use only in order to minimize human-caused wildfire threats and the spread of non-native invasive plants and noxious weeds,
- Allow administrative use only on some routes to Monument infrastructure such as range improvements associated with grazing and livestock operations, wildlife management, and exclosures,
- Construct vehicle parking areas in order to minimize human-caused wildfire threats and the spread of non-native invasive plants and noxious weeds,
- Close and remove/rehabilitate some Primitive Roads in the Pristine Zone to protect archaeological and geological resources,
- Provide access for motorized and non-motorized recreational activities,
- Develop and analyze a ‘toolbox’ of options for route closures, and
- Protect valid existing rights.

Visitor Use Management Actions

VISIT-1: A Long-Range Interpretive Plan for the Monument will be developed.

VISIT-2: Both agencies will coordinate services to meet the needs of permittees, visitors, students, educators, interest groups, and the general public.

VISIT-3: Monument staff will continue to promote visitor safety and resource protection. Designated roads, trails, and facilities will be maintained, and new facilities will be provided as appropriate in the Frontcounty Zone for resource protection and visitor enjoyment.

VISIT-4: Developed facilities such as the visitor center at the original NPS Monument will continue to be provided. Informational/orientation materials dealing with recreation, maps, safety, and resource concerns will be posted on kiosks located at all primary backcountry access points surrounding the Monument and at the Carey and Kimama BLM fire stations.

VISIT-5: Interpretive programs and the maintenance of exhibits and waysides will continue.

VISIT-6: Educational programs for schools will focus on programs on-site in the original NPS-administered Monument. A number of programs (summer and winter) aimed at special users will be presented each year.

VISIT-7: Educational programs will be expanded to off-site locations.

VISIT-8: A variety of interpretive media for on- and off-site use will continue to be developed.

VISIT-9: Interpretive signs will be provided along the US 20/26/93 corridor.

VISIT-10: Interpretation outside the Frontcounty Zone will emphasize publications, web sites, exhibits, and other off-site interpretive media.

VISIT-11: Interpretive emphasis will be on providing new interpretive and educational materials and programs outside the expanded portion of the Monument and in partnering communities and facilities.

VISIT-12: A variety of portable media (maps, tapes, guidebooks, etc.) will be developed to interpret the expanded portion of the Monument.

VISIT-13: Informational/orientation material dealing with recreation, maps, safety, and resource concerns will be available in gateway communities. Visitor center(s) operated in cooperation with local partners will be proposed within the I-84 corridor.

VISIT-14: Commercial outfitters and guides will be encouraged to offer a range of guided experiences. Visitors who might not otherwise have the proper knowledge, vehicles, or preparation to experience the interior of the Monument will then have a viable option that will not require a lot of road, trail, and facility improvement.

VISIT-15: Safety and resource protection will be emphasized at all access points.

Socioeconomic Values Management Actions

SOCIO-1: An intergovernmental coordination group will be considered to ensure consistency of this plan with other state and local plans.

SOCIO-2: The agencies will participate with interested communities in their planning for accommodating Monument visitors through their communities.

Chapter 5. Summary of Scoping/Issues and Management Opportunities

This page intentionally
left blank

Scoping is a term used in the Council on Environmental Quality (CEQ) regulations to describe the early and open process for determining issues to be addressed in an EIS. A list of stakeholders and other interested parties is also confirmed and augmented during the scoping process. The scoping process serves two main purposes:

- It involves the public in identifying significant issues related to potential management actions; and
- It helps identify non-relevant issues that can be eliminated from detailed analysis.

5.1. The Scoping Process

A Notice of Intent (NOI) informs the public of BLM's intent to initiate the planning process and prepare an EIS. It invites participation from affected and interested agencies, organizations, and the general public in determining the scope and significant issues to be addressed in the alternatives. The NOI to prepare the Craters of the Moon Plan Amendment was published in the Federal Register on June 28, 2013. This Notice served as the beginning of BLM's formal scoping process. It included the following, internally identified categories:

- Special status species management
- Livestock grazing management

The BLM's ongoing Idaho and Southwestern Montana Sub-Regional EIS/RMP Amendment process will address measures for sage-grouse conservation and is expected to result in a plan amendment to the existing Craters of the Moon Management Plan. The BLM anticipates that the Sub-Regional EIS/RMP Amendment effort will be completed in the fall of 2014. The amendment announced in this Notice is expected to primarily address issues related to management of livestock grazing in the Craters of the Moon planning area. However, the BLM may also address additional issues relating to the conservation measures for sage-grouse identified in the U.S. District Court's Orders that are not addressed in the Sub-Regional EIS/RMP Amendment process.

The following are sub-categories that were identified as having possible impacts with regard to livestock grazing management:

- Upland vegetation management
- Lands with wilderness characteristics evaluations
- Social and economic sustainability of local communities
- Protection of cultural resources and sacred sites

5.2. Identification of Issues

In July and August of 2013, "open house," style scoping meetings were held in Rupert, Carey, Arco and American Falls, Idaho. This format was used to encourage discussions about (1) issues to be addressed in the plan, (2) concerns about the process/planning criteria, and (3) development of the alternatives to be analyzed in the Draft EIS. At each meeting, at least three members of the MMP Interdisciplinary (ID) Team, plus the BLM Monument Manager, were available to answer questions; maps and a presentation were also displayed. Some attendees submitted written

comments at that time. Forty individuals participated in these meetings (Table 5.1, “Scoping Meeting Locations, Dates, and Attendance”).

Table 5.1. Scoping Meeting Locations, Dates, and Attendance

Location	Date	Number of Attendees
Rupert City Hall	July 30, 2013	0
Carey City Council	August 1, 2013	20
Arco/Butte Business Incubator	August 6, 2013	2
American Falls District Library	August 9, 2013	18

A press release was sent out on July 22, 2013. Letters to interested parties and permittees were sent on July 23, 2013. A Public Notice of the scoping meetings was placed in five newspapers and ran in July and August. Newspapers included: The Times-News, The Arco Advertiser, The Post Register, The Idaho Mountain Express, and the Idaho State Journal.

A project email address and website were created when the NOI was published. The website provided information on the open houses, instructions for submitting scoping comments, a link to the Federal Register NOI, scoping information, and a link to the current management plan for Craters of the Moon National Monument and Preserve.

Cooperating Agency invitations were sent to 5 Counties, 5 Cities, and 14 State and Federal agencies. Blaine County, Power County, the City of American Falls, and the Idaho State Department of Agriculture requested Cooperating Agency status. Memoranda of Understanding (MOUs) have been signed with four cooperators.

The BLM initiated formal government-to-government consultation with the Shoshone-Paiute Tribe through the Wings and Roots process in August 2013. Government-to-government consultation with the Shoshone-Bannock Tribes was initiated through correspondence in September 2013.

As a result of public scoping efforts, twenty-six responses were received. Responses were submitted in the form of comment forms provided during public scoping meetings, letters, and e-mails.

5.3. Issues Addressed

The BLM Land Use Planning Handbook defines a planning issue as, “disputes or controversies about existing and potential resource allocations, levels of resource use, production, and related management practices” ([BLM2005a]). It is more than just a position statement about current policies. An issue:

- Has a cause and effect relationship with the proposed action or alternatives,
- Is within the scope of the analysis,
- Has not been decided by law, regulation, or previous decision, and
- Is amenable to scientific analysis rather than conjecture.

Issue identification is critical for alternative development for resource management planning. For the Craters of the Moon MMP Amendment, a three-step process was used to identify and group the issues. First, the Interdisciplinary (ID) Team read all twenty-six scoping comment letters and identified 316 individual comments. Next, they determined which comments were within the scope for analysis in this amendment because they (1) suggest a reasonable alternative, (2) contribute to developing reasonable alternatives, (3) contribute to developing design features or mitigation measures, (4) suggest credible information or methodologies that should be considered during the analysis, (5) present information that is relevant to the analysis, (6) describe changes to the proposed action along with supporting reasons why the changes should be made, or (7) suggest analysis that is necessary to make a reasoned choice among alternatives. They were grouped into nine broad resource or management-driven concerns. Finally, the team summarized the applicable concerns into one overall issue that reflects fundamental challenges to be addressed in this MMP Amendment and alternative development.

For a detailed description of all issues identified during scoping, refer to the Craters of the Moon National Monument Final Scoping Report. The report is available on the Craters of the Moon MMP Amendment web site at: www.blm.gov/id/st/en/prog/nepa_register/Craters-plan-amdt_2013.html

5.3.1. Management Opportunities

The overall issue is livestock grazing. The ID Team applied its expertise of a resource or resource use to better define or expand on the issue. Public resource concerns or questions used to develop the issue statement are provided below. By combining public concerns with BLM knowledge, alternatives will be developed that incorporate public concerns along with land management policies.

5.3.1.1. Issue 1: Livestock Grazing Management

Changes to livestock grazing management and related infrastructure could increase opportunities for use/resource conflicts and resource improvement or degradation.

Summarized public concerns used to develop this issue statement include:

- Livestock grazing has a beneficial impact by reducing the amount of fine fuels, which lead to larger and more frequent wildfires, in Craters of the Moon. Livestock grazing can also have a beneficial effect on recovery of sage-grouse habitat.
- Traditional and historic grazing in Craters of the Moon has important socioeconomic value for local communities and permittees. Changes in the amount of livestock grazing allowed in Craters of the Moon could impact revenue for state endowment lands as well as the economies of the five counties within Craters of the Moon.
- Allowing spring and fall grazing will improve the health and diversity of plants in Craters of the Moon. Age diversity in plants helps with recovery of vegetation following wildfires.
- Livestock grazing has negative impacts on ecological conditions in Craters of the Moon including degradation of native vegetation and soils, leading to infestation and spread of weeds and subsequently larger and more frequent wildfires.
- Livestock grazing negatively impacts wildlife.

- Livestock grazing developments and infrastructure (including roads and fences) have negative impacts on resource values explicitly protected by Proclamation 7373.
- Cultural resources are threatened by livestock grazing management, infrastructure, and disturbance associated with restoration of playas.
- Removing livestock grazing and associated developments from Craters of the Moon will have beneficial impacts to native vegetation and rehabilitation of greater sage-grouse habitat.
- Removing livestock grazing from Craters of the Moon will have negative impacts on ecological conditions.

Management Concerns

In addition to the issue described above, the planning handbook identifies management concerns. Management concerns include: a) topics raised during scoping that require attention, but which have a lower level of controversy than the issues identified above or b) guidance under the BLM Land Use Planning Handbook ([BLM 2005a]).

Management concerns are generally of a program-specific nature, and while they may not be externally generated or controversial, they deserve consideration in the planning process. Some of the management concerns related to livestock grazing in the Planning Area include the following:

Soils and Water: How will riparian areas be managed? Will changes to grazing affect wet soils (compaction)? How will playas be managed?

Special Status Species: How will certain deficiencies related to greater sage-grouse be addressed throughout the Plan Amendment process as well as in the Idaho and Southwestern Montana Greater Sage-Grouse Amendment?

Cultural Resources: How will cultural resources be protected in the Craters of the Moon Management Plan?

Lands with Wilderness Characteristics: How will BLM manage public lands in order to protect and preserve lands with wilderness characteristics?

Visual Resources: How will visual resource objectives be applied to the Planning Area to manage different values?

Comprehensive Trails and Travel Management: How will roads that could potentially become unnecessary due to changes to grazing be treated?

Climate Change: How could BLM reduce management effects on climate change?

5.4. Issues Considered but Not Further Analyzed

Several types of comments do not warrant analysis in the EIS because they do not provide information that is helpful to make a reasoned choice among alternatives. Unsupported comments include, but are not limited to, (1) stating a personal opinion with no supporting rationale, (2) discussing other projects or other project areas, (3) stating a disagreement with BLM policy, (4) discussing decisions that have already been made, or (5) simply stating agreement or opposition to the project. Four concerns raised beyond the scope of this plan are presented below.

*Chapter 5 Summary of Scoping/Issues and
Management Opportunities
Issues Considered but Not Further Analyzed*

5.4.1. Issues beyond the scope of the plan

Concern 1 –Controlling predatory populations will benefit greater sage-grouse populations.

Management and control of predators is outside the jurisdictional authority of BLM.

Concern 2- The BLM should look beyond livestock grazing in Craters of the Moon and update all components of the 2007 Craters of the Moon Management Plan.

The Craters of the Moon Management Plan process has already addressed and analyzed the other land use allocations and activities within the Planning Area. The scope of this planning effort is limited to curing the remaining deficiencies identified by the Court in 2012. The BLM will focus on analyzing a range of reasonable alternatives for livestock grazing management, including reduced and no grazing alternatives. Desired future conditions, management goals, and management actions that are not directly related to livestock management in Craters of the Moon will remain unchanged.

Concern 3 - The BLM should accept the Governor’s Sage-Grouse Alternative.

The Governor’s sage-grouse alternative is being considered in the BLM’s Idaho and Southwest Montana greater sage-grouse amendment EIS. The amendments that will be crafted in that decision-making process will govern the BLM’s management of sage-grouse within Craters of the Moon. It is premature to adopt the Governor’s sage-grouse amendment wholesale, when its management direction may be altered through the programmatic EIS process that is expected to be completed later in 2014.

Concern 4 - The BLM should consider an Area of Critical Environmental Concern (ACEC) designation for greater sage-grouse.

While the BLM 1613 Manual - Area of Critical Environmental Concern provides guidance on how the public can nominate ACECs, in this case it is considered outside the scope of the purpose and need of this amendment. The analysis and designation of ACECs took place during the MMP planning process. The Craters of the Moon MMP previously examined several ACEC nominations. The scope of this planning effort is limited to curing the remaining deficiencies identified by the Court in 2012. The BLM will focus on analyzing a range of reasonable alternatives for livestock grazing management, including reduced and no grazing alternatives.

This page intentionally
left blank

Chapter 6. List of Preparers

This page intentionally
left blank

Table 6.1. List of Preparers

Name	Responsibility	Qualifications
Tara Anderson	Wildlife Biologist	MSc Natural Resources and Environmental Studies - Biology BAc Ecology (minor in Chemistry); 5 Years Experience
Lisa Cresswell	Project Manager/Team Lead, Archaeologist	MA Anthropology; 23 Years Experience
Nathan Jayo	Recreation Planner	BS Resource Recreation and Tourism w/ Minor in Parks, Protected Areas, and Wilderness Conservation; 10 Years Experience
Cassandra Mavencamp	GIS, Writer/Editor	BS Biology (concentration in Organismal Ecology); 8 Years Experience
Danelle Nance	Natural Resource Specialist	BS Agricultural Science & Technology; 12 Years Experience
Dan Patten	Rangeland Management Specialist	BS Range Resources BS Wildlife Management MS Rangeland Ecology; 12 Years Experience
Julie Suhr-Peirce	Socioeconomist	PhD Economics; 29 Years Experience

This page intentionally
left blank

Chapter 7. References

This page intentionally
left blank

Bibliography

- [Aldridge et al. 2008] Aldridge, C. L., S. E. Nielsen, H. L. Beyer, M. S. Boyce, J. W. Connelly, S. T. Knick, and M. A. Schroeder. 2008. Range-wide patterns of greater sage-grouse persistence. *Diversity and Distributions* 17:983-994..
- [Alexander, Liston, & Popovich, 2004] Alexander, J.A., Liston, A., & Popovich, S.J. (2004). Genetic Diversity of the Narrow Endemic *Astragalus oniciformis* (Fabaceae). *American Journal of Botany*, 91(12), doi: 10.3732/ajb.91.12.2004 .
- [Alpe et al. 1999] Alpe, M. J., Kingery, J. L., and Mosley, J. C. (1999). Effects of Summer Sheep Grazing on Browse Nutritive Quality in Autumn and Winter. *Journal of Wildlife Management*, 63(1), 346-354. .
- [Anderson and Holte 1981] Anderson, J.E., and K.E. Holte. 1981. Vegetation development over 25 years without grazing on sagebrush-dominated rangeland in southeastern Idaho. *Journal of Range Management* 34:25-29..
- [Anderson & Inouye, 2001] Anderson, J. E., and Inouye, R. S. (2001, November). Landscape-Scale Changes in Plant Species Abundance and Biodiversity of a Sagebrush Steppe over 45 Years. *Ecological Monographs*, 71(4), 531-556. Retrieved April 9, 2014, from <http://www.jstor.org/stable/3100035>.
- [Armour, Duff, & Elmore, 1991] Armour, C. L., Duff, D. A., and Elmore. W. (1991). Position statement on the effects of livestock grazing on riparian and stream ecosystems. *Fisheries*. 16(1), 7-11..
- [Austin 2000] Austin, D. (2000). Managing Livestock Grazing for Mule Deer (*Odocoileus hemionus*) on Winter Range in the Great Basin. *Western North American Naturalist*, 60(2), 198-203. .
- [Baker et al. 2001] Baker T., Boren J., Allison C.D. 2001. Strategies for livestock management in riparian areas in New Mexico. College of Agriculture and Home Economics Guide B-119. New Mexico State University, Las Cruces, New Mexico. Available: http://aces.nmsu.edu/pubs/_b/B-119.pdf.
- [Barnett and Crawford 1994] Barnett, J. F., and J. A. Crawford. 1994. Pre-laying nutrition of sage-grouse hens in Oregon. *Journal of Wildlife Management* 47:114-118..
- [Beck & Mitchell, 2000] Beck, J. L., and Mitchell, D. L. (2000, Winter). Influences of Livestock Grazing on Sage Grouse Habitat. *Wildlife Society Bulletin*, 28(4), 993-1002. Retrieved from <http://www.jstor.org/stable/3783858>.
- [Beever, 2002] Beever, E. A. (2002). Persistence of pikas in two low-elevation national monuments in the western United States. *Park Science*, 21, 23-29..
- [Bellows 2003] Bellows, B.C. 2003. Managed grazing in riparian areas. National Sustainable Agriculture Information Service, Fayetteville, Arkansas..
- [Belnap, 2003] Belnap, J. (2003, May). The World at Your Feet: Desert Biological Soil Crusts. *Frontiers in Ecology and the Environment*. 1(4), 181-189. Retrieved March 14, 2014, from <http://www.jstor.org/stable/3868062>.

- [Beneficial Use Reconnaissance Program (BURP) 2007] Beneficial Use Reconnaissance Program (BURP). 2007. Idaho Department of Environmental Quality, Twin Falls, Idaho..
- [Blaisdell, Murray, & McArthur, 1982] Blaisdell, J. P., Murray, R. B., and McArthur, E. D. (October 1982). Managing Intermountain Rangelands — Sagebrush-Grass Ranges. General Technical Report INT-134. USDA Forest Service (USDA FS)..
- [Bratton, 1990] Bratton, J. H. (1990). Seasonal pools - an overlooked invertebrate habitat. *British Wildlife*, 22-29..
- [Braun et al. 1977] Braun, C. E., T. Britt, and R. O. Wallestad. 1977. Guidelines for maintenance of sage-grouse habitats. *Wildlife Society Bulletin* 5:99-106..
- [Brewer, Mosley, Lucas, & Schmidt, 2007] Brewer, T. K., Mosley, J. C., Lucas, D. E., and Schmidt, L. R. (2007, September). Bluebunch Wheatgrass Response to Spring Defoliation on Foothill Rangeland. *Rangeland Ecology & Management*, 60(5), 498-507. Retrieved from <http://www.jstor.org/stable/4540849>.
- [Braun, Baker, Gashwiler, & Schroeder, 1976] Braun, C. E., Baker, M. F., Eng, R. L., Gashwiler, J. S., and Schroeder, M. H. (1976). Conservation committee report on effects of alteration of sagebrush communities on the associated avifauna. *Wilson Bulletin* 88, 165-171..
- [Bunting et al., 2002] Bunting, S. C., Kingery, J. L., Hemstrom, M. A., Schroeder, M. A., Gravenmier, R. A., and Hann, W. J. (September 2002). Altered Rangeland Ecosystems in the Interior Columbia Basin. General Technical Report PNS-GTR-553. USDI BLM..
- [Caicco & Wellner, 1983a] Caicco, S. L. and Wellner, C.A. (October 1983). Research Natural Area Recommendation for Big Juniper Kipuka. BLM..
- [Caicco & Wellner, 1983b] Caicco, S. L. and Wellner, C.A. (October 1983). Research Natural Area Recommendation for Brass Cap Kipuka. BLM..
- [Caicco & Wellner, 1983c] Caicco, S. L. and Wellner, C.A. (October 1983). Research Natural Area Recommendation for Sand Kipuka. BLM..
- [Coates 2007] Coates, P. S. 2007. Greater Sage-Grouse (*Centrocercus urophasianus*) nest predation and incubation behavior. Idaho State University, Boise. .
- [Connelly et al. 1988] CONNELLY, J.W., H. W. BROWERS, AND R. J. GATES. 1988. Seasonal movements of sage grouse in southeastern Idaho. *Journal of Wildlife Management* 52:116-122. .
- [Connelly et al. 1991] Connelly, J. W., W. L. Wakkinen, A. P. Apa, and K. P. Reese. 1991. Sage-grouse use of nest sites in southeastern Idaho. *Journal of Wildlife Management* 55:521-524..
- [Connelly and Braun 1997] CONNELLY, J.W., AND C. E. BRAUN. 1997. Long-term changes in Sage Grouse *Centrocercus urophasianus* populations in western North America. *Wildlife Biology* 3:229-234. .
- [Connelly et al. 2000] CONNELLY, J.W., M. A. SCHROEDER, A. R. SANDS, AND C. E. BRAUN. 2000. Guidelines to manage sage grouse populations and their habitats. *Wildlife Society Bulletin* 28(4):967-985. .

- [Connelly, Knick, Schroder, & Stiver, 2004] Connelly, J. W., Knick, S. T., Schroder, M. A., and Stiver, S. J. (2004). Conservation assessment of greater sage-grouse and sagebrush habitats. Western Association of Fish and Wildlife Agencies. Cheyenne, Wyoming..
- [Cooperrider et al. 1986] COOPERRIDER, A. Y., R. J. BOYD, AND H. R. STUART, EDITORS. 1986. Inventory and monitoring of wildlife habitat. United States Department of the Interior, Bureau of Land Management, Denver, Colorado, USA. .
- [Copeland et al., 2010] Copeland, J. P., McKelvey, K. S., Aubry, K. B., Landa, A., Persson, J., Inman, R. M., Krebs, J., Lofroth, E., Golden, H., Squires, J. R., Magoun, A., Schwartz, M. K., Wilmot, J., Copeland, C. L., Yates, R. E., Kojola, I., and May, R. (May 2010). The bioclimatic envelope of the wolverine (*Gulo gulo*): do climatic constraints limit its geographic distribution? Canadian Journal of Zoology 88, 233-246..
- [Courtois, Perryman, & Hussein, 2004] Courtois, D. R., Perryman, B. L., and Hussein, H. S. (2004, November). Vegetation Change after 65 Years of Grazing and Grazing Exclusion. Journal of Range Management, 57(6), 574-582. Retrieved April 18, 2014, from <http://www.jstor.org/stable/4004011>.
- [Cox & Anderson, 2004] Cox, R. D., and Anderson, V. (March 2004). Increasing Native Diversity of Cheatgrass-Dominated Rangeland through Assisted Succession. Journal of Range Management, 57(2), 203-210. Retrieved from <http://www.jstor.org/stable/4003920>.
- [Davies et al. 2010] Davies, K. W., J. D. Bates, T. J. Svejcar, and C. S. Boyd. 2010. "Effects of long-term livestock grazing on fuel characteristics in rangelands: An example from the sagebrush steppe." Rangeland Ecological Management 63:662-669. November 2010. .
- [Davies et al. 2009] Davies, K. W., T. J. Svejcar, and J. D. Bates. 2009. "Interaction of historical and nonhistorical disturbances maintains native plant communities." Ecological Applications, 19(6):1536-1545. .
- [Day & Wright, 1985] Day, T. A., and Wright, R. G. (January 1985). The Vegetation Types of Craters of the Moon National Monument. Forest, Wildlife, and Range Experiment Station. University of Idaho, Moscow, Idaho..
- [Dealy, Leckenby, & Concannon, 1981] Dealy, J. E., Leckenby, D. A., and Concannon, D. M. (1981). Wildlife habitats in managed rangelands - the Great Basin of southeastern Oregon: plant communities and their importance to wildlife. USDA Forest Service general technical report PNW-120..
- [DeLong et al. 1995] DeLong, A. K., J. A. Crawford, and D. C. DeLong, Jr. 1995. Relationships between vegetational structure and predation of artificial sage-grouse nests. Journal of Wildlife Management 59:88-92..
- [Dobkin 1995] Dobkin, D. S. 1995. Management and conservation of sage-grouse, denominative species for the ecological health of shrubsteppe ecosystems. United States Department of Interior, Bureau of Land Management, Portland, Oregon..
- [Falter & Freitag, 1996] Falter, M. C. and Freitag, R. J. (1996). Baseline study of water resources on Craters of the Moon National Monument, Idaho. Technical report NPS/CCSOUI/NRTR-96/06..

- [Gabler, Heady, & Laundre, 2001] Gabler, K. L., Heady, L. T., and Laundre, J. W. (2001). A habitat suitability model for pygmy rabbits (*Brachylagus idahoensis*) in southeastern Idaho. *Western North American Naturalist* 61:480-489..
- [Ganskopp, 1988] Ganskopp, D. (1988, November). Defoliation of Thurber Needlegrass: Herbage and Root Responses. *Journal of Range Management*, 41(6), 472-476. Retrieved March 15, 2014, from <https://journals.uair.arizona.edu/index.php/jrm/article/viewFile/12852/12129#page=27>.
- [Ganskopp, 1998] Ganskopp, D. (1998, May). Thurber Needlegrass: Seasonal Defoliation Effects on Forage Quantity and Quality. *Journal of Range Management*, 51(3), 276-281. Retrieved March 15, 2014, from <http://oregonstate.edu/dept/EOARC/sites/default/files/publication/419.pdf>.
- [Ganskopp & Bedell, 1981] Ganskopp, D. C. and Bedell, T. E. (1981, March). An Assessment of Vigor and Production of Range Grasses following Drought. *Journal of Range Management*, 34(2), 137-141. Retrieved April 16, 2014, from <http://www.jstor.org/stable/3898130>.
- [Ganskopp et al. 1999] Ganskopp, D., Svejcar, T., Taylor, F., Farstvedt, J., and Paintner, K. (1999). Seasonal Cattle Management in 3 to 5 Year Old Bitterbrush Stands. *Journal of Range Management*, 52, 166-173. .
- [Garton et al., 2011] Garton, E. O., Connelly, J. W., Horne, J. S., Hagen, C. A., Moser, A., and Schroeder, M. (2011). Greater sage-grouse population dynamics and probability of persistence. S.T. Knick and J.W. Connelly (editors). *Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and its Habitats*. *Studies in Avian Biology* 38, 239–382. University of California Press, Berkeley, California..
- [Gregg 1991] Gregg, M. A. 1991. Use and selection of nesting habitat by sage-grouse in Oregon. Thesis, Oregon State University, Corvallis..
- [Gregg et al. 1994] Gregg, M.A., Crawford, J.A., Drut, M.S., and DeLong, A.K. 1994. Vegetational cover and predation of sage grouse nests in Oregon. *Journal of Wildlife Management*, 58:162-166..
- [Griffith, 1983] Griffith, B. (1983). Ecological characteristics of mule deer: Craters of the Moon National Monument, Idaho. Thesis. University of Idaho College of Forestry, Moscow, Idaho..
- [Habich 2001] HABICH, E. F. 2001. Ecological site inventory. Bureau of Land Management, Technical Reference 1734-7, Denver, Colorado, USA. .
- [Hagen et al. 2007] HAGEN, C.A., J.W. CONNELLY, AND M.A. SCHROEDER. 2007. A meta-analysis of greater sage-grouse *Centrocercus urophasianus* nesting and brood-rearing habitats. *Wildl. Biol.* 13:Suppl. 1, 42-50..
- [Hanser and Knick 2011] HANSER, S. E., AND S. T. KNICK. 2011. Greater sage-grouse as an umbrella species for shrubland passerine birds: a multi-scale assessment. *Studies in Avian Biology*, Pp. 475–488.
- [Headwaters Economics, 2014] Headwaters Economics. Economic Profile System-Human Dimensions Toolkit. (2014).

- [Hempy-Mayer & Pyke, 2008] Hempy-Mayer, K., and Pyke, D. A. (2008, January). Defoliation Effects on *Bromus tectorum* Seed Production: Implications for Grazing. *Rangeland Ecology & Management*, 61(1), 116-123. Retrieved from <http://www.jstor.org/stable/25146757>.
- [Henderson & Murie, 1958] Henderson, F. and Murie, A. (October 20, 1958). Proposed Addition to Craters of the Moon National Monument. USDI NPS..
- [Henrikson, 2005] Henrikson, L. S. (2005). "Using Geospatial Data to Interpret the Holocene Archaeological Record on the Craters of the Moon National Monument and Preserve." Craters of the Moon Science Symposium, Pocatello, Idaho. Paper presentation..
- [Henrikson, McAlister, & Long, 2006] Henrikson, L. S., McAlister, K. W., and Long, M. M. (2006). "Craters of the Moon National Monument and Preserve Archaeological Overview." Report of research compiled for the Bureau of Land Management and the National Park Service by the Museum of Natural and Cultural History, University of Oregon, Eugene Report 2006-022. Copy on file at the Shoshone Field Office BLM, Idaho..
- [Henrikson, Guenther, & Cravins, 2009] Henrikson, L. S., Guenther, M., and Cravins, C. (2009). "Shoshone Field Office BLM Archaeological Overview." Report of research compiled for the Bureau of Land Management by the Center for Archaeological Research, California State University, Bakersfield. Copy on file at the Shoshone Field Office BLM, Idaho..
- [Hironaka, Fosberg, & Winward, 1983] Hironaka, M., Fosberg, M. A., and Winward, A. H. (May 1983). Sagebrush-Grass Habitat Types of Southern Idaho. Forest, Wildlife, and Range Experiment Station. Bulletin No. 35. University of Idaho. Moscow, Idaho..
- [Hoffman, 1988] Hoffman, R. A. (1988). Craters of the Moon National Monument base-line inventory and monitoring (wildlife) final report, Report B-88. University of Idaho, Cooperative Park Studies Unit, Moscow, Idaho..
- [Holmes et al. 2003] Holmes, A. L., Green, G. A., Morgan, R. J., and Livezey, K. B. (2003). Burrowing Owl Nest Success and Burrow Longevity in North Central Oregon. *Western North American Naturalist*, 63 (2), 244-250. .
- [Horning & Barr, 1970] Horning, D. S., Jr., and Barr, W. F. (1970). Insects of Craters of the Moon National Monument, Idaho. University of Idaho College of Agriculture, Miscellaneous series no. 8..
- [Hurlbutt, 1998] Hurlbutt, D.C. (1998). Order of partial decree, water right nos. 34-13586, 34-13587, 34-12383/36-15342, 34-12384/36-15343. 34-12385/36-15344, 34-12386, 34-12387, 34-12388, 34-12389, 3615345, and 36-15346, Presiding Judge, Snake River Basin Adjudication, Fifth Judicial District for the State of Idaho..
- [Idaho Department of Fish and Game (IDFG), 2003] Idaho Department of Fish and Game (IDFG). (2003). Unpublished survey or observation data from Idaho Department of Fish and Game..
- [IDFG, 2005] Idaho Department of Fish and Game (IDFG). (2005). Idaho comprehensive wildlife conservation strategy, appendix F: species accounts and distribution maps for Idaho species of greatest conservation need. Idaho Conservation Data Center, Idaho Department of Fish and Game, Boise, Idaho. <http://fishandgame.idaho.gov/cms/tech/CDC/cwcs.cfm>.

- [IDFG, 2010.] Idaho Department of Fish and Game (IDFG). 2010. Bighorn sheep management plan 2010. Idaho Department of Fish and Game, Boise, Idaho..
- [IDFG & Nez Perce Tribe, 2014] Idaho Department of Fish and Game (IDFG) and Nez Perce Tribe. (2014). 2013 Idaho wolf monitoring progress report. Idaho Department of Fish and Game, Boise, Idaho; Nez Perce Tribe Wolf Recovery Project, Lapwai, Idaho..
- [Idaho Sage-grouse Advisory Committee (ISAC) 2006.] Idaho Sage-grouse Advisory Committee (ISAC). 2006. Conservation plan for the greater sage-grouse in Idaho. Idaho Department of Fish and Game..
- [Idaho State Conservation Effort, 1996] Idaho State Conservation Effort. (1996). Habitat conservation assessment and conservation strategy for the Idaho dunes tiger beetle. Report no. 7, Boise, Idaho..
- [Jurs & Sands, 2004] Jurs, L. and Sands, A. (2004). An Inventory, Assessment, and Recommended Management of Sagebrush Steppe Vegetation in Laidlaw Park, Little Park, and Paddelford Flat, Craters of the Moon National Monument and Preserve, Idaho. .
- [Kaltenecker et al. 2006] Kaltenecker, G.S., Moser, A.M., and Bond, L. 2006. Assessment of habitat for sagebrush steppe dependent birds at Craters of the Moon National Monument and Preserve. Idaho Bird Observatory, Boise State University, Boise, Idaho..
- [Keller & Saathoff, 1996] Keller, B. and Saathoff, R. T. (1996). A netting survey of water and cave areas used by bats at Craters of the Moon National Monument, Butte County, Idaho. Unpublished report from Idaho Museum of Natural History..
- [Kerlinger, 1995] Kerlinger, P. (1995). How Birds Migrate. Stackpole Books, Mechanicsburg, Pennsylvania..
- [Klebenow 1969] Klebenow, D. A. 1969. Sage-grouse nesting and brood habitat in Idaho. Journal of Wildlife Management 33:649-662..
- [Klemmedson & Smith, 1964] Klemmedson, J. O. and Smith, J. G. (1964). Cheatgrass (*Bromus tectorum* L.). Botanical Review. 30(2): 226-262..
- [Knick et al. 2003] Knick, S.T., Dobkin, D.S., Rotenberry, J.T., Schroeder, M.A., Vander Haegen, W.M., and Van Riper III, C. 2003. Teetering on the edge or too late? Conservation and research issues for avifauna of sagebrush habitats. Condor 105:611-634..
- Kuntz, Mel, Duane E. Champion, Elliott C. Spiker, Richard H. Lefebvre, and Lisa McBromme. (1996). The Great Rift and the Evolution of the Craters of the Moon Lava Field, Idaho..
- Kuntz, Mel, Betty Skipp, Duane E. Chamion, Philip B. Gans, D. Paco Van Sistine, and Scott R. Snyders. (2007). Geologic Map of the Craters of the Moon 30' X 60' Quadrangle, Idaho.
- [Laycock, 1967] Laycock, W. A. (1967). How Heavy Grazing and Protection Affect Sagebrush-Grass Ranges. Journal of Range Management, 20(4), 206-213. Retrieved from <http://www.jstor.org/stable/3896253>.
- [Laycock, 1979] Laycock, W. A. (1979). Management of Sagebrush. Rangelands, 1(5), 207-210. Retrieved from <http://www.jstor.org/stable/3900320>.

- [Lee, 2002] Lee, J. (2002). Personal communication..
- [Leu & Hanser, 2011] Leu, M., and S.E. Hanser. (2011). Influences of the human footprint on the sagebrush landscape patterns: implications for sage-grouse conservation. S.T. Knick and J.W. Connelly (editors). Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and its Habitats. Studies in Avian Biology, 38, 253–272. University of California Press, Berkeley, California..
- [Louter, 1992] Louter, D. (1992). Craters of the Moon National Monument: An Administrative History. National Park Service, Pacific Northwest Region. Seattle, Washington..
- [Magoun & Copeland, 1998] Magoun, A. J. and Copeland, J.P. (1998). Characteristics of wolverine reproductive den sites. Journal of Wildlife Management 62:1313-1320..
- [Makela and Major 2012] Makela, P., and Major, D. 2012. A framework to identify greater sage-grouse preliminary priority habitat and preliminary general habitat for Idaho. BLM Idaho State Office, Boise, Idaho..
- [Manier et al., 2013] Manier, D. J., Wood, D. J. A., Bowen, Z. H., Donovan, R., Holloran, M. J., Juliusson, L. M., and Mayne, K. S. (2013). Summary of science, activities, programs and policies that influence the rangewide conservation of greater sage-grouse (*Centrocercus urophasianus*). United States Geological Survey open-file report 2013-1098, Fort Collins, Colorado..
- [Marra et al. 2004] Marra, P., Griffing, S., Caffrey, C., Kilpatrick, A. M., McLean, R., Brand, C., Saito, E., Dupuis, A. P., Kramer, L., and Novak, R. (2004). West Nile Virus and Wildlife. BioScience, 54(5), 393-402. .
- [Meays, Laliberte, & Doescher, 2000] Meays, C. L., Laliberte, A. S., and Doescher, P. S. (2000). Defoliation Response of Bluebunch Wheatgrass and Crested Wheatgrass: Why We Cannot Graze These Two Species in the Same Manner. Rangelands, 22(6), 16-18. Retrieved from <http://www.jstory.org/stable/4001468>.
- [Mills 2007] Mills, L. S. 2007. Bridging applied population and ecosystem ecology with focal species concepts. Pp. 276-285 in Conservation of wildlife populations. Blackwell Publishing, Oxford, United Kingdom..
- [Morrison et al. 1998] Morrison, M.L., Marcot, B.M., and Mannan, R.W. 1998. Wildlife-habitat relationships: concepts and applications. University of Wisconsin Press, Madison, Wisconsin..
- [Moseley & Popovich, 1995] Moseley, R., Popovich, S. (1995). The Conservation Status of Picabo milkvetch (*Astragalus oniciformis* Barneby). Idaho Department of Fish and Game & Shoshone District Bureau of Land Management..
- [Mosley et al. 1997] Mosley, J.C., Cook, P.S., Griffis, A.J., O’Laughlin, J. 1997. Guidelines for managing cattle grazing in riparian areas to protect water quality: review of research and best management practices policy. Idaho Forest, Wildlife and Range Policy Analysis Group, Report no. 15..

- [Murphy, 2002] Murphy, C. (2002). The Conservation Status of *Phacelia inconspicua* (Obscure scorpion plant) in Idaho — an update. Idaho Department of Fish and Game & Upper Snake River District, Bureau of Land Management. .
- [Nader, Henkin, Smith, Ingram, & Narvaez, 2007] Nader, G., Henkin, Z., Smith, E., Ingram, R., and Narvaez, N. (2007). Planned Herbivory in the Management of Wildfire Fuels: Grazing Is Most Effective at Treating Smaller Diameter Live Fuels that Can Greatly Impact the Rate of Spread of a Fire along with the Flame Height. *Rangelands*, 29(5), 18–24. Retrieve from <http://www.jstor.org/stable/4640320> Accessed May 2014..
- [National Technical Team (NTT), 2011] National Technical Team (NTT). (2011). National greater sage-grouse conservation measures/planning strategy. U.S. Department of Interior Bureau of Land Management (USDI BLM)..
- [Natural Resource Conservation Service (NRCS), 2004] Natural Resource Conservation Service (NRCS). (2004). Understanding Soil Risks and Hazards: Using Soil Survey to Identify Areas with Risks and Hazards to Human Life and Property. National Soil Survey Center. Lincoln NE: USDA. Retrieved April 23, 2014 from http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052508.pdf.
- [NRCS, 2013] Natural Resource Conservation Service (NRCS), (2013). Web Soil Survey. USDA. Retrieved January 25, 2012 from <http://websoilsurvey.nrcs.usda.gov/>.
- [NatureServe, 2013] NatureServe. (2013). International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington VA, USA. Data current as of 12 July 2013..
- [North Magic Valley Sage-grouse Local Working Group (NMV LWG) 2009] North Magic Valley Sage-grouse Local Working Group (NMV LWG). 2009. Seasonal Habitat Mapping Methodology, Habitat Sub-committee..
- [Paige & Ritter, 1999] Paige, C. and S.A. Ritter. (1999). Birds in a sagebrush sea. Partners in Flight, Western Working Group..
- [Patterson 1952] Patterson, R. L. 1952. The sage-grouse in Wyoming. Sage Books, Denver, Colorado..
- [Peterson, 2003] Peterson, C. (2003). Personal communication..
- [Peterson, 1995] Peterson, J.G. (1995). Sagebrush: ecological implications of sagebrush manipulation. Montana Department of Fish, Wildlife and Parks, Helena, Montana..
- [Pitt 1986] Pitt, M. D. (1986). Assessment of Spring Defoliation to Improve Fall Forage Quality of Bluebunch Wheatgrass (*Agropyron spicatum*). *Journal of Range Management*, 39(2), 175-181. .
- [Platts 1991] Platts, W.S. 1991. Livestock grazing. Pages 389-423 in W.R. Meehan (ed.) Influences of forest and rangeland management on salmonid fishes and their habitat. American Fisheries Society, Special Publication 19, Bethesda, Maryland..
- [Popovich, 2006] Popovich, S. (October 2006). Checklist of Vascular Plants: Craters of the Moon National Monument and Preserve. Wildhorse Consulting, Idaho..

- [Rambo and Faeth 1999] Rambo, J.L., and Faeth, S.H. 1999. Effect of vertebrate grazing on plant and insect community structure. *Conservation Biology* 13:1047–1054..
- [Renfrew and Ribic 2003] Renfrew, R. B. and Ribic, C. A. (2003). Grassland Passerine Nest Predators Near Pasture Edges Identified on Videotape. *Auk*, 120(2), 371-383. .
- [Renfrew et al. 2005] Renfrew, R. B., Ribic, C. A., and Nack, J. L. (2005). Edge Avoidance by Nesting Grassland Birds: A Futile Strategy in a Fragmented Landscape. *Auk*, 122(2), 618-636. .
- [Rich, 1984] Rich, T. (1984). Mountain bluebird use of treeless lava flows for nest sites. *Western Birds* 15: 39-40..
- [Rimbey & Torrell, 2011] Rimbey, N. and Torrell, L.A. (July 2013). Grazing Costs: What's the Current Situation?, University of Idaho, 2011. Accessed at <http://web.cals.uidaho.edu/idahoagbiz/files/2013/01/GrazingCost2011.pdf>.
- [Sankey, Germino, & Glenn, 2009] Sankey, J.B., Germino, M.J., and Glenn, N.F. (2009). Aeolian sediment transport following wildfire in sagebrush steppe. *Journal of Arid Environments*. V. 73:912-919..
- [Sather-Blair et al. 2000] SATHER-BLAIR, S., P.MAKELA, T. CARRIGAN AND L. ANDERSON. 2000. A Framework to Assist in Making Sensitive Species Habitat Assessment for BLM-Administered Public Lands in Idaho. Idaho Bureau of Land Management. Unpublished report. .
- [Schroeder et al., 2004] Schroeder, M. A., Aldridge, C. L., Apa, A. D., Bohne, J. R., Braun, C. E., Bunnell, S. D., Connelly, J. W., Deibert, P. A., Gardner, S. C., Hilliard, M. A., Kobriger, G. D., McAdam, S.M., McCarthy, C.W., McCarthy, J. J., Mitchell, D. L., Rickerson, E. V., and Stiver, S. J. (2004). Distribution of sage-grouse in North America. *Condor* 106:363-376..
- [Shariff, Biondini, & Grygiel, 1994] Shariff, A. R., Biondini, M. E., and Grygiel, C. E. (1994). Grazing Intensity Effects on Litter Decomposition and Soil Nitrogen Mineralization. *Journal of Range Management*. 47(6), 444–449. Allen Press & Society for Range Management. <http://www.jstor.org/stable/4002994>.
- [Smithsonian Institute, 2003] Smithsonian Institute. (2003). Museum records of the National Museum of Natural History at the Smithsonian Institute, Washington D.C..
- [Soil Conservation Service, 1993] Soil Survey Division Staff. (1993). Soil survey manual. Ch. 3. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps.portal/nrcs/detail/soils/planners/&cid=nrcs142p2_054262.
- [State of Idaho, 2001] State of Idaho. (2001). Noxious Weeds Rules. Idaho Administrative Code. Department of Agriculture. IDAPA 02.06.22.
- [Stevens 2011] Stevens, B.S. 2011. Impacts of fences on greater sage-grouse in Idaho: collision, mitigation, and spatial ecology. Thesis. University of Idaho..
- [Stevens et al. 2012] Stevens, B. S., J. W. Connelly, and K. P. Reese. 2012. "Multi-scale assessment of Greater Sage-Grouse fence collision as a function of site and broad scale factors." *Journal of Wildlife Management*. 76:1370-1380. .

- [Stiver et al. 2010] Stiver, S.J., Rinkes, E.T., and Naugle, D.E. 2010. Sage-grouse habitat assessment framework. U.S. Bureau of Land Management. Unpublished report. Idaho State Office, Boise, Idaho..
- [Stiver et al. in press] Stiver, S.J., Rinkes, E.T., and Naugle, D.E. Sage-grouse habitat assessment framework. U.S. Bureau of Land Management. In press. Idaho State Office, Boise, Idaho..
- [Strand & Launchbaugh, 2013] Strand, Eva K. and Launchbaugh, K.L. (April 2013). Livestock Grazing Effects on Fuel Loads for Wildland Fire in Sagebrush Dominated Ecosystems. Great Basin Fire Science Delivery Report..
- [Tisdale, Hironaka, & Fosberg, 1965] Tisdale, E. W., Hironaka, M., and Fosberg, M.A. (May 1965). An Area of Pristine Vegetation in Craters of the Moon National Monument, Idaho. *Ecology*, Vol. 46, No. 3, pp. 349–352. Ecological Society of America. <http://www.jstor.org/stable/1936343>.
- [Torell et al., 2002] Torell, L. A., Tanaka, J. A., Rimbey, N., Darden, T., Van Tassell, L., and Harp, A. (2002). Ranch-Level impacts of changing grazing policies on BLM land to protect the greater sage-grouse: evidence from Idaho, Nevada and Oregon (Policy Paper SG-01-02). Caldwell, ID, USA: Policy Analysis Center for Western Public Lands..
- [Trimble, 1989] Trimble, S. (1989). *The Sagebrush Ocean*. University of Nevada Press, Reno, Nevada..
- [University of Idaho Extension Enterprise Budgets, 2014] University of Idaho Extension Enterprise Budgets. <http://web.cals.uidaho.edu/idahoagbiz/enterprise-budgets/>, accessed April 2014.
- [U.S. Department of Agriculture (USDA), 2014] U.S. Department of Agriculture (USDA). National Agricultural Statistics Service Data. http://www.nass.usda.gov/Statistics_by_State/, accessed April 2014.
- [USDI 2006] U.S. Department of the Interior (USDI). 2006. Riparian area management: grazing management processes and strategies for riparian-wetland areas. Technical reference 1737-20. BLM/ST/ST-06/002+1737. Bureau of Land Management, National Science and Technology Center, Denver, Colorado..
- [USDI BLM 1997] U.S. Department of the Interior, Bureau of Land Management (USDI BLM). 1997. Riparian area management: grazing management for riparian-wetland areas. USDO, Bureau of Land Management, BLM/RS/ST-97/002+1737, National Applied Resource Sciences Center, Denver, Colorado..
- [USDI BLM 2010] U.S. Department of the Interior, Bureau of Land Management. 2010. Seasonal wildlife restrictions and procedures for processing requests for exceptions on public lands in Idaho. BLM Idaho State Office, Boise, Idaho..
- [USDI BLM 2012] U.S. Department of the Interior, Bureau of Land Management. 2012. Instruction memorandum no. 2012-043: greater sage-grouse interim management policies and procedures. Washington, D.C..

- [U.S. Department of the Interior, Bureaus of Land Management (USDI BLM), 2013] U.S. Department of the Interior, Bureau of Land Management Internal Data, WO IM 2013-084, 2013 Grazing Fee, Surcharge Rates, and Penalty for Unauthorized Grazing Use.
- [USDI BLM 2013] U.S. Department of the Interior, Bureau of Land Management. 2013. Instruction memorandum no. 2013-094: resource management during drought. Washington, D.C..
- [USDI BLM, 1980] U.S. Department of the Interior, Bureau of Land Management (USDI BLM). (1980). Great Rift Proposed Wilderness Final Environmental Impact Statement..
- [USDI BLM, 1997] U.S. Department of the Interior, Bureau of Land Management (USDI BLM). (1997). Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management. <http://www.blm.gov/pgdata/etc/medialib/blm/id/publications.Par.91993.File.dat/SGFinal.pdf>, accessed April 2014..
- [USDI BLM, 1999] U.S. Department of the Interior, Bureau of Land Management (USDI BLM). (1999). Utilization Studies and Residual Measurements. (Technical Reference 1734–3). National Applied Resource Sciences Center. Denver, CO: Bureau of Land Management. <http://web.nc.blm.gov/blmlibrary/techref.htm>, Accessed April 2014..
- [USDI BLM, 2006] U.S. Department of the Interior, Bureau of Land Management (USDI BLM). (2006). Riparian Area Management: Grazing Management Processes and Strategies for Riparian-Wetland Areas. (Technical Reference 1737-20). National Science and Technology Center. Denver, CO: Bureau of Land Management. doi:BLM/ST/ST-06/002+1737.
- [USDI BLM, 2011] U. S. Department of the Interior, Bureau of Land Management (USDI BLM). (2011, July 21). Final Supplementary Rules to Require the Use of Certified Noxious-Weed-Free Forage and Straw on Bureau of Land Management Lands in the State of Idaho. Federal Register, 76(140)..
- [USDI USFWS, 2010] U. S. Department of the Interior, U.S. Fish and Wildlife Service (USFWS). (2010). Federal register notice March 5, 2010. FWS-R6-ES-2010-0018 or MO 92210-0-0008-B2. Endangered and threatened wildlife and plants; 12-month findings for petitions to list the greater sage-grouse (*Centrocercus urophasianus*) as threatened or endangered..
- [USDI USFWS 2012] U.S. Department of the Interior, U.S. Fish and Wildlife Service (USDI USFWS). 2012. Greater sage-grouse (*Centrocercus urophasianus*) conservation objectives: draft report. Denver, Colorado..
- [USDI USFWS, 2013] U. S. Department of the Interior, U.S. Fish and Wildlife Service (USFWS). (2013). Greater sage-grouse (*Centrocercus urophasianus*) conservation objectives: final report. U.S. Fish and Wildlife Service, Denver, Colorado..
- [USDI NPS, 2003] U.S. Department of the Interior, National Park Service (USDI NPS). (April 2003). Interim final guidance on assessing impacts and impairment to natural resources. Natural Resource Program..

- [U.S. Department of Commerce, Bureau of Economic Analysis (USDC BEA), 2012] U.S. Department of Commerce (USDC), Bureau of Economic Analysis, Regional Economic Information System. (2012). Tables CA05, CA05N, & CA45. Washington, D.C. .
- [U.S. Geological Survey, Gap Analysis Program (USGS GAP), 2011] U.S. Geological Survey, Gap Analysis Program (USGS GAP). (2011). National Land Cover, Version 2..
- [Valone, Meyer, Brown, & Chew, 2002] Valone, T. J., Meyer, M., Brown, J. H., and Chew, R. M. (2002). Timescale of Perennial Grass Recovery in Desertified Arid Grasslands Following Livestock Removal. *Conservation Biology*, 16(4), 995-1002..
- [Wambolt and Payne 1986] Wambolt, C. L., and G. F. Payne. 1986. An 18-year comparison of control methods for Wyoming big sagebrush in southwestern Montana. *Journal of Range Management* 39:314-319..
- [Welch et al. 1988] Welch, B. L., J. C. Pederson, and R. L. Rodriquez. 1988. Selection of big sagebrush by sage-grouse. *Great Basin Naturalist* 48:274-279..
- [Welch et al. 1991] Welch, B. L., F. J. Wagstaff, and J. A. Roberson. 1991. Preference of wintering sage-grouse for big sagebrush. *Journal of Range Management* 44:462-465..
- [Westenskow-Wall et al. 1994] Westenskow-Wall, K. J., Krueger, W. C., Bryant, L. D., and Thomas, D. R. (1994). Nutrient Quality of Bluebunch Wheatgrass Regrowth on Elk Winter Range in Relation to Defoliation. *Journal of Range Management*, 47, 240-244. .
- [Whisenant, 1990] Whisenant, S. G. (November 1990). Changing Fire Frequencies on Idaho's Snake River Plains: Ecological and Management Implications. Proceedings — Symposium on Cheatgrass Invasion, Shrub Die-off, and Other Aspects of Shrub Biology and Management. (General Technical Report INT-276). USDA Forest Service..
- [Whittington and Allen 2008] Whittington, D.M., and Allen, G.T. 2008. Draft guidelines for raptor conservation in the western United States. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C..
- [Whipple, 1992] Whipple, J. (1992). Review of Herbarium Plant List. Crater of the Moon Herbarium..
- [Wilkins et al. 2003] Wilkins, R. N., R. D. Brown, R. J. Conner, J. Engle, C. Gilliland, A. Hays, R. D. Slack, and D. W. Steinbach. 2003. Fragmented lands: Changing land ownership in Texas. Texas A&M University, College Station. .
- [Williams, 2002] Williams, R. (2002). U.S. Department of Agriculture, Wildlife Services, Arco, Idaho. Personal communication..
- [Williams et al. 2009] Williams, B.K., Szaro R.C., and Shapiro, C.D. 2009. Adaptive management: the U.S. Department of the Interior technical guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, D.C..
- [Yingst & Handy, 1961] Yingst, D. and Handy, H. M. (1961). Research Island? Our Public Lands. *Bureau of Land Management*. 11(1)..

Appendix A. Common and Scientific Names of Plant and Animal Species Occurring at Craters of the Moon National Monument and Preserve

Table A.1. Common and Scientific Names of Plant and Animal Species Occurring at Craters of the Moon National Monument & Preserve

Type	Common Name	Scientific Name
Trees	Limber Pine	<i>Pinus flexilis</i>
	Quaking aspen	<i>Populus tremuloides</i>
	Douglas-fir	<i>Pseudotsuga menziesii</i>
	Juniper	<i>Juniperus</i> spp.
	Black cottonwood	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>
	Chokecherry	<i>Prunus virginiana</i>
	Willow	<i>Salix</i> spp.
	Alder	<i>Alder</i> spp.
	Shrubs	Mountain big sagebrush
Low sagebrush		<i>Artemisia arbuscula</i>
Mountain snowberry		<i>Symphoricarpos oreophilus</i>
Basin big sagebrush		<i>Artemisia tridentata</i> ssp. <i>tridentata</i>
Wyoming big sagebrush		<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>
Threetip sagebrush		<i>Artemisia tripartita</i>
Antelope bitterbrush		<i>Purshia tridentata</i>
Rubber rabbitbrush		<i>Ericameria nauseosa</i>
Yellow rabbitbrush		<i>Chrysothamnus viscidiflorus</i>
Desert sweet		<i>Chamaebatiaria millefolium</i>
Rockspirea		<i>Holodiscus dumosus</i>
Lewis' mock orange		<i>Philadelphus lewisii</i>
Grasses and Grasslike Plants		Sandberg bluegrass
	Idaho fescue	<i>Festuca idahoensis</i>
	Needle-grasses	<i>Achnatherum/Hesperostipa</i> spp.
	Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>
	Cheatgrass	<i>Bromus tectorum</i>
	Crested wheatgrass	<i>Agropyron cristatum</i>
	Siberian wheatgrass	<i>Agropyron fragile</i>
	Snake River wheatgrass	<i>Elymus wawawaiensis</i>
	tall wheatgrass	<i>Thinopyrum ponticum</i>
	Sherman's big bluegrass	<i>Poa ampla</i>
	Western wheatgrass	<i>Pascopyrum smithii</i>
Forbs	Buckwheats	<i>Eriogonum</i> spp.
	Arrowleaf balsamroot	<i>Balsamorhiza sagittata</i>
	Lupine	<i>Lupinus</i> spp.
	Phlox	<i>Phlox</i> spp.
	Milkvetch	<i>Astragalus</i> spp.
	Flax	<i>Linum</i> spp.
	Sainfoin	<i>Onobrychis viciifolia</i>
	Scarlet globemallow	<i>Sphaeralcea coccinea</i>
	Alfalfa	<i>Medicago sativa</i>
Penstemon	<i>Penstemon</i> spp.	

Type	Common Name	Scientific Name
	Sticky cinquefoil	<i>Potentilla glandulosa</i>
	Hidden phacelia°	<i>Phacelia inconspicua</i>
	Mourning milkvetch°	<i>Astragalus atratus</i> var. <i>inseptus</i>
	Meadow pussytoes°	<i>Antennaria arcuata</i>
	Picabo milkvetch°	<i>Astragalus oniciformis</i>
	Spotted knapweed*	<i>Centaurea stoebe</i>
	Diffuse knapweed*	<i>Centaurea diffusa</i>
	Russian knapweed*	<i>Acroptilon repens</i>
	Rush skeletonweed*	<i>Chondrilla juncea</i>
	Leafy spurge*	<i>Euphorbia esula</i>
	Canada thistle*	<i>Cirsium arvense</i>
	Musk thistle*	<i>Carduus nutans</i>
	Scotch thistle*	<i>Onopordum acanthium</i>
	Dalmation toadflax*	<i>Linaria dalmatica</i>
	Dyer's woad*	<i>Isatis tinctoria</i>
	Field bindweed*	<i>Convolvulus arvensis</i>
Amphibians	Western toad	<i>Bufo boreas</i>
	Boreal chorus frog	<i>Pseudacris maculate</i>
	Pacific tree frog	<i>Pseudacris regilla</i>
	Great Basin spadefoot	<i>Spea intermontana</i>
Birds	Cooper's hawk +	<i>Accipiter cooperii</i>
	Northern goshawk +	<i>Accipiter gentilis</i>
	Sharp-shinned hawk +	<i>Accipiter striatus</i>
	Spotted sandpiper +	<i>Acitis macularia</i>
	Western grebe +	<i>Aechmophorus occidentalis</i>
	Northern saw-whet owl +	<i>Aegolius acadicus</i>
	White-throated swift +	<i>Aeronautes saxatalis</i>
	Red-winged blackbird +	<i>Agelaius phoeniceus</i>
	Chukar	<i>Alectoris chukar</i>
	Grasshopper sparrow +	<i>Ammodramus savannarum</i>
	Sagebrush sparrow +	<i>Amphispiza belli</i>
	Black-throated sparrow +	<i>Amphispiza bilineata</i>
	Northern pintail +	<i>Anas acuta</i>
	American wigeon +	<i>Anas americana</i>
	Northern shoveler +	<i>Anas clypeata</i>
	Green-winged teal +	<i>Anas crecca</i>
	Cinnamon teal +	<i>Anas cyanoptera</i>
	Blue-winged teal +	<i>Anas discors</i>
	Mallard +	<i>Anas platyrhynchos</i>
	Gadwall +	<i>Anas strepera</i>
	American pipet +	<i>Anthus rubescens</i>
	Golden eagle +	<i>Aquila chrysaetos</i>
	Black-chinned hummingbird +	<i>Archilochus alexandri</i>
	Great blue heron +	<i>Ardea herodias</i>
	Short-eared owl +	<i>Asio flammeus</i>
	Long-eared owl +	<i>Asio otus</i>
	Western burrowing owl +	<i>Athene cunicularia</i>
	Lesser scaup +	<i>Aythya affinis</i>
	Redhead +	<i>Aythya americana</i>
	Ring-necked duck +	<i>Aythya collaris</i>
	Canvasback +	<i>Aythya valisineria</i>
	Cedar waxwing +	<i>Bombycilla cedrorum</i>
	Bohemian waxwing +	<i>Bombycilla garrulus</i>

Type	Common Name	Scientific Name
	Ruffed grouse	<i>Bonasa umbellus</i>
	Canada goose +	<i>Branta canadensis</i>
	Great horned owl +	<i>Bubo virginianus</i>
	Bufflehead +	<i>Bucephala albeola</i>
	Common goldeneye +	<i>Bucephala clangula</i>
	Red-tailed hawk +	<i>Buteo jamaicensis</i>
	Rough-legged hawk +	<i>Buteo lagopus</i>
	Ferruginous hawk +	<i>Buteo regalis</i>
	Swainson's hawk +	<i>Buteo swainsonii</i>
	Lark bunting +	<i>Calamospiza melanocorys</i>
	Common redpoll +	<i>Carduelis flammea</i>
	Hoary redpoll +	<i>Carduelis hornemanni</i>
	Pine siskin +	<i>Carduelis pinus</i>
	American goldfinch +	<i>Carduelis tristis</i>
	Cassin's finch +	<i>Carpodacus cassinii</i>
	House finch +	<i>Carpodacus mexicanus</i>
	Turkey vulture +	<i>Cathartes aura</i>
	Hermit thrush +	<i>Catharus guttas</i>
	Swainson's thrush +	<i>Catharus ustulatus</i>
	Greater sage-grouse	<i>Centrocercus urophasianus</i>
	Brown creeper +	<i>Certhia americana</i>
	Belted kingfisher +	<i>Ceryle alcyon</i>
	Killdeer +	<i>Charadrius vociferus</i>
	Snow goose +	<i>Chen caerulescens</i>
	Black tern +	<i>Chlidonias niger</i>
	Lark sparrow +	<i>Chondestes grammacus</i>
	Common nighthawk +	<i>Chordeiles minor</i>
	American dipper +	<i>Cinclus mexicanus</i>
	Northern harrier +	<i>Circus cyaneus</i>
	Marsh wren +	<i>Cistothorus palustris</i>
	Evening grosbeak +	<i>Coccothraustes vespertinus</i>
	Northern flicker +	<i>Colaptes auratus</i>
	Band-tailed pigeon +	<i>Columba fasciata</i>
	Rock pigeon	<i>Columba livia</i>
	Olive-sided flycatcher +	<i>Contopus cooperi</i>
	Western wood-pewee +	<i>Contopus sordidulus</i>
	American crow +	<i>Corvus brachyrhynchos</i>
	Common raven +	<i>Corvus corax</i>
	Stellar's jay +	<i>Cyanocitta stelleri</i>
	Tundra swan +	<i>Cygnus columbianus</i>
	Blue grouse	<i>Dendragapus obscurus</i>
	Yellow-rumped warbler +	<i>Dendroica coronata</i>
	Yellow warbler +	<i>Dendroica petechia</i>
	Townsend's warbler +	<i>Dendroica townsendii</i>
	Bobolink +	<i>Dolichonyx oryzivorus</i>
	Gray catbird +	<i>Dumetella carolinensis</i>
	Hammond's flycatcher +	<i>Empidonax hammondi</i>
	Dusky flycatcher +	<i>Empidonax oberholseri</i>
	Cordilleran flycatcher +	<i>Empidonax occidentalis</i>
	Willow flycatcher +	<i>Empidonax traillii</i>
	Gray flycatcher +	<i>Empidonax wrighti</i>
	Horned lark +	<i>Eremophilla alpestris</i>
	Brewer's blackbird +	<i>Euphagus cyanocephalus</i>

Type	Common Name	Scientific Name
	Merlin +	<i>Falco columbarius</i>
	Prairie falcon +	<i>Falco mexicanus</i>
	Peregrine falcon +	<i>Falco peregrinus</i>
	Gyr falcon +	<i>Falco rusticolus</i>
	American kestrel +	<i>Falco sparverius</i>
	American coot +	<i>Filica americana</i>
	Wilson's snipe +	<i>Gallinago gallinago</i>
	Sandhill crane +	<i>Grus canadensis</i>
	Pinyon jay +	<i>Gymnorhinus cyanocephalus</i>
	Bald eagle +	<i>Haliaeetus leucocephalus</i>
	Barn swallow +	<i>Hirunda rustica</i>
	Yellow-breasted chat +	<i>Icteria virens</i>
	Bullock's oriole +	<i>Icterus bullockii</i>
	Varied thrush +	<i>Ixoreus naevius</i>
	Dark-eyed junco +	<i>Junco hyemalis</i>
	Northern shrike +	<i>Lanius excubitor</i>
	Loggerhead shrike +	<i>Lanius ludovicianus</i>
	Herring gull +	<i>Larus argentatus</i>
	California gull +	<i>Larus californicus</i>
	Ring-billed gull +	<i>Larus delawarensis</i>
	Franklin's gull +	<i>Larus pipixan</i>
	Black rosy-finch +	<i>Leucosticte atrata</i>
	Gray-crowned rosy-finch +	<i>Leucosticte tephrocotis</i>
	Long-billed dowitcher +	<i>Limnodromus scolopaceus</i>
	Red crossbill +	<i>Loxia curvirostra</i>
	Western screech owl +	<i>Megascops kennicottii</i>
	Red-headed woodpecker +	<i>Melanerpes erythrocephalus</i>
	Lewis's woodpecker +	<i>Melanerpes lewis</i>
	Lincoln's sparrow +	<i>Melospiza lincolni</i>
	Song sparrow +	<i>Melospiza melodia</i>
	Brown-headed cowbird +	<i>Molothrus ater</i>
	Townsend's solitaire +	<i>Myadestes townsendi</i>
	Ash-throated flycatcher +	<i>Myiarchus cinerascens</i>
	Clark's nutcracker +	<i>Nucifraga columbiana</i>
	Long-billed curlew +	<i>Numenius americanus</i>
	Whimbrel +	<i>Numenius phaeopus</i>
	Snowy owl +	<i>Nyctea scandiaca</i>
	MacGillivray's warbler +	<i>Oporornis tolmiei</i>
	Sage thrasher +	<i>Orreoscoptes montanus</i>
	Ruddy duck +	<i>Oxyura jamaicensis</i>
	Osprey +	<i>Pandion haliaetus</i>
	House sparrow	<i>Passer domesticus</i>
	Savannah sparrow +	<i>Passerculus sandwichensis</i>
	Lazuli bunting +	<i>Passerina amoena</i>
	Fox sparrow +	<i>Passerlla iliaca</i>
	American white pelican +	<i>Pelecanus erythrorhynchos</i>
	Gray partridge +	<i>Perdix perdix</i>
	Cliff swallow +	<i>Petrochelidon pyrrhonota</i>
	Common poorwill +	<i>Phalaenoptilus</i>
	Wilson's phalarope +	<i>Phalaropus tricolor</i>
	Ring-necked pheasant	<i>Phasianus colchicus</i>
	Black-headed grosbeak +	<i>Pheucticus melanocephalus</i>
	Black-billed magpie +	<i>Pica hudsonia</i>

Type	Common Name	Scientific Name
	Downy woodpecker +	<i>Picoides pubescens</i>
	Hairy woodpecker +	<i>Picoides villosus</i>
	Pine grosbeak +	<i>Pinicola enucleator</i>
	Green-tailed towhee +	<i>Pipilo chlorurus</i>
	Spotted towhee +	<i>Pipilo maculatus</i>
	Western tanager +	<i>Piranga ludoviciana</i>
	Snow bunting +	<i>Plectrophenax nivalis</i>
	White-faced ibis +	<i>Plegadis chihi</i>
	Eared grebe +	<i>Podiceps nigricollis</i>
	Pied-billed grebe +	<i>Podilymbus podiceps</i>
	Black-capped chickadee +	<i>Poecile atricapilla</i>
	Mountain chickadee +	<i>Poecile gambeli</i>
	Blue-gray gnatcatcher +	<i>Poliotilta caerulea</i>
	Vesper sparrow +	<i>Pooecetes gramineus</i>
	Sora +	<i>Porzana carolina</i>
	Common grackle +	<i>Quiscalus quiscula</i>
	Virginia rail +	<i>Rallus limicola</i>
	American avocet +	<i>Recurvirostra americana</i>
	Ruby-crowned kinglet +	<i>Regulus calendula</i>
	Golden-crowned kinglet +	<i>Regulus satrapa</i>
	Rock wren +	<i>Salpinctes obsoletus</i>
	Say's phoebe +	<i>Sayornis saya</i>
	Northern waterthrush +	<i>Seiurus noveboracensis</i>
	Broad-tailed hummingbird +	<i>Selasphorus platycercus</i>
	Rufous hummingbird +	<i>Selasphorus rufus</i>
	American redstart +	<i>Setophaga ruticilla</i>
	Mountain bluebird +	<i>Sialia currucoides</i>
	Western bluebird +	<i>Sialia mexicana</i>
	Red-breasted nuthatch +	<i>Sitta canadensis</i>
	White-breasted nuthatch +	<i>Sitta carolinensis</i>
	Red-naped sapsucker +	<i>Sphyrapicus nuchallis</i>
	Williamson's sapsucker +	<i>Sphyrapicus thryoides</i>
	Brewer's sparrow +	<i>Spizella breweri</i>
	Chipping sparrow +	<i>Spizella passerina</i>
	Northern rough-winged swallow +	<i>Stelgidopteryx serripennis</i>
	Calliope hummingbird +	<i>Stellula calliope</i>
	Forster's tern +	<i>Sterna forsteri</i>
	Western meadowlark +	<i>Sturnella neglecta</i>
	European starling	<i>Sturnus vulgaris</i>
	Tree swallow +	<i>Tachycineta bicolor</i>
	Violet-green swallow +	<i>Tachycineta thalassina</i>
	Brown thrasher +	<i>Toxostoma rufum</i>
	House wren +	<i>Troglodytes aedon</i>
	Winter wren +	<i>Troglodytes troglodytes</i>
	American robin +	<i>Turdus migratorius</i>
	Eastern kingbird +	<i>Tyrannus tyrannus</i>
	Western kingbird +	<i>Tyrannus verticalis</i>
	Orange-crowned warbler +	<i>Vermivora celata</i>
	Tennessee warbler +	<i>Vermivora peregrina</i>
	Nashville warbler +	<i>Vermivora ruficapilla</i>
	Cassin's vireo +	<i>Vireo cassinii</i>
	Warbling vireo +	<i>Vireo gilvus</i>
	Plumbeous vireo +	<i>Vireo plumbeus</i>

Type	Common Name	Scientific Name
	Wilson's warbler +	<i>Wilsonia pusilla</i>
	Yellow-headed blackbird +	<i>Xanthocephalus xanthocephalus</i>
	Mourning dove +	<i>Zenaida macroura</i>
	White-throated sparrow +	<i>Zonotrichia albicollis</i>
	Golden-crowned sparrow +	<i>Zonotrichia atricapilla</i>
	White-crowned sparrow +	<i>Zonotrichia leucophrys</i>
Mammals	Moose	<i>Alces alces</i>
	Pronghorn	<i>Antilocapra americana</i>
	Pallid bat	<i>Antrozous pallidus</i>
	Pygmy rabbit	<i>Brachylagus idahoensis</i>
	Coyote	<i>Canis latrans</i>
	Gray wolf	<i>Canis lupus</i>
	Beaver	<i>Castor canadensis</i>
	Elk	<i>Cervus elephas</i>
	Townsend's big-eared bat	<i>Corynorhinus townsendii</i>
	Ord's kangaroo rat	<i>Dipodomys ordii</i>
	Big brown bat	<i>Eptesicus fuscus</i>
	Porcupine	<i>Erethizon dorsatum</i>
	Mountain lion	<i>Felis concolor</i>
	Sagebrush vole	<i>Lagurus curtatus</i>
	Snowshoe hare	<i>Lepus americanus</i>
	White-tailed jackrabbit	<i>Lepus californicus</i>
	Black-tailed jackrabbit	<i>Lepus townsendii</i>
	Bobcat	<i>Lynx rufus</i>
	Yellow-bellied marmot	<i>Marmota flaviventris</i>
	Striped skunk	<i>Mephitis mephitis</i>
	Long-tailed vole	<i>Microtus longicaudis</i>
	Montane vole	<i>Microtus montanus</i>
	Short-tailed weasel	<i>Mustela ermina</i>
	Long-tailed weasel	<i>Mustela frenata</i>
	California myotis	<i>Myotis californicus</i>
	Long-eared myotis	<i>Myotis evotis</i>
	Small-footed myotis	<i>Myotis leibii</i>
	Little brown myotis	<i>Myotis lucifugus</i>
	Fringed myotis	<i>Myotis thysanodes</i>
	Long-legged myotis	<i>Myotis volans</i>
	Bushy-tailed woodrat	<i>Neotoma cinerea</i>
	Pika	<i>Ochotona princeps</i>
	Mule deer	<i>Odocoileus hemionus</i>
	Muskrat	<i>Ondatra zibethicus</i>
	Great Basin pocket mouse	<i>Perognathus parvus</i>
	Deer mouse	<i>Peromyscus maniculatus</i>
	Heather vole	<i>Phenacomys intermedius</i>
	Raccoon	<i>Procyon lotor</i>
	Western harvest mouse	<i>Reithrodontomys megalotis</i>
	Merriam's shrew	<i>Sorex merriami</i>
	Dusky shrew	<i>Sorex monticolus</i>
	Vagrant shrew	<i>Sorex vagrans</i>
	Columbian ground squirrel	<i>Spermophilus columbianus</i>
	Golden-mantled ground squirrel	<i>Spermophilus lateralis</i>
	Piute ground squirrel	<i>Spermophilus mollis</i>
	Western spotted skunk	<i>Spilogale gracilis</i>
	Mountain cottontail	<i>Sylvilagus nuttallii</i>

Type	Common Name	Scientific Name
	Yellow-pine chipmunk	<i>Tamias amoenus</i>
	Least chipmunk	<i>Tamias minimus</i>
	Red squirrel	<i>Tamiasciurus hudsonicus</i>
	Badger	<i>Taxidea taxus</i>
	Northern pocket gopher	<i>Thomomys talpoides</i>
	Black bear	<i>Ursus americanus</i>
	Kit fox	<i>Vulpes macrotis</i>
	Red fox	<i>Vulpes vulpes</i>
	Western jumping mouse	<i>Zapus princeps</i>
Reptiles	Rubber boa	<i>Charina bottae</i>
	Western yellow-bellied racer	<i>Coluber constrictor</i>
	Western rattlesnake	<i>Crotalus viridis</i>
	Western skink	<i>Eumeces skiltonianus</i>
	Longnose leopard lizard	<i>Gambelia wislizenii</i>
	Short-horned lizard	<i>Phrynosoma douglasii</i>
	Desert horned lizard	<i>Phrynosoma platyrhinos</i>
	Gopher snake	<i>Pituophis catenifer</i>
	Sagebrush lizard	<i>Sceloporus graciosus</i>
	Western terrestrial garter snake	<i>Thamnophis elegans</i>
*Noxious Weeds		
° Rare Plants		
+Species protected by the Migratory Bird Species Act		

This page intentionally
left blank

Appendix B. Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management (USDI BLM, 1997)

Idaho Standards for Rangeland Health

- **Standard 1 (Watersheds)**

Watersheds provide for the proper infiltration, retention, and release of water appropriate to soil type, vegetation, climate, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

- **Standard 2 (Riparian Areas and Wetlands)**

Riparian-wetland areas are in properly functioning condition appropriate to soil type, climate, geology, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

- **Standard 3 (Stream Channel/Floodplain)**

Stream channels and floodplains are properly functioning relative to the geomorphology (e.g. gradient, size, shape, roughness, confinement, and sinuosity) and climate to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

- **Standard 4 (Native Plant Communities)**

Healthy, productive, and diverse native animal habitat and populations of native plants are maintained or promoted as appropriate to soil type, climate, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

- **Standard 5 (Seedings)**

Rangelands seeded with mixtures, including predominately non-native plants, are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

- **Standard 6 (Exotic Plant Communities, other than Seedings)**

Exotic plant communities, other than seedings, will meet minimum requirements of soil stability and maintenance of existing native and seeded plants. These communities will be rehabilitated to perennial communities when feasible cost effective methods are developed.

- **Standard 7 (Water Quality)**

Surface and ground water on public lands comply with Idaho Water Quality Standards.

- **Standard 8 (Threatened and Endangered Plants and Animals)**

*Appendix B Idaho Standards for Rangeland
Health and Guidelines for Livestock Grazing
Management (USDI BLM, 1997)*

Habitats are suitable to maintain viable populations of threatened and endangered, sensitive, and other special status species.

Guidelines for Livestock Grazing Management

- Use grazing management practices and/or facilities to maintain or promote significant progress towards adequate amounts of ground cover (determined on an ecological site basis) to support infiltration, maintain soil moisture storage, and stabilize soils.
- Locate livestock management facilities away from riparian areas wherever they conflict with achieving or maintaining riparian-wetland functions.
- Use grazing management practices and/or facilities to maintain or promote soil conditions that support water infiltration, plant vigor, and permeability rates and minimize soil compaction appropriate to site potential.
- Implement grazing management practices that provide periodic rest or deferment during critical growth stages to allow sufficient regrowth to achieve and maintain healthy, proper functioning conditions, including good plant vigor and adequate vegetative cover appropriate to site potential.
- Maintain or promote grazing management practices that provide sufficient residual vegetation to improve, restore, or maintain healthy riparian-wetland functions and structure for energy dissipation, sediment capture, ground water recharge, streambank stability, and wildlife habitat appropriate to site potential.
- The development of springs, seeps, or other projects affecting water and associated resources shall be designed to protect the ecological functions, wildlife habitat, and significant cultural and historical/archaeological/paleontological values associated with the water source.
- Apply grazing management practices to maintain, promote, or progress toward appropriate stream channel and streambank morphology and functions. Adverse impacts due to livestock grazing will be addressed.
- Apply grazing management practices that maintain or promote the interaction of the hydrologic cycle, nutrient cycle, and energy flow that will support the appropriate types and amounts of soil organisms, plants, and animals appropriate to soil type, climate, and landform.
- Apply grazing management practices to maintain adequate plant vigor for seed production, seed dispersal, and seedling survival of desired species relative to soil type, climate, and landform.
- Implement grazing management practices and /or facilities that provide for complying with the Idaho Water Quality Standards.
- Use grazing management practices developed in recovery plans, conservation agreements, and Endangered Species Act, Section 7 consultations to maintain or improve habitat for federally listed threatened, endangered, and sensitive plants and animals.
- Apply grazing management practices and/or facilities that maintain or promote the physical and biological conditions necessary to sustain native plant populations and wildlife habitats in native plant communities.

- On areas seeded predominantly with non-native plants, use grazing management practices to maintain or promote the physical and biological conditions to achieve healthy rangelands.
- Where native communities exist, the conversion to exotic communities after disturbance will be minimized. Native species are emphasized for rehabilitating disturbed rangelands. Evaluate whether native plants are adapted, available, and able to compete with weeds or seeded exotics.
- Use non-native plant species for rehabilitation only in those situations where:
 1. native species are not readily available in sufficient quantities;
 2. native plant species cannot maintain or achieve the standards; or
 3. non-native plant species provide for management and protection of native rangelands.
- Include a diversity of appropriate grasses, forbs, and shrubs in rehabilitation efforts.
- On burned areas, allow natural regeneration when it is determined that populations of native perennial shrubs, grasses, and forbs are sufficient to revegetate the site. Rest burned or rehabilitated areas to allow recovery or establishment of perennial plant species.
- Carefully consider the effects of new management facilities (e.g., water developments, fences) on healthy and properly functioning rangeland prior to implementation.
- Use grazing management practices, where feasible, for wildlife control and to reduce the spread of targeted undesirable plants (e.g., cheatgrass, medusa head, wild rye, and noxious weeds) while enhancing vigor and abundance of desirable native or seeded species.
- Employ grazing management practices that promote natural forest regeneration and protect reforestation projects until the Idaho Forest Practices Act requirements for timber stand replacement are met.
- Design management fences to minimize adverse impacts, such as habitat fragmentation, to maintain habitat integrity and connectivity for native plants and animals.

This page intentionally
left blank

Appendix C. Greater Sage-Grouse Occupied Breeding Habitat Methodology on Craters of the Moon BLM National Monument Lands

The breeding period for greater sage-grouse in the Craters of the Moon National Monument and Preserve (the Monument) typically occurs from March 15 to June 15 (North Magic Valley Sage-grouse Local Working Group (NMV LWG) 2009). During this time, sage-grouse attend leks to breed, prepare nutritionally for nesting, nest, and raise young chicks (Connelly et al. 2000). Sagebrush cover types within 11 miles of a lek for migratory populations and 3 miles for non-migratory populations generally provide breeding habitat for sage-grouse (Stiver et al. 2010). The Monument appears to support both migratory and non-migratory sage-grouse populations (NMV LWG 2009).

Occupied breeding habitats for greater sage-grouse were mapped in the Monument using current data and knowledge by local sage-grouse experts. Sources used to identify occupied breeding areas included: observations by the North Magic Valley Sage-grouse Local Working Group and agency personnel, observations in land management and wildlife agency files, telemetry data, lek survey data, and vegetation maps. The extent of occupied breeding habitat was delineated based largely on the presence of sagebrush, occupied leks, and/or breeding sage-grouse observation data (primarily from telemetry studies). In general, areas within 3 miles of occupied leks were mapped as occupied breeding habitat. Occupied breeding habitat was also delineated in areas highly suspected of supporting sage-grouse nesting outside of the 3 mile lek buffer.

Specifically, we used GIS to overlay spatial data of sage-grouse occurrence and sagebrush communities in and adjacent to the Monument. We used the NMV LWG spatial data delineating breeding habitat across the west half of the Monument (NMV LWG 2009). We combined this data with areas within 3 miles of occupied leks (IDFG state-wide lek database 2012) in and adjacent to the Monument. GIS shapefiles of sage-grouse observations were also compiled from Idaho Fish and Game (IDFG) telemetry studies (Palmer 1991–1995, Lowe 2004–2006, IDFG/BLM 2012–2014), falconer GPS locations (King 2000–2008, Skinner 2007–2008, Greene 2008), and BLM and other agency observation data (BLM 1991–2013).

Observation and telemetry data points of sage-grouse were generally captured within the NMV LWG breeding habitat and the occupied lek buffers. Outlying areas containing sage-grouse observation data were also included in the occupied breeding habitat if the data was ≤ 10 years old (Stiver et al. 2010). Areas containing sage-grouse observation data > 10 years old remained identified as occupied breeding habitat if sagebrush cover was $\geq 5\%$. In addition, sagebrush and associated vegetation communities contiguous with areas of recent known use (≤ 10 years old), which did not have effective barriers to sage-grouse movement from known use areas, were considered occupied unless specific information existed that documented the lack of sage-grouse use (Stiver et al. 2010). Some of the mapped, occupied breeding areas do not currently provide suitable breeding habitat (e.g., Stiver et al. 2010) for sage-grouse due to plant structure characteristics, edaphic conditions, slope, aspect, or other factors. However, at the scale of the seasonal home range, these areas likely provide for the life-cycle activities of the local sage-grouse population.

Areas that were not delineated as occupied breeding habitat did not contain verified sage-grouse observations or recent lek activity. In addition, the non-delineated areas have burned numerous times over the past 20 years and generally do not provide suitable sagebrush cover for breeding activities. For example, portions of the NMV LWG breeding habitat map were removed from the map of occupied breeding habitat because these areas were not contiguous with areas of recent known use and sagebrush cover was < 5%. These areas may be incidentally used by sage-grouse during the breeding period and could provide adequate breeding habitat in the future; however, they likely do not currently support the local breeding population of sage-grouse.

Appendix D. Greater Sage-Grouse Habitat Assessment Framework

Assessing Site-Scale Habitat Suitability in the Craters of the Moon National Monument & Preserve ¹

Overview

Habitat assessments for greater sage-grouse were conducted on BLM lands in the Craters of the Moon National Monument and Preserve (the Monument) during the summers of 2012 and 2013. These data were used to characterize the suitability of areas for breeding, summer, and winter use by sage-grouse. Information regarding the protocols and project design can be reviewed in the text and appendices of the *BLM Sage-grouse Habitat Assessment Framework Manual* (Stiver et al., in press).

Based on extensive research in many western states, Connelly et al. (2000) developed and Hagen et al. (2007) refined habitat criteria or indicators required by sage-grouse for specific seasonal needs. Generalized seasonal habitats are characterized as occurring during breeding, summer, and winter. Breeding habitat provides for the life-cycle activities of lekking, pre-laying, nesting, and early brood-rearing. Summer habitat includes areas used by sage-grouse during late brood-rearing. Winter habitat describes areas used from late fall through winter, when sagebrush becomes increasingly important for food and cover. Connelly et al. (2000) provides extensive treatment of each of these seasonal ranges.

Seasonal habitat suitability matrices were based primarily on Connelly et al. (2000) because they used data collected across the species' range. Habitat indicators for sage-grouse within seasonal habitats included sagebrush canopy cover, sagebrush height, sagebrush shape, perennial grass and forb heights, perennial grass and forb canopy cover, and preferred forb availability. For the purpose of standardizing habitat descriptions, discrete ranges of numeric values or other measurements (e.g., visual site guides) were used to describe seasonal habitat indicators as suitable, marginal, or unsuitable (Sather-Blair et al. 2000).

There is a tendency to review each indicator and its suitability category independently, but site suitability is determined by the relationship among indicator values. The suitability expectations for these matrices are based on range-wide data, and the term "suitable" is not synonymous with "optimum." Although general criteria were recommended, Connelly et al. (2000) recognized that ecological site potential should also be considered at the site scale.

In general, suitable habitats provided the appropriate protective cover (sagebrush and herbaceous plants), food (forbs and sagebrush), and security (proximity of trees and tall structures for predators) needs for sage-grouse to survive and reproduce (Connelly et al. 2000, Sather-Blair et al. 2000). Marginal habitats included habitat components to support sage-grouse but habitat conditions were lower in quality compared to suitable habitats. It was assumed that survival rates and reproduction were lower in marginal habitats compared to suitable habitats (Cooperrider et al. 1986, Morrison et al. 1998). Unsuitable habitats were currently missing one or more of the basic life requisites of food or shelter, though they may have the potential to provide these life requisites in the future (Stiver et al. 2010).

Breeding Habitat

¹Distilled from Stiver et al. (2010)

In the Monument, breeding activities generally occur from March 15 to June 15. Leks can be found at a variety of locations but are generally located in relatively open areas adjacent to denser sagebrush cover. Such sites include meadows, openings created by fires or roads, areas of low sagebrush, windswept ridges, exposed knolls, or dry lake beds. Most leks are traditional and are used year after year (Patterson 1952, Connelly et al. 2004).

Productive nesting areas are typically characterized by sagebrush with an understory of native grasses and forbs, with horizontal and vertical structural diversity that provides an insect prey base, herbaceous forage for pre-laying and nesting hens, and cover for the hen while she is incubating (Gregg 1991, Connelly et al. 2000, Connelly et al. 2004). Sage-grouse also may use other shrub or bunchgrass species for nest sites (Klebenow 1969, Connelly et al. 2000, Connelly et al. 2004); however, nests under shrubs other than sagebrush are generally less successful (Connelly et al. 1991).

Shrub canopy and grass cover provide concealment for sage-grouse nests and chicks, which is critical for reproductive success (Gregg et al. 1994, DeLong et al. 1995, Connelly et al. 2004). Published vegetation characteristics of successful nest sites include a sagebrush canopy cover of 15-25%, sagebrush heights of 12-32 in (30-80 cm), and grass/forb cover of at least 7 in (18 cm) (Connelly et al. 2000; Table 1). Cover values for Sandberg bluegrass are not included in the cover estimate for perennial grasses due to the relatively low contribution the plant provides as concealment cover for sage-grouse nesting and early brood-rearing (Stiver et al., in press).

Table D.1. Breeding habitat life requisites, indicators, and suitability categories for site-scale habitat descriptions (adapted from Connelly et al. 2000, Sather-Blair et al. 2000, Hagen et al. 2007).

Life Requisite	Habitat Indicator	Suitable	Marginal	Unsuitable
Cover	Sagebrush Canopy Cover (%)	15 to 25	5 to < 15 or > 25	< 5
	Sagebrush Height: Mesic Site ¹ (in)	16 to 32	8 to < 16 or > 32	< 8
	Sagebrush Height: Arid Site (in)	12 to 32	8 to < 12 or > 32	< 8
	Sagebrush Shape	Spreading	Mix of spreading and columnar	Columnar
	Herbaceous Height (in)	≥ 7	4 to < 7	< 4
	Perennial Grass Cover: Mesic Site (%)	≥ 15	5 to < 15	< 5
Cover and Food	Perennial Grass Cover: Arid Site (%)	≥ 10	5 to < 10	< 5
	Forb Canopy Cover: Mesic Site (%)	≥ 10	5 to < 10	< 5
Food	Forb Canopy Cover: Arid Site (%)	≥ 5	3 to < 5	< 3
	Preferred Forb Availability ²	Preferred forbs are common with several species present	Preferred forbs are common but only a few preferred species are present	Preferred forbs are rare

¹ Mesic and arid sites were defined on a local basis; annual precipitation, herbaceous understory, and soils were considered (Connelly et al. 2000).

2 Relative to ecological site potential.

The numeric values described for productive habitat by Connelly et al. (2000) are guidelines and are not intended to be used as strict prescriptions (Stiver et al. 2010). Although sagebrush canopy cover is a crucial habitat indicator, the composition and percent cover of shrubs other than sagebrush can positively affect site suitability in certain circumstances. For example, sagebrush may only provide 10% canopy cover in a particular location, but antelope bitterbrush is also present with a canopy cover of 5%. Here, the density of bitterbrush positively affects the overall site suitability (Stiver et al. 2010). Conversely, areas with an excess canopy cover (25-35%) of three-tip sagebrush can also provide suitable nesting habitat, provided that forb abundance and grass cover are adequate relative to the site potential (Klebenow 1969, Dobkin 1995). Slopes > 40% generally do not provide suitable nesting habitat for sage-grouse (Idaho Sage-grouse Advisory Committee 2006), regardless of their vegetative characteristics. However, low sagebrush communities present on these sites provide important foraging habitat for adult sage-grouse year-round.

Summer Habitat

As sagebrush areas desiccate during late June and July, sage-grouse move to more mesic sites with succulent forbs (Connelly et al. 1988). Late summer brood-rearing habitat may include sagebrush, relatively small burned areas within sagebrush, wet meadows, farmland, and other irrigated areas adjacent to sagebrush communities. Proximity to taller sagebrush communities may be an important habitat indicator in some situations. For instance, some brood-rearing habitat occurs in forb-rich low sagebrush communities adjacent to big sagebrush communities. In other cases, the available forbs such as arrowleaf balsamroot may be providing additional cover in low sagebrush communities, especially for very young broods (< 21 days old). In the Monument, summer habitats are generally used by sage-grouse from June 16 to October 15. Late summer brood-rearing habitat generally overlaps early summer brood-rearing habitat, especially during years of above-average summer precipitation.

The indicators for upland summer habitats are similar to those described for breeding habitat, but the ranges for the suitability categories differ (Table 2). Here, the percent cover of sagebrush is less important than the total amount of cover provided by sagebrush and other shrubs, as well as mid-sized perennial bunchgrasses. The abundance and diversity of late-season upland forbs also contributes significantly to the value of summer habitats for sage-grouse.

Table D.2. Summer habitat life requisites, indicators, and suitability categories for upland sagebrush site-scale habitat descriptions (adapted from Connelly et al. 2000, Sather-Blair et al. 2000, Hagen et al. 2007).

Life Requisite	Habitat Indicator	Suitable	Marginal	Unsuitable
Cover	Sagebrush Canopy Cover (%)	10 to 25	5 to < 10 or > 25	< 5
	Sagebrush Height (in)	16 to 32	8 to < 16 or > 32	< 8
Cover and Food	Perennial Grass and Forb Canopy Cover (%)	≥ 15	5 to < 15	< 5
Food	Preferred Forb Availability ¹	Preferred forbs are common with several species present	Preferred forbs are common but only a few preferred species are present	Preferred forbs are rare

1 Relative to ecological site potential.**Winter Habitat**

Characteristics of wintering areas used by sage-grouse are relatively similar throughout the species' range (ISAC 2006). Sage-grouse generally select winter habitats based on topography, snow depth, and the availability of sagebrush above snow level (Table 3). Sage-grouse are known to forage on windblown ridges and south- and west-facing aspects during late fall and winter, in addition to lower-elevation areas of dense sagebrush (ISAC 2006) with heights of 10-12 in (25-30 cm) above the snow. Big sagebrush dominates the diet in most portions of the range (Patterson 1952, Welch et al. 1988, 1991), although low sagebrush and black sagebrush are consumed in many areas depending on availability. In the Monument, late fall and winter habitats are generally used by sage-grouse from October 16 to March 14.

Table D.3. Winter habitat life requisites, indicators, and suitability categories for site-scale habitat descriptions (adapted from Connelly et al. 2000, Sather-Blair et al. 2000, Hagen et al. 2007).

Life Requisite	Habitat Indicator	Suitable	Marginal	Unsuitable
Cover and Food	Sagebrush Canopy Cover (%)	≥ 10	5 to < 10	< 5
	Sagebrush Height Above Snow (in)	> 10	> 4 to < 10	≤ 4

Appendix E. Applicable Laws, Regulations, and Policies

The development of the Craters of the Moon National Monument and Preserve Management Plan Amendment will follow all applicable laws, regulations, and policies, including, but not limited to, those listed in the tables below. The ID Team will continue to refine this list throughout the planning process. For more detail on what is required by these documents, please refer to the original document.

Table E.1. Laws, Regulations, and Policies

Document Name	Requirements for Land Use Planning
Laws	
Antiquities Act of 1906 (16 USC 431-433)	Authorizes permit process for scientific study of paleontological remains on public land and establishes penalties to control unauthorized use.
Migratory Bird Treaty Act of 1918 (16 USC 703 <i>et seq.</i>)	Establishes Federal responsibility for the protection of international migratory bird resources. Requires the BLM to provide habitat and minimize impacts to a variety of migratory birds (songbirds, raptors, shorebirds, etc.): all water troughs and open water storage tanks need to be fitted with wildlife escape ramps that are properly maintained and functional to minimize the killing of songbirds, raptors, and other wildlife; and adequate residual nesting/wintering herbaceous cover needs to be provided for a variety migratory wildlife and to meet the needs of prey species for raptors.
Taylor Grazing Act of 1934, as amended (43 USC 315)	Establishes the authority for grazing administration on public land. Authorizes the establishment of grazing districts, regulation and administration of grazing on public lands, and improvement of the public rangelands. Directs the BLM to avoid injury; prevent overgrazing and soil deterioration on public lands; and provide for their orderly use, improvement, and development. Also authorizes the Secretary of Interior to accept contributions for the administration, protection, and improvement of grazing lands, and establishment of a trust fund to be used for these processes. Authorizes the BLM to continue to study erosion and flood control and to perform the work necessary to amply protect and rehabilitate such areas.
Sikes Act of 1960, as amended (16 USC 670 <i>et seq.</i>)	Provides for the conservation, restoration, and management of species and their habitats in cooperation with State wildlife agencies.
Water Resources Planning Act of 1962 (42 USC 1962 <i>et seq.</i>)	Encourages the conservation, development, and utilization of water and related resources of the United States on a comprehensive and coordinated basis by Federal, State, and local governments and private enterprise.
Wilderness Act of 1964 (16 USC 1131 <i>et seq.</i>)	Provides that the management of caves within designated wilderness is subject to regulations limiting the type of public and management activities that may occur.
Fish and Wildlife Coordination Act of 1965 (16 USC 661 <i>et seq.</i>)	Provides for wildlife conservation to be given equal consideration and coordination with other features of water resource development.

National Historic Preservation Act of 1966, as amended, (16 USC 470) in accordance with the National Programmatic Agreement*, the Idaho State Protocol Agreement, and implementing regulations 36 CFR 60 and 36 CFR 800	Provides BLM-specific policy and guidance for implementing cultural resource laws and regulations, directing BLM to consider the short- and long-term management of cultural resources. Requires Federal agencies, in consultation with the State Historic Preservation Officer, Native American Tribes, and other affected parties, to ensure that management actions do not inadvertently affect significant cultural resources. Requires agencies to actively inventory, monitor, and protect historic properties under their jurisdiction, including significant archaeological sites and traditional cultural properties; to cooperate with the Secretary, the Advisory Council on Historic Preservation, and other Federal and State agencies, local governments, and organizations and individuals to ensure that historic properties are taken into consideration at all levels of planning and development; and to the maximum extent possible, to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking. Requires the BLM to conduct government-to-government consultation with Tribes to identify tribally significant religious or cultural properties that may be eligible for the National Register of Historic Places.
National Trails System Act of 1968 (16 USC 1241-1251)	Directs the BLM to manage the Oregon National Historic Trail to identify and protect the historic route and its historic remnants and artifacts for public use and enjoyment.
National Environmental Policy Act of 1969 (42 USC 4321 <i>et seq.</i>)	Requires the preparation of environmental impact statements for Federal projects that may have significant effects on the environment. Requires systematic, interdisciplinary planning to ensure the integrated use of the natural and social sciences and the environmental design arts in making decisions about major Federal actions that may significantly affect the environment.
Clean Air Act of 1970, as amended (42 USC 7401 <i>et seq.</i>)	Requires the BLM to comply with all Federal, State, interstate, and local requirements, administrative authority, and processes and sanctions respecting the control and abatement of air pollution in the same manner, and to the same extent as any nongovernmental entity. Requires tribal consultation and intergovernmental coordination regarding smoke management.
Endangered Species Act of 1973 (16 USC 1531 <i>et seq.</i>)	Requires all Federal departments and agencies to conserve species listed by the Secretary of the Interior or Commerce as threatened or endangered and ensure the continued existence of listed species is not jeopardized and designated critical habitat of listed species is not destroyed or adversely modified. Requires consultation with the US Fish and Wildlife Service or National Marine Fisheries Service for all actions that may affected listed species or designated critical habitat or conference with the same agencies if actions are likely to jeopardize the continued existence of a proposed species or result in the destruction or adverse modification of proposed critical habitat.
Archeological and Historic Preservation Act of 1974 (16 USC 469)	Provides for the recovery and preservation of historical and archaeological data that might be lost as the result of a Federal construction project or a Federally assisted or licensed project.
Federal Noxious Weed Act of 1975 (7 USC 2801 <i>et seq.</i>)	Directs agencies to designate an office or person adequately trained in the management of undesirable plant species to develop and coordinate an undesirable plants management program, establish adequate funding, implement cooperative agreements with State agencies for management on undesirable plants, and establish integrated management systems to control or contain undesirable plant species.

<p>Federal Land Policy and Management Act of 1976, as amended (43 USC 1701 <i>et seq.</i>)</p>	<p>Provides for administration of public lands through the BLM and management of the public lands on a multiple use basis. Requires that the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource and archaeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide habitat for fish, wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use. Also requires that public lands be managed in a manner that recognizes the need for domestic sources of minerals, food, timber, and fiber from the public lands. Requires land use planning, including public involvement, and a continuing inventory of resources. Requires BLM to integrate physical, biological, economic, and other sciences in developing land use plans. Authorizes acquisition of land consistent with the mission of the Department and land use plans; compliance with pollution control laws, review of land classifications in land use planning; modification or termination of land classifications when consistent with land use plans; management of the use, occupancy, and development of the public lands through leases and permits. Requires the range betterment fund be spent on aquatic and terrestrial wildlife habitat where domestic livestock grazing occurs. Provides for the creation of Areas of Critical Environmental Concern. Mandates that the BLM give priority to the designation and protection of ACECs in the development and revision of land use plans.</p>
<p>Clean Water Act of 1977, as amended (30 USC 1251)</p>	<p>Provides for protection, restoration, or improvement of water quality, including riparian/wetland areas. Requires Federal agencies to coordinate with State water quality programs such as the Idaho DEQ Total Maximum Daily Load program during the planning process and adhere to State water quality standards and plans (i.e., Idaho Non-Point Source Management Program Plans and Idaho State Water Quality Standards).</p>
<p>Safe Drinking Water Act Amendments of 1977 (42 USC 201)</p>	<p>Requires compliance with all Federal, State, and local statutes for safe drinking water.</p>
<p>Soil and Water Resources Conservation Act of 1977 (16 USC 2001)</p>	<p>Provides for conservation, protection, and enhancement of soil, water, and related resources.</p>
<p>American Indian Religious Freedom Act of 1978 (42 USC 1996)</p>	<p>Requires the BLM to consult with Tribes and individuals, as appropriate, to ensure that management actions do not inadvertently interfere with traditional Indian religious beliefs or practices, including access to sacred sites.</p>
<p>Public Rangelands Improvement Act of 1978 (43 USC 1901 <i>et seq.</i>)</p>	<p>Provides that public rangelands be managed to become as productive as feasible for watershed protection, livestock grazing, wildlife habitat, and other rangeland values, in accordance with management guidelines and the land use planning process. Provides funding for rangeland improvements, including stabilizing soil and water conditions and providing habitat for livestock and wildlife. Provides for research of horse and burro population dynamics.</p>
<p>Migratory Bird Conservation Act of 1979, as amended (16 USC 715)</p>	<p>Provides for the acquisition of lands determined to be suitable as an inviolate sanctuary for migratory birds.</p>
<p>Archaeological Resources Protection Act of 1979, as amended (16 USC 470 <i>et seq.</i>); implementing regulations 43 CFR 7</p>	<p>Requires the BLM to conduct government-to-government consultation with the Tribes to identify tribal religious or cultural locations on public lands, which archaeological activities, if permitted, could harm or destroy and to consider protective terms and conditions that could be attached to a permit to protect tribal religious or cultural locations from harm or destruction. Ensures long-term protection of Federally managed archaeological resources, establishes a permit system to authorize the excavation and removal of archaeological materials by qualified professionals, and provides penalties for unauthorized damage to archaeological materials that are over 100 years old.</p>

Native American Graves Protection and Repatriation Act of 1990 (25 USC 301) and implementing regulations 43 CFR 10	Requires consultation with Tribal governments concerning permits for the excavation or removal of cultural items protected by the Act and for discoveries of protected items during land use activities.
Regulations and Departmental Guidance	
40 CFR 1500-1508	Provides CEQ guidance on implementing NEPA.
43 CFR 1600	Provides BLM's land use planning regulations.
43 CFR 1610.4, Resource Management Planning	Requires BLM to analyze social, economic, and institutional information
43 CFR 8340, Off-Road Vehicles	Establishes criteria for designating public lands as open, limited, or closed to the use of off-road vehicles and for establishing controls governing the use and operation of off-road vehicles in such areas.
50 CFR 400, Interagency Cooperation under the ESA	Provides consultation guidelines and procedures for Endangered Species Act consultation with the US Fish and Wildlife Service.
Secretarial Order 3602, American Indian Tribal Rights, Federal Tribal Trust Responsibilities, and the	Requires Interior agencies to consult with Indian Tribes when as a result of compliance with the Endangered Species Act, agency actions to protect a listed species affect or may affect Indian lands, Tribal trust resources, or the exercise of American Indian Tribal Rights. Consultation under this Order should be closely coordinated with regional or field offices of the US Fish and Wildlife Service and/or NOAA-Fisheries for game and non-game species.
BLM Manuals	
BLM Manual 1553, Planning and Creating Graphics	Provides guidance on graphic arts for publications.
BLM Manual 1610, Land Use Planning	Contains BLM policy for conducting land use planning activities.
BLM Manual 1613, ACECs	Provides policy and procedural guidance on the identification, evaluation, and designation of ACECs in the development, revision, and amendment of RMPs and amendments of management framework plans not yet replaced by RMPs.
BLM Manual 1737, Riparian and Wetland Management	Provides guidance for identification, protection, restoration, and maintenance of natural and manmade wetlands.
BLM Manual 1790, NEPA	Contains BLM policy for NEPA analyses and documents.
BLM Manual 4180, Rangeland Health Standards	Describes the authorities, objectives, and policies that guide the implementation of the Healthy Rangeland Initiative. Implementation will provide for the assessment of public land health, and for taking appropriate action to achieve, or make progress toward achieving, specified rangeland health standards.
BLM Manual 6500, Wildlife and Fisheries Management	Directs the BLM to ensure that big game/upland game species on the public lands are provided habitat of sufficient quantity and quality to sustain identifiable economic and/or social contributions to the American people. Directs the BLM to help perpetuate a diversity and abundance of waterfowl for the Nation by managing wetlands and other habitats on the public lands that are of importance to the maintenance of this international resource. Provides for management of wetlands on BLM lands to provide adequate water, retain functionality, create diverse native vegetation, and protect the associated water table from degradation. Requires the BLM to provide suitable habitat conditions for birds of prey on public lands through the conservation and management of essential habitat components, including habitat for prey species, especially in areas where birds of prey concentrate during some period of the year, or in important habitats where populations are suppressed.

BLM Manual 6521, State Agencies	Recognizes that State wildlife agencies have the authority to regulate wildlife harvest as well as set population goals for species. Directs BLM to provide adequate habitat to meet State wildlife agency population targets. Priority must be given to those introductions, release, trapping, and transplant actions intended to sustain threatened/endangered species and other animals that both agencies have mutually deemed of special interest.
BLM Manual 6600, Fish, Wildlife, and Special Status Plant Resources Inventory and Monitoring	Provides policy guidance for conducting inventory and monitoring of fish, wildlife, and special status plant resources.
BLM Manual 6840, Special Status Species Management	Provides policy guidance, consistent with appropriate laws, for the conservation of special status species of plant and animals, and the ecosystems upon which they depend. Provides for responsibility for conducting and maintaining current inventories for special status species on public lands. Requires that BLM implement management plans that conserve candidate species and their habitats and that ensure that actions authorized, funded, or carried out by the BLM do not contribute to the need for the species to become listed. The minimum level of protection required under BLM policy is to treat candidate and sensitive species as well as proposed species or proposed critical habitat as if it were listed as threatened or endangered or designated critical habitat.
BLM Manual 7000, Soil, Water, and Air Management	Provides policy guidance for the management of soil, water, and air resources and watershed values with BLM land administration.
BLM Manual 8120 and Handbook H-8210-1, Tribal Consultation under Cultural Resources	Provides policy and guidance on conducting government-to-government consultation with the Native American Tribes.
BLM Manual 8160, Native American Coordination and Consultation	Provides guidance for conducting Native American consultation.
BLM Manual 8300, Recreation Management	Provides policy guidance for recreation management, defines program goals and objectives, and provides a framework for recreation program development.
BLM Manual 8400-1, Visual Resource Management	Establishes visual resource management classes through the RMP process for all BLM-administered lands. Class boundaries are adjusted as necessary to reflect the resource allocation decisions made in RMPs. Visual management objectives are established for each class.
BLM Manual 9211, Fire Planning	Provides guidance for preparing various types of fire plans.

This page intentionally
left blank

Appendix F. Glossary

F.1. Glossary

- Adaptive Management:** An approach to natural resource management that involves identifying areas of scientific uncertainty, devising field management activities as real-world experiments to test that uncertainty, learning from the outcome of such experiments, and revising management guidelines on the basis of the knowledge gained.
- Allotment:** An area allocated for livestock use by one or more qualified grazing permittees including prescribed numbers and kinds of livestock under one plan of management.
- Animal Unit Month (AUM):** The amount of forage required to sustain one mature cow or the equivalent (e.g., five sheep or five goats), based on an average daily forage consumption of 26 pounds of dry matter per day.
- Area of Critical Environmental Concern (ACEC):** An area of public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes, or to protect humans from natural hazards.
- a'a:** A Hawaiian term for basaltic lava flows that are typically rough and jagged with a clinkery surface.
- Biological Soil Crust:** A complex mosaic of mosses, lichens, algae, cyanobacteria, and fungi that occupies the soil surface in arid and semiarid plant communities. These organisms weave through the soil and essentially glue the surface particles together, forming a protective coating against erosive forces.
- Breeding Habitat:** Leks and the sagebrush habitat surrounding leks that are collectively used for pre-laying, breeding, nesting, and early brood-rearing, from approximately March through June (Connelly et al. 2003).
- Candidate Species:** Species not protected under the Endangered Species Act but under consideration by the U.S. Fish and Wildlife Service for inclusion on the list of federally threatened or endangered species.
- Climax Vegetation:** The final vegetation community and highest ecological development of a plant community that emerges after a series of successive vegetational stages. The climax community perpetuates itself indefinitely unless disturbed by outside forces.
- Cultural Resource:** The fragile and nonrenewable remains of human activity that are found in historic districts, sites, buildings, and artifacts and that are important in past and present human events.

Desired Future Condition:	Used to describe the future condition of resources to meet management objectives. Desired future condition is based on ecological, social, and economic considerations during the land and resource management planning process.
Diversity (Species):	(1) The absolute number of species in a community, species richness; and (2) a measure of the number of species and their relative abundance in a community; low diversity refers to few species or unequal abundance, high diversity to many species, or equal abundance.
Early Brood-Rearing Habitat:	Upland sagebrush sites relatively close to nest sites, typically characterized by high species richness with an abundance of forbs and insects, where sage-grouse hens raise young chicks (<21 days old) (Connelly et al. 2003).
Ecological Succession:	An ecosystem's gradual evolution to a stable state or climax. If through the ability of its populations and elements, an ecosystem can absorb changes, it tends to persist and become stable through time.
Endangered Species:	Any animal or plant species that is in danger of extinction throughout all of a significant portion of its range. These species are listed by the U.S. Fish and Wildlife Service under provisions of the Endangered Species Act.
Environmental Impact Statement (EIS):	A detailed written statement that is required by the National Environmental Policy Act for a proposed major federal action significantly affecting the quality of the human environment. The findings from the document are published in a Record of Decision.
Ethnographic Resource:	A site structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it.
Exotic Species:	An animal or plant species that is not a part of an area's original fauna or flora.
Fall Habitat:	The matrix of sagebrush habitat areas that sage-grouse slowly move through from September through November, transitioning from summer habitat to winter habitat, and shifting their diet from including large amounts of forbs to feeding exclusively on sagebrush (Connelly et al. 2000).
Fire Suppression:	All work and activities associated with fire extinguishing operations, beginning with the discovery and continuing until the fire is completely extinguished.
Forb:	A broad-leaved plant (herb) whose stem does not produce woody, persistent tissue and generally dies back at the end of each growing season, such as arrowleaf balsamroot.

Functional At-Risk:	A riparian-wetland area that is in functional condition but has at least one attribute or process that makes it susceptible to degradation.
Government-to-Government Consultation:	The active, affirmative process between agencies of the federal government and tribal governments under the laws of the United States. Tribal governments are considered domestic sovereignties with primary and independent jurisdictions over tribal lands. Consultation consists of: (1) identifying and seeking input from appropriate Native American governing bodies, community groups and individuals; and (2) considering their interests as a necessary and integral part of the decision-making process. The aim of consultation is to involve affected Native Americans in the identification of issues and the definition of the range of acceptable management options.
Habitat Suitability:	The relative appropriateness of a certain ecological area for meeting the life requirements of an organism (i.e., food, shelter, water, space).
Important Wildlife Habitat:	Big game crucial winter range, big game parturition areas, designated critical migration corridors, sage-grouse breeding and nesting areas, raptor concentration areas, and critical fish spawning areas.
Indicator:	Components or attributes of an ecosystem that can be observed and/or measured that provides evidence of the function, productivity, health and/or condition of the ecosystem.
Inholding:	A nonfederal parcel of land that is completely surrounded by federal land.
Integrated Weed Management (IWM):	A balanced approach to managing resources including the following processes: prevention, inventory, control, monitoring, and reporting. With IWM the actions include preventing weeds from invading; proper identification and knowledge of invasive weed species; inventory, mapping and monitoring of weed populations and damage. Weed control decisions are based on knowing potential damage, cost of control method, and environmental impact of the weed and control decision; using control strategies that may include a combination of methods to reduce the weed population to an acceptable level; and, evaluating the effectiveness and effects of management decisions.
Invasive Species:	In this document, the definition for this term is “a plant or animal species (typically non-native) that rapidly spreads into or displaces a desirable native species or community.” [Exception: An “invasive species,” as defined in Executive Order 13112, is a species that is (1) non-native (or alien) to the ecosystem under consideration, and (2) whose introduction causes or is likely to cause economic or

environmental harm or harm to human health. Invasive species can be plants, animals, and other organisms (e.g., microbes)].

- Isolated Habitat: :** Isolated habitats are a subset of Key habitat that support relatively small Greater sage-grouse populations. Isolated habitats are separated from other Key habitat by developed land or unsuitable habitat, such as farmland, forests, or grassland.
- Key Habitats: :** Key habitats contain generally large-scale, intact sagebrush steppe areas that provide Greater sage-grouse habitat during some portion of the year.
- Kipuka:** < kee' poo ka > Hawaiian word meaning “key”, or opening such as for a door. A mound of older land, usually covered by vegetation, which is surrounded by a younger lava flow.
- Late Brood-Rearing Habitat:** Variety of habitats used by sage-grouse from July through September. Habitats used include, but not limited to, meadows, farmland, riparian areas, dry lakebeds, sagebrush areas (Connelly et al. 2003).
- Lava Tube:** Subterranean openings that form when the surface of flowing lava congeals forming a crust. Insulated from the cooling air, the lava underneath the solidified crust continues to flow. As the lava eruption ceases, the tube drains, and a large tubular cave may be left.
- Lek:** An assembly area where birds, especially Greater sage-grouse, carry on display and courtship behavior.
- Lithic Scatter:** Pertaining to or composed of stone tool scatter; a form of an archeological resource.
- Litter:** Dead plant or animal material on the soil surface.
- Livestock Developments:** Physical facilities, such as fences, water developments, and corrals that are used to handle and control livestock.
- Marginal Habitat :** Area supports the species but survival rates and reproductive success are generally lower by comparison, and the area may or may not have the potential to become suitable in the future (Cooperrider et al. 1986).
- Multiple Use Management:** The definition of multiple use is defined in the Federal Land Policy and Management Act of 1976 as follows: The management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resource or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform with changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses

that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historic values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of the uses that will give the greatest economic return or the greatest output.

National Environmental Policy Act of 1969 (NEPA):

The federal law that established a national policy for the environment and requires federal agencies to (1) become aware of the environmental ramifications of their proposed actions, (2) fully disclose to the public proposed federal actions and provide a mechanism for public input to federal decision-making, and (3) prepare environmental impact statements for every major action that would significantly affect the quality of the human environment.

National Register of Historic Places (NRHP):

The official list, established by the National Historic Preservation Act, of the nation's cultural resources worthy of preservation. The national register lists archeological, historic, and architectural properties (districts, sites, buildings, structures, and objects) nominated for their local, state, or national significance by state and federal agencies and approved by the national register staff.

Native American Graves Protection and Repatriation Act (NAGPRA):

Requires Federal Agencies to inventory human remains and associated funerary objects in existing federal museum collections and to provide culturally affiliated tribes with the inventory of collections. The act also requires repatriation, on request, to the culturally affiliated tribes.

Native American Tribe:

Any indigenous cultural group in the conterminous United States that the Secretary of the Interior recognizes as possessing tribal status, i.e. federally recognized (listed annually in the Federal Register).

Native Species:

Plants or animals indigenous to the area.

Nesting Habitat:

Area with protective grass and high lateral shrub cover where hens nest, typically under sagebrush shrubs (Connelly et al. 2000).

Nonfunctional :

A riparian-wetland area that clearly does not provide adequate vegetation, landform, or large woody debris to dissipate energies associated with high flow, and thus does not reduce erosion, improve water quality, etc.

Non-habitat:

Area within the historical distribution of sage-grouse that is unoccupied, does not currently provide habitat, and does not have the potential to provide habitat in the foreseeable future (<100 years).

Noxious Weeds:	According to the Federal Noxious Weed Act (Public Law 93-629), a weed that causes adverse effects on humans and their environment and is therefore detrimental to public health and the agriculture and commerce of the United States.
Occupied Habitat (Sage-Grouse) :	All sagebrush and associated plant communities known to be used by sage-grouse within the last 10 years. Sagebrush areas contiguous with areas of known use, which do not have effective barriers to sage-grouse movement from known use areas, are considered occupied unless specific information exists that documents the lack of sage-grouse use (Stiver et al. 2010).
Pahoehoe:	A Hawaiian term for a basaltic lava flow that has a smooth, billowy, or ropy surface.
Particulate Matter:	Fine liquid or solid particles suspended in the air and consisting of dust, smoke, mist, fumes, and compounds containing sulfur, nitrogen, and metals, typically averaging one micron or smaller in diameter.
Perennial Stream:	A stream that flows continuously. Perennial streams generally are associated with a water table in the localities through which they flow.
Permittee:	A person or organization legally permitted to graze a specific number and class of livestock on designated areas of public land during specified seasons each year.
Pictograph:	Aboriginally painted designs on natural rock surfaces.
Pioneer Plants:	Plants that establish themselves first on disturbed areas or bare soil.
Playa:	An area of flat, dried-up land, especially a desert basin from which water evaporates quickly.
Pleistocene Age:	The latest major geological epoch from 11,000 to 2 million years ago, the time of human evolution. Also known as the “Ice Age” due to the multiple expansion and retreat of glaciers.
Population :	A collection of organisms of the same species that freely share genetic material (i.e., breed).
Potential Habitat :	Area is currently unoccupied but has the potential for occupancy in the foreseeable future (<100 years), through succession or restoration.
Prescribed Fire:	Controlled application of fire to natural fuels under conditions of weather, fuel moisture, and soil moisture that would allow confinement of the fire to a predetermined area and, at the planned benefits to one or more objectives to wildlife, livestock, and watershed values. The overall objectives are to employ fire scientifically to realize maximum net benefits at minimum

	<p>environmental damage and acceptable cost, and at the same time, would produce the intensity of heat and rate of spread required to accomplish certain planned benefits to one or more objectives to wildlife, livestock, and watershed values. The overall objectives are to employ fire scientifically to realize maximum net benefits at minimum environmental damage and acceptable cost.</p>
Proper Functioning Condition (PFC) :	<p>A riparian-wetland area in which adequate vegetation or other structure components are present to dissipate energy, reduce erosion and improve water quality, filter sediment and aid in floodplain development, improve flood-water retention and ground-water recharge, stabilize streambanks and shorelines, develop diverse ponding and channel characteristics for fish and wildlife habitat among other things, and support greater biodiversity.</p>
Public Land:	<p>Any land or interest in land owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management, without regard to how the United States acquired ownership, except for (1) land located on the Outer Continental Shelf and (2) land held for the benefit of American Indians, Aleuts, and Eskimos.</p>
Rangeland:	<p>Land on which the potential natural vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundra, and areas that support certain forb and shrub communities.</p>
Raptor:	<p>Bird of prey with sharp talons and a strongly curved beak, such as hawks, falcons, owls, vultures, and eagles.</p>
Record of Decision (ROD):	<p>A document signed by a responsible official recording a decision that was preceded by the preparation of an environment impact statement.</p>
Restoration Habitats:	<p>Potential restoration habitats have the potential to provide Greater sage-grouse habitat in the future. These are sagebrush steppe that have been converted to grassland or woodland or are in the successional process of converting to woodland. These areas are located in close proximity to Key or Source habitats. Data indicate that Greater sage-grouse historically occupied these areas and may still utilize some sporadically, such as during migrations. Restoration habitats have a high likelihood of being reoccupied if habitat suitability improves.</p>
Rift Zone:	<p>Area characterized by an open volcanic fissure.</p>
Right-of-Way (ROW):	<p>A permit or an easement that authorizes the use of public land for certain specified purposes, commonly for pipelines, roads, telephone lines, electric lines, and reservoirs. It is also the reference to the land covered by such an easement or permit.</p>

Riparian Areas:	An area that is saturated or inundated at a frequency and duration sufficient to produce vegetation typically adapted for life in saturated soil conditions.
Sacred Site:	Any specific, discrete, narrowly delineated location on federal land that is identified by a Native American tribe, or Native American individual determined to be appropriately authoritative representative of a Native American religion, as sacred by virtue of its established religious significance to, or ceremonial use by, a Native American religion.
Sagebrush Obligates:	Species restricted to sagebrush habitats during the breeding season or year round.
Sagebrush Steppe Community:	A semi-arid plant community that is characterized by a predominance of big sagebrush and other sagebrush species, plus grasses and forbs.
Section 106 Consultation:	Also known as the 36 CFR 800 process. Discussions between a federal agency official and the Advisory Council on Historic Preservation, State Historic Preservation Officer, and other interested parties concerning historic properties that could be affected by a specific undertaking. Section 106 is the portion of the National Historic Preservation Act that outlines the procedure. The procedure is codified in 36 CFR 800.
Section 110:	The section of the National Historic Preservation Act that requires federal agencies to complete cultural resources surveys and reports for all its lands and existing projects.
Sensitive Species:	Plant and animal species not yet officially listed but that are undergoing status review for listing on the U.S. Fish and Wildlife Service official threatened and endangered list; species whose populations are small and widely dispersed or restricted to a few localities; and species whose numbers are declining so rapidly that official listing may be necessary.
Source Habitat: :	Source habitats are a subset of Key habitat that support concentrated Greater sage-grouse populations. Source habitats are also commonly referred to as population strongholds. Data indicate that Greater sage-grouse populations in Source habitats have been generally stable or increasing since the drought of the early 1990s.
Special Status Species:	Wildlife and plant species that are either federally listed as threatened or endangered, proposed threatened or endangered, candidate species, state-listed as threatened or endangered, or listed by a Bureau of Land Management State Director as sensitive or determined priority.
Subpopulation:	A portion of a population in a specific geographic location.

Successional Stage:	A stage of development of a plant community with another. Conditions of the prior plant community (or successional stage) create conditions that are favorable for the establishment of the next stage.
Suitable Habitat:	Area provides environmental conditions necessary for successful survival and reproduction to sustain stable populations (Cooperrider et al. 1986, Morrison et al. 1998).
Summer Habitat:	The summer or late brood-rearing period from July through August, when hens and chicks use a variety of moist and mesic habitats where succulent forbs and insects are found in close proximity to sagebrush (Connelly et al. 2000).
Threatened and Endangered Species:	As defined in the Endangered Species Act of 1973, as amended (Public Law 93-205; 87 Stat. 884), an endangered species means “any species which is in danger of extinction throughout all or a significant portion of its range” and threatened species means “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” Whether a species is threatened or endangered is determined by the following factors: (1) present or threatened destruction, modification, or curtailment of its habitat or range; (2) over-utilization for commercial, sporting, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors.
Traditional Cultural Properties:	A cultural property that is eligible for inclusion in the National Register of Historic Places because of its association with a living community’s cultural practices or beliefs that (a) are rooted in that community’s history and (b) are important in maintaining the community’s continuing cultural identity.
Traditional Lifeway Values:	Values that are important for maintaining a group’s traditional system of religious belief, cultural practice, or social interaction.
Treaty:	A formal agreement between the United States and one or more Native American tribes. Typically, these arrangements ceded lands to the United States, reserving certain rights, privileges, and/or lands to the Native American signatories.
Trust Responsibility (also referred to as fiduciary responsibility):	The trust responsibility of the United States, executed through the Secretary of the Interior, to uphold obligations of the federal government to federally recognized Native American tribes.
Understory:	Herbaceous plant components, including grasses and forbs, which grow beneath the overstory in stand of woody shrubs; or the herbaceous and woody shrubs growing beneath the overstory in a stand of trees.

- Unsuitable Habitat:** Area does not currently provide one or more of the life requisites, and therefore does not provide habitat, but may provide habitat some time in the foreseeable future (<100 years), through succession or restoration.
- Upland Habitat:** An area that is not inundated with water and typically supports vegetation types adapted to life in non-saturated soil conditions.
- Valid Existing Rights:** Locatable mineral development rights that existed when the Federal Land Policy and Management Act (FLPMA) was enacted on October 21, 1976. Some areas are segregated from entry and location under the Mining Law to protect certain values or allow certain uses. Mining claims that existed as of the effective date of the segregation may still be valid if they can meet the test of discovery of a valuable mineral required under the Mining Law. Determining the validity of mining claims located in segregated lands requires the Bureau of Land Management to conduct a validity examination and is called a “valid existing right” determination.
- Way:** A road-like feature created and used by vehicles having four or more wheels, but not declared a road by the owner and that receives no maintenance to guarantee regular and continuous use.
- Wetland:** Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and which under normal circumstances support a prevalence of vegetation typically adapted for life in saturated soil conditions.
- Wilderness Area:** An area of federal land designated by the United States Congress and defined by the Wilderness Act of 1964 as a place “where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” Designation is aimed at ensuring that these lands are preserved and protected in their natural condition. Wilderness areas, which are generally at least 5,000 acres or more in size, offer outstanding opportunities for solitude or a primitive and unconfined type of recreation; such areas may also contain ecological, geological, or other features that have scientific, scenic, or historical value.
- Wilderness Inventory:** A written description of resource information and accompanying map of those public lands that meet the wilderness criteria as established under Section 603(a) of the Federal Land Policy and Management Act and Section 2(c) of the Wilderness Act.
- Wilderness Study Area (WSA):** An area designated by a federal agency as having wilderness characteristics, thus making it worthy of consideration by Congress for wilderness designation.
- Wildfire:** An unwanted wildland fire, regardless of ignition source, which is unplanned, has escaped control, or does not meet management objectives and therefore requires a suppression response.

Wildland Fire Use (also called “Wildland Fire for Resource Benefit”):

A naturally ignited fire allowed to burn under designated conditions to meet resource management objectives.

Winter Habitat:

Sagebrush habitats that provide access to sagebrush above the snow for all food and cover requisite needs (Connelly et al. 2000).

Withdrawal:

Removal or “withholding” of public lands from operation of some or all of the public land laws (settlement, sale, mining, and or mineral leasing). An action that restricts the use or disposal of public lands, segregating the land from the operation of some or all of the public land and/or mineral laws and holding it for a specific public purpose. Withdrawals may also be used to transfer jurisdiction of management to other federal agencies

This page intentionally
left blank

Appendix G. Acronyms and Abbreviations

G.1. Acronyms

ACEC:	Area of Critical Environmental Concern
AMP:	Allotment Management Plan
ATV:	All Terrain Vehicle
AUM:	Animal Unit Month
BLM:	Bureau of Land Management
BMP:	Best Management Practice
CEQ:	Animal Unit Month
CFR:	Council on Environmental Quality
CRMP:	Cultural Resource Management Plan
CRMP:	Cultural Resource Management Plan
DFC:	Desired Future Condition
EA:	Environmental Assessment
EIS:	Cultural Resource Management Plan
EIS:	Environmental Impact Statement
EPA:	Environmental Protection Agency
ESA:	Endangered Species Act
ESR:	Emergency Stabilization and Rehabilitation
FEIS:	Final Environmental Impact Statement
FLPMA:	Federal Land Policy and Management Act
FMDA:	Fire Management Direction Amendment
FMP:	Fire Management Plan
FY:	fiscal year
GIS:	Geographic Information System
GPS:	Global Positioning System
GSG:	Greater Sage-Grouse
ICDC:	Idaho Conservation Data Center

IDEQ:	Idaho Department of Environmental Quality
IDFG:	Idaho Department of Fish and Game
IDL:	Idaho Department of Lands
IDPR:	Idaho Department of Parks and Recreation
IMP:	Interim Management Policy
LHA:	Land Health Assessment
MBTA:	Migratory Bird Treaty Act
MMP:	Monument Management Plan
Monument:	Craters of the Moon National Monument and Preserve
MOU:	Memorandum of Understanding
NAGPRA:	Native American Graves Protection and Repatriation Act
NEPA:	National Environmental Policy Act
NHPA:	National Historic Preservation Act
NOI:	Notice of Intent
NPS:	National Park Service
NRCS:	National Resource Conservation Service
NWI:	National Wetlands Inventory
OHV:	Off Highway Vehicle
PFC:	Proper Functioning Condition
PGH:	Preliminary General Habitat
PPH:	Preliminary Priority Habitat
RAC:	Resource Advisory Council
RMP:	Resource Management Plan
ROW:	Right-of-way
RV:	Recreational Vehicle
SHPO:	State Historic Preservation Office
US:	United States
USC:	United States Code
USDA:	United States Department of Agriculture

USDI:	United States Department of the Interior
USFWS:	United States Fish and Wildlife Service
USGS:	United States Geological Survey
VRM:	Visual Resource Management
WSA:	Wilderness Study Area