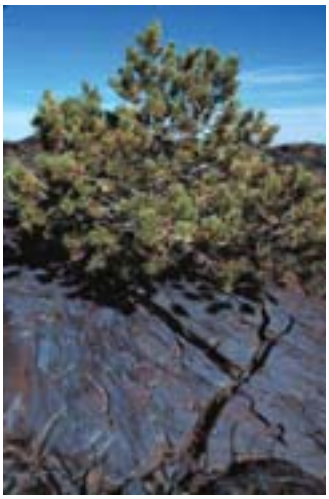
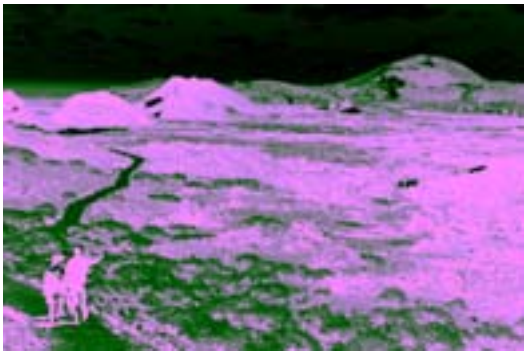


Chapter 2
THE PLAN

Chapter 2: THE PLAN

AREAS ZONED AS PRISTINE ARE UNDEVELOPED AND PROVIDE A WILD EXPERIENCE.



DEVELOPED TRAILS IN THE FRONTCOUNTRY ZONE PROVIDE ACCESS TO A VARIETY OF VOLCANIC FEATURES.

The key components of the Craters of the Moon National Monument and Preserve Management Plan are as follows:

- Promotes use of partnerships at off-site facilities such as visitor centers, state parks, and gateway communities to provide Monument information and interpretation.
- Emphasizes protection of vegetation resources in North Laidlaw Park.
- Maintains a road network suitable for aggressive fire management within the Monument.
- Encourages outfitter and guide services in the expanded portion of the Monument instead of new agency-provided services and facilities.
- Supports a large and proactive integrated weed management program.
- Proactively protects and restores sagebrush steppe communities.
- Continues to focus visitor experience within the Monument on the existing NPS lands and facilities at the north end of the Monument.

DESCRIPTION OF MANAGEMENT ZONES

All federal lands within the Monument are assigned to one of the four management zones (see Figure 3 and Table 1). The management zones — Frontcountry, Passage, Primitive, and Pristine — guide future management actions within the Monument.

Management zones are tools that help guide decision-making on appropriate visitor uses, facility development, and other uses. Management zones do not address natural and cultural resource management. Management zoning is established throughout the planning area to provide and maintain a range of recreation and access for different user-types with varying interests and abilities. Each separate zone has distinct settings to be provided and maintained. Physical settings consider the degree of naturalness and amount and type of facilities, as well as proximity to roads. Social settings consider the number of contacts with other people, the size of groups, and evidence of other users. Managerial settings consider the amount of visitor management used to achieve desired social and resource conditions, the compatibility of traditional land uses with the recreational environment, and the type of access and vehicle use allowed in the area.

Although different management emphasis will be applied in each of the management zones of the Monument, the actions of managers must always be consistent with the purposes for which the Monument was established, applicable laws, regulations and policies, and with the mission goals identified in Chapter 1.

Table 1. Management Zones

	FRONTCOUNTRY ZONE	PASSAGE ZONE	PRIMITIVE ZONE	PRISTINE ZONE
Basic Concept	The frontcountry zone is defined by structures and grounds provided for visitor support services such as information, education, and recreation. Access will be easy and convenient, and the encounter rate very high. High maintenance and intervention will be required to accommodate concentrated visitor use. Challenge and adventure is less important compared to other zones. Zone corridor will be 660 feet wide along roads.	The passage zone is intended to accommodate the flow of people and vehicles from one place to another and to provide minimal accommodations such as parking, trailheads, primitive campsites, and information kiosks or signs for people preparing to venture into the Primitive and/or Pristine Zones of the Monument. Where the zone is only a narrow corridor following a road (660 feet wide), the expectation is that a particular road will be maintained to a consistent standard along the length of the corridor, normally a Class B or Class C road from one end of the corridor to the other.	The primitive zone provides an undeveloped, primitive, and self-directed visitor experience while accommodating motorized and mechanized access on designated routes. Facilities will be rare and provided only where essential for resource protection.	The pristine zone includes mostly lava flows, designated Wilderness, and Wilderness Study Areas. This zone provides an undeveloped, primitive, and self-directed visitor experience, generally without motorized or mechanical access. Facilities will be virtually nonexistent.
Visitor Experience	High chance for encounters with people.	Medium chance for encounters with people.	Low chance for encounters with people.	High chance for solitude.
	Travel on paved, improved, or maintained roads.	Travel on higher level of road maintenance than the Primitive Zone.	Travel on low-standard roads with challenging driving conditions.	Travel involves challenging conditions and no roads.
	Developed campgrounds.	Rustic, designated campsites.	No developed campsites; dispersed primitive camping.	No developed campsites; dispersed primitive camping.
	A high level of interpretation programs; informational exhibits.	Limited interpretation, wayside exhibits.	Minimal on-site interpretation.	No on-site interpretation.
	Diverse trail system, some paved.	Multiuse, maintained, and designated trails.	Low-standard multiuse trails with little or no maintenance.	Very few trails.
	Low chance for encounters with livestock or associated developments.	High chance for encounters with livestock or associated developments.	Medium chance for encounters with livestock or associated developments.	Low chance for encounters with livestock or associated developments.
	High level of contact with agency staff.	Low to moderate level of contact with agency staff.	Very low level of contact with agency staff.	Essentially no contact with agency staff.
	Typical visitor activities: sightseeing, driving, bicycling, walking, nature study, ranger-led programs, camping, and picnicking.	Typical visitor activities: driving, sightseeing, hiking, mountain biking, horseback riding, and dispersed camping.	Typical visitor activities require self-sufficiency: hiking, hunting, horseback riding, mountain biking, remote camping, and driving on unimproved roads.	Typical visitor activities require self-sufficiency and involve challenge, risk, and adventure: dispersed camping, backpacking, nature study, and hunting.
Access and Kinds of Development	Paved roads and high-standard gravel roads.	Class B-D roads. Some arterial roads would be regularly maintained to allow seasonal car, SUV, light truck passage.	Class C-D roads. Dirt roads, accessible seasonally only with high-clearance vehicles and off-highway vehicles.	No roads.
	Hardened and maintained pedestrian trails.	Trailheads; maintained motorized and non-motorized trails.	Low standard multiuse trails.	Very few trails; no motorized trails.
	Frequent signs for directions, safety, and interpretation.	Signs for directions, safety, resource protection, and interpretation.	Minimal signs for visitor safety and resource protection only.	Very few signs.
	Offices, utilities, maintenance facilities, storage areas, visitor center, employee housing, and restrooms.	Minimal administrative structures, vault toilets.	No buildings.	No buildings.

ROAD AND TRAIL CLASSIFICATIONS

Within the Monument, a "road" is defined as an established route capable of accommodating travel by a full-sized automobile or truck. Following other routes or establishing new routes with motorized or mechanized vehicles is considered "off-road" use, which is prohibited in the Monument. Following are four different road classifications and two trail classifications within the Monument:

Class A Roads generally are paved and have a surface of asphalt, concrete, or similar continuous material. In addition to US Highway 20/26/93 (US 20/26/93), the only Class A roads are the loop drive, spur roads, and associated parking areas in the original NPS Monument. Class A roads are only found in the Frontcountry Zone.

Class B Roads are improved roads constructed with a natural or aggregate surface, and they may have berms, ditches, or culverts. Regular maintenance allows passage by standard passenger and commercial vehicles such as cars, light trucks, and some heavy trucks. Seasonal conditions and lack of snow removal may render these roads impassable. Class B roads are found primarily in the Passage Zone.

Class C Roads have a natural surface and may be either constructed or established over time by repeated passage of vehicles. The natural surface may be dirt, sand, or rock. A minimal amount of maintenance, if any at all, is limited primarily to spot surface grading to allow vehicle passage within the original road corridor. Maintenance on these roads is performed only as necessary, not in accordance with any regular schedule. Class C roads accommodate a much smaller range of vehicles than Class B roads, usually high-clearance two-wheel-drive and four-wheel-drive vehicles. Seasonal conditions or wet weather may render these roads impassable at any time. Class C roads are found primarily in the Passage and Primitive Zones.

Class D Roads are primitive roads that were not constructed but have been established over time by the passage of motorized vehicles. These roads receive no maintenance or grading. However, management retains the authority to perform occasional emergency repairs or maintenance as necessary for administrative purposes and general resource protection. These roads are generally referred to as "two-tracks" or a set of two ruts with vegetation growing in between the wheel ruts. The condition of these roads varies from sometimes passable by a passenger car to only suitable for high-clearance four-wheel-drive vehicles. Seasonal conditions or wet weather may render these roads impassable at any time. Class D roads are found primarily in the Primitive Zone.

Class D Roads and other existing roads include only those roads in existence as of the date of Monument Proclamation 7373 and shown on Figure 4. Any routes created by cross-country vehicle or mechanical use since the date of Proclamation 7373 are considered illegal and will be closed.

MANY ROADS WITHIN THE MONUMENT ARE PRIMITIVE DIRT TRACTS CLASSIFIED AS CLASS D ROADS.

TABLE 2. ROAD AND TRAIL INVENTORY BY MANAGEMENT ZONE

Road Classification	MANAGEMENT ZONES*				
	Frontcountry	Passage	Primitive	Pristine	Total Miles
Class A	30	0	0	0	30
Class B	0	46	11	0	57
Class C	2	34	321	2	359
Class D	0	2	141	26	169
Class 1 Trails	7	0	1	6	14
Total Miles	**39**	**82**	**474**	**34****	**629**

*Approximate miles of existing roads and trails within each zone rounded to the nearest whole number.

**To be closed.

Class 1 Trails are restricted to non-motorized/non-mechanized travel (wheelchairs are allowed). Examples of permitted forms of travel include foot travel, pack animal, and horseback. Examples of prohibited forms of travel on Class 1 trails include mountain bikes and all motorized vehicles. Class 1 trails may be further restricted, for example, to foot travel only.

Class 2 Trails are open to motorized/mechanized travel in addition to foot travel, pack animal, horseback, and other forms of passage. Examples of prohibited forms of travel include any vehicle with a footprint wider than an 18-inch tread (all-terrain vehicles, four-wheelers, and four-wheel-drive vehicles). Class 2 Trails can only be created from decommissioned roads that will no longer be open to use by full-sized vehicles. No new Class 2 Trails will be created in any other manner.

Table 2 summarizes where the various types of roads would fall within the management zones.

BOUNDARIES

MONUMENT BOUNDARIES

The original Craters of the Moon National Monument is an area of 53,420 acres, with all federal lands administered by the National Park Service. Proclamation 7373 expanded the boundaries by adding to Craters of the Moon National Monument all lands and interests in lands owned or controlled by the United States within the boundaries of the area described on the map entitled "Craters of the Moon National Monument Boundary Enlargement," which is included as part of Appendix B.

In a memorandum from the Secretary of the Interior (memo from the Secretary of the Interior dated November 24, 2000), the Bureau of Land Management was instructed to complete a metes and bounds description of the Monument boundary. A cadastral survey of the external monument boundary was completed in 2001. Based on that survey, the total area encompassed by the Monument boundary is 753,333 acres including 738,680 acres of federal land, 8,157 acres of state land, and 6,642 acres of private land. State and private lands within the Monument boundary are not affected by this plan.

NATIONAL PRESERVE BOUNDARIES

Proclamation 7373 states that the National Park Service shall have primary management authority over the portion of the Monument that includes the exposed lava flows. This land area was described as including approximately 410,000 acres and is specifically designated as a unit of the National Park System "Craters of the Moon National Preserve" by Public Law 107-213 on August 21, 2002.

Proclamation 7373 describes the boundary between the NPS- and BLM-administered lands as being the edge of exposed lava fields, an irregular natural feature. When a determination of the National Preserve boundary within the greater Monument area is required, the line will generally be described by the edge of the brown-colored shading for lava flows on the most recent U.S. Geological Survey 7.5-minute series topographic quadrangle maps available on the date of the Proclamation 7373.

BOUNDARY MODIFICATIONS

Potential boundary modifications are examined to identify potential additional lands with significant resources or opportunities, or which are critical to fulfilling the Monument's mission. The agencies referred to previous studies of boundary modifications for Craters of the Moon, including the Reconnaissance Survey — Expansion of Craters of the Moon National Monument (1989) and Management Alternatives — Expansion of Craters of the Moon National Monument (1990), and concluded that no additional recommendation for boundary adjustments needed to be proposed in this plan. However, when the Bureau of Land Management develops the Shoshone Resource Management Plan, areas such as Sand Butte (identified by the public for inclusion within the Monument) will be examined to determine if additional protection is warranted.

Based on these criteria, eight areas have been identified for potential boundary modifications and are described in Appendix C. All resolve potential conflicts with existing grazing use by transferring small tracts within the National Preserve to the BLM Monument where grazing is authorized.

MANAGEMENT OF MONUMENT RESOURCES

Laws, regulations, and policies provide the legal basis for management. These can expressly mandate certain things and prohibit others. Such legal guidance leaves certain decisions up to the discretion of the agencies. This section describes these discretionary decisions, made by the Bureau of Land Management and National Park Service, regarding future management of natural and cultural resources, development, and recreational and non-recreational uses within the Monument.

Organized by resource topic, this section includes a brief summary on the status of the resource in the Monument, the desired condition of each resource in the monument, and specific management actions identified to maintain or achieve these desired conditions. In addition to resources, topics include the recreational experience of visitors to the Monument, facilities such as roads and campgrounds, and uses such as livestock grazing.

Desired condition statements describe what the status of the resource or recreational experience should be, which may or may not currently be the case. Management actions maintain the resource condition at the desired condition or help move it closer to the desired condition.

NATURAL RESOURCES

NATURAL RESOURCES — GENERAL

The awesome effects of volcanism are evident throughout the Monument. During the past 15,000 years, lava eruptions created a rugged but scenic landscape that has forced animals and plants to adapt, and people to endure, detour, or ponder. Located on the Snake River Plain, a volcanic terrain spanning southern Idaho, the Monument encompasses the Great Rift volcanic rift zone. In places, this plain is 60 miles wide, with basalt lava deposits more than 10,000 feet deep in some locations. Eruptions 2,000 years ago at the Craters of the Moon and the Wapi Lava Fields are among the most recent volcanic activity to take place anywhere in this immense geographic area.

The protection, study, and appreciation of the Monument's unique natural features in this remote and often harsh environment are the overriding purposes of the Monument as directed by Proclamation 7373. To that end, basic and applied scientific research, resource inventories, and monitoring of resource conditions play important roles in the identification, characterization, and interpretation of the Monument's resources.

Today the Monument provides unique opportunities for visitors to encounter plants and animals in various lava habitats, enjoy hiking on a number of trails, or simply partake in the solitude and beauty of this incredible place.

Desired Future Conditions:

Resource inventories and surveys documenting the condition and extent of natural resources including geologic features and processes, kipukas, and sensitive species are given sufficient emphasis to enable completion during the life of the plan.

Monitoring programs are developed and implemented to track changes in the condition of key resources serving as "vital signs" of ecosystem health or to fulfill other purposes of enabling proclamations and laws.

Management Actions:

NRES-1: Resource inventories, surveys, and monitoring programs will be provided for and implemented.

NRES-2: Proactive management activities will be undertaken to mitigate potential effects of public use.

NRES-3: Information gained will be disseminated to the public and used in management decisions.

NRES-4: The agencies will seek opportunities with the tribes and state and federal agencies for partnering in long-term monitoring of the Monument's natural resources.

GEOLOGICAL RESOURCES

The purpose and significance of the Monument tie directly to its volcanic geology. Volcanism has generated an array of features and habitats that make the Monument a recognized outdoor laboratory. As a result, the Monument draws scientists and visitors from around the world to study and experience the diverse volcanic terrain.

The Monument is in the Snake River Basin-High Desert (Omernik 1986) and is comprised of three geologically young (Late Pleistocene-Holocene) lava fields that lie along the Great Rift. The Great Rift volcanic rift zone, which varies in width between approximately 1 and 5 miles, is a belt of open cracks, eruptive

fissures, shield volcanoes, and cinder cones. It begins north of the Monument, approximately 6 miles from the topographic edge of the Snake River Plain, in the vent area of the Lava Creek flows located in the southern Pioneer Mountains (Kuntz et al. 1992). The Great Rift extends southeasterly from the Lava Creek vents for more than 50 miles to somewhere beneath the Wapi Lava Field (Kuntz et al. 1982).

The Craters of the Moon Lava Field is the northernmost and largest of the three young lava fields. Kings Bowl Lava Field is the smallest and lies between Craters of the Moon Lava Field and the Wapi Lava Field. The rest of the Monument is composed of Pleistocene-age pahoehoe and a'a flows, near-vent tephra deposits, cinder cones, lava cones, and shield volcanoes (Kuntz et al. 1988). These older areas are mantled with loess deposits (windblown silt) and in some places by windblown sand. During the Holocene (last 10,000 years), the most volcanic activity of any of the Eastern Snake River Plain basaltic rift systems was exhibited by these three lava fields associated with the Great Rift (Hughes et al. 1999).

Kings Bowl Lava Field formed approximately 2,200 years ago during a single burst of eruptive activity that may have lasted as little as six hours (Kuntz et al. 1992). Kings Bowl has a central eruptive fissure approximately 4 miles long, flanked by two sets of non-eruptive fissures. The dominant feature is a bowl, 280 feet long, 100 feet wide, and 100 feet deep, produced when lava came into contact with groundwater, causing a steam or phreatic explosion.

The Craters of the Moon Lava Field formed during eight eruptive periods with a recurrence interval averaging 2,000 years, and it has been more than 2,000 years since the last eruption. The constancy of the most recent eruptive periods suggests that slightly more than one cubic mile of lava will be erupted during the next eruption period.

PILLAR BUTTE IS THE HIGHEST POINT ON THE WAPI LAVA FIELD.

In the past, eruptions in the Craters of the Moon Lava Field have generally shifted to the segment of the Great Rift with the longest repose interval. The next eruptive period should begin along the central portion of the Great Rift in the Craters of the Moon Lava Field, but may include the northern part of the Monument (Kuntz et al. 1986). Initial flows, based on past performance, will probably be relatively nonexplosive and produce large-volume pahoehoe flows. Eruptions from potential vents on the northern part of the Great Rift may be comparatively explosive and may produce significant amounts of tephra, destroy cinder cones, and build new ones (Kuntz et al. 1986).

There are many different kinds of caves in the Monument. Shelly pahoehoe areas contain many small open tubes and blisters. There are thousands of these small open tubes and blisters in the Monument. Pahoehoe flows can travel more than 20 miles because the ceilings of lava tubes insulate them from heat loss and some of the tubes are greater than 30 feet in height. Some fissure caves associated with the Great Rift can be passable to hundreds of feet below the surface. The nature of flowing lava can produce shallow caves and

HUNDREDS OF LAVA TUBE CAVES OCCUR WITHIN THE MONUMENT.

overhangs at flow fronts as a result of inflation processes. Differential weathering of cinder layers on some cinder cones has also generated a few shallow caves. Some of these small caves are more than 10 feet deep.

These various types of caves in the Monument can be associated with archeological and paleontological features, and they can harbor wildlife such as the blind lava-tube beetle, bushy-tailed woodrats, and Townsend's big-eared bats. Deep cracks and fissures, including cracks with likely connections to lava tubes beneath, and the entrances to caves often create or provide microenvironments or microhabitats. Some of these microenvironments support impressive moss, algal, or lichen communities and even ferns. People are attracted to caves, and some of the easily accessed caves in the Monument now contain considerable graffiti (e.g., Lariat Cave), litter, and other forms of vandalism.

Desired Future Conditions:

Natural processes remain the dominant agents of change to geologic resources within the Primitive and Pristine Zones.

Unique or representative geologic features within Frontcountry and Passage Zones are identified and documented and have protective strategies implemented to minimize any adverse effects from improved public access to the areas.

Knowledge and understanding of geologic resources and process are sufficient to interpret the interrelationships between geology and biotic communities.

Resource inventories and surveys that document the condition and extent of geologic features (including caves and paleontological resources) and also the geologic processes are sufficiently completed to provide scientifically defensible management decisions.

Disturbed or degraded geologic features are identified and restored when feasible.

Geologic knowledge and understanding are effectively shared with the public in order to stimulate appreciation and protection of the geologic resources.

Management Actions:

GEOL-1: When developing any visitor access within the Frontcountry and Passage Zones, the least impacting methods will be utilized to facilitate visitor access while also protecting geologic features.

GEOL-2: Steps will be taken to protect geological features from damage resulting from unrestricted public access and/or poorly designed or constructed public facilities.

GEOL-3: Threats to unique or outstanding examples of geologic features, including paleontological and cave resources, will be identified and mitigated as appropriate.

GEOL-4: Prior to authorizing surface-disturbing activities, areas will be surveyed for unique, rare, or special geologic resources including fossils.

GEOL-5: A cave management plan will be developed to meet Federal Cave Resources and Protection Act requirements.

GEOL-6: An intensive restoration program will be initiated to remove graffiti from caves and foster public understanding of the need for cave resource protection.

GEOL-7: Public access to caves and other geological features that are experiencing recreational use-related damage will be controlled, and damaged geological features will be restored as needed and when feasible.

SOILS

The soils of the Monument area reflect the differences and interactions between parent material, topography, vegetation, climate, and time. The most notable differences in soils involve the presence or absence of more recent volcanic materials and the degree of soil development on volcanic substrates.

The basalt flows that are visible on the surface of the majority of the Snake River Plain began approximately 2 million years ago, during the Pleistocene, and continued until approximately 2,000 years ago. The younger or more recent lava flows occupy two-thirds of the Monument. The soils on the younger basalt flows 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 derived from weathering geologic parent materials within the Basin and Range Province — sedimentary, igneous, and silica-rich lava rocks deposited during a sequence of geologic events that began almost 600 million years ago. The high desert environment results in lighter colored soils with low organic matter content. Soil textures in the Monument range from fine to coarse; however, most of the soils in the Monument area are silt loam to sandy loam in texture and vary in depth. They are moderately drained to well drained, except where clay horizons are present. Soils that are disturbed, not properly vegetated, or located on steep slopes are susceptible to water and wind erosion.

Biological soil crusts are a feature common to nearly all plant communities in arid and semiarid regions throughout the world (Belnap et al. 2001). The development of biological soil crusts is dependent on a number of factors, including soil texture and chemistry, annual precipitation amount and timing, associated vegetation, and disturbance history. Biological soil crusts have not been observed as a highly conspicuous element in the Monument, which could be due to any one of these factors.

Desired Future Conditions:

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.

Management Actions:

SOIL-1: Soils will be protected from accelerated or unnatural erosion from ground-disturbing activities. For example, post-fire stabilization efforts will protect erosion-prone soils through natural and assisted revegetation.

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

LIMBER PINE

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

VEGETATION, INCLUDING SPECIAL STATUS SPECIES, AND FIRE MANAGEMENT

Although some of the younger lava flows are devoid of vegetation, there is a surprising diversity of plants and plant communities in the Monument (see Figure 5). The type and density of vegetation varies widely, depending on the availability of soil. The lavas and kipukas (islands of vegetation surrounded by younger lava flows) show a full range of ecological succession — from pioneer plants, such as lichens and mosses on the basalt surfaces, to complex mid- to late- seral plant communities in the kipukas and rangelands bordering the lava flows. The 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 (*Pinus flexilis)* stands occur on the cinder cones and lava flows in the northern part of the Monument. A transition between limber pine and juniper (*Juniperus* spp.) vegetation types occurs between Blacktail Butte and the original Monument. This ecotone normally occurs only in montane regions and is thus an unusual feature for the lava flows. Quaking aspen (*Populus tremuloides*) and Douglas-fir (*Pseudotsuga menziesii*) stands are found on some north-facing slopes in the northern portion of the Monument. Riparian and wetland habitats are directly influenced by the watersheds of the Pioneer Mountains and are limited to the northern periphery of the Monument due to the geology, topography, and climate of this Basin and Range Province.

LOW ELEVATION SAGEBRUSH STEPPE

Early successional plant communities on the cinder cones produce stunning 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 the rangelands, kipukas, cinder cones, older lava flows, and the foothills of the Pioneer Mountains. This once was the most common vegetation throughout the Snake River Plain, as well as in the Intermountain West and Upper Columbia River Basin. However, fire, agriculture, and livestock grazing have modified composition and reduced the extent of this vegetation type throughout these regions (Blaisdell et al. 1982; Whisenant 1990; Bunting et al. 2002).

Sagebrush steppe, which is the dominant vegetation in the Monument, appears to be a monotonous landscape; however, there is a range of plant and community types occurring over an elevation gradient. Many factors influence the diversity, density, cover, distribution, and health of this high desert sagebrush steppe, including differences in soil depth and development; the precipitation gradient ranging from 8 to 16 inches; the 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 plant community to (1) resist invasive species infestation; (2) its susceptibility to, as well as recovery from, fire; and (3) land management goals, decisions, and practices.

Understory components in the sagebrush steppe complex vary in type and abundance, but common species include Sandberg bluegrass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), needle-grasses (*Stipa* spp.), bluebunch wheatgrass (*Pseudoroegneria spicata*), and the exotic annual cheatgrass. Forbs such as buckwheats (*Eriogonum* spp.), arrowleaf balsamroot (*Balsamorhiza sagittata*), lupine *(Lupinus* spp.), phlox (*Phlox* spp.), and milkvetches (*Astragalus* spp.) are also commonly found growing in these vegetation types. Both diversity and abundance of herbaceous plants increase with increasing elevation and moisture in the Monument (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 such as Greater sage-grouse, important watersheds, sources of forage for livestock, and enjoyable recreational sites. There is a range of conditions, primarily due to relative isolation and past and present land uses.

The Monument contains more than 500 kipukas, many of which have not been grazed by domestic livestock and have seen little in the way of other human-related disturbances. While fire, livestock grazing, recreation, or cheatgrass invasion have altered some of the kipukas, others that are protected by new rough lavas offer some of the best remaining examples of native sagebrush steppe for the Snake River Plain. They are valuable as examples of range conditions in the absence of domestic livestock, and offer an opportunity to observe climax vegetation, as well as successional processes associated with natural disturbances such as fire. Four of these areas — Carey Kipuka, Brass Cap Kipuka, Sand Kipuka, and Big Juniper Kipuka — were designated as Research Natural Areas for their long-term value as reference areas. Brass Cap, Sand, and Big Juniper Kipukas were formerly managed by the Bureau of Land Management; all four are currently under NPS management.

CHEATGRASS HAS INVADED EXTENSIVE AREAS OF SAGEBRUSH STEPPE HABITAT.

There are no proposed or listed threatened or endangered plants known within the Monument. However, two BLM sensitive plants are known to occur within the Monument. Obscure phacelia (*Phacelia inconspicua*) is one of Idaho's most rare plants, with only six occurrences (population areas) known statewide. This species is also listed as endangered in Nevada. It is a diminutive annual that occurs on north- and east-facing slopes of volcanic-based mountains and buttes. Picabo milkvetch (*Astragalus oniciformis*) is a perennial species that is narrowly endemic to stable, sandy soils near the foothills of the Pioneer Mountains and in the central portion of the northern Snake River Plain.

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.

Between 1970 and 2005, more than 300,000 acres have burned in wildfires within the boundary of the expanded Monument, primarily on BLM-administered land. Nearly a third of this acreage

THE 2006 SHALE BUTTE FIRE IN LOW ELEVATION SAGEBRUSH STEPPE.

has burned two or more times. 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 (632 acres). Overall, fires within the original NPS Monument boundaries represent less than 10% of the total area burned since 1970.

The length and timing of the fire season is highly dependent on annual weather and fuel conditions. Generally, the season can extend from mid-May through mid-October. Warm, dry, and windy weather associated with thunderstorm cells can result in lightning activity with or without rain. Ignition of vegetation can occur from natural sources, primarily lightning, or from human sources such as vehicles, campfires, or cigarettes.

Fire management in the Monument is directed by the Fire Management Plan for the South Central Idaho Fire Planning Unit (USDI 2005), and the NPS Craters of the Moon National Monument Wildland Fire Management Plan (USDI NPS 2000a) within the original Monument boundaries. Under these plans, all wildfires are suppressed except for naturally ignited fires in designated wilderness, which may be managed for resource benefit (also known as wildland fire use).

Federal wildland fire policy (USDI and USDA 1995; USDI et al. 2001; USDI BLM 2003) focuses on protecting sensitive resources while using fire along with other treatments (such as herbicides and seeding) to achieve desired future conditions for vegetation resources. Currently all federal land management agencies are implementing, or preparing to implement, this policy through a cohesive strategy (Laverty and Williams 2000). This strategy presents guidelines for reducing wildland fire risk to human communities and to restore and maintain ecosystem health within fire-prone areas.

The cohesive strategy is based on the concept of restoring vegetation composition and structure (and thus fire regimes) to historical levels. As part of this process, three fire condition classes (FCC1 through 3) have been identified to help clarify the degree to which a particular vegetation community departs from its historic fire regime, with FCC1 having the least departure and FCC3 having the greatest. These ratings, along with recent inventories, were used to categorize vegetation conditions within the Monument and prioritize areas for fuels reduction and restoration projects (see Figure 6 and Table 3). In general, FCC3 corresponds with poor biotic integrity, FCC2 with fair biotic integrity, and FCC1 with good biotic integrity.

Ten species of weeds designated as noxious by Idaho State Law (State of Idaho 2001) have been identified in the

CONTROL OF NOXIOUS WEEDS REQUIRES CONTINUOUS CONTROL EFFORTS.

TABLE 3. APPROXIMATE ACREAGE OF EACH VEGETATION TYPE IN THE MONUMENT AND PERCENTAGE THAT OCCURS IN EACH FIRE CONDITION CLASS

VEGETATION TYPE	APPROXIMATE ACREAGE IN MONUMENT	% FIRE CONDITION CLASS 1	% FIRE CONDITION CLASS 2	% FIRE CONDITION CLASS 3
Low-Elevation Sagebrush Steppe	157,000	40	20	40
Annual Grassland (exotic)	31,000	0	0	100
Perennial Grassland (seeding and native)	153,000	10	90	0
Mid-Elevation Sagebrush Steppe	9,400	0	100	0
Lava (bare and vegetated)	399,000	100	0	0
Mountain Shrub	400	50	50	0
Aspen	60	0	100	0
Conifer (Douglas fir)	140	50	50	0
Riparian	670	90	10	0

RUSH SKELETON WEED IS A NEW INVADER OF THE MONUMENT.

Monument: spotted knapweed, diffuse knapweed, Russian knapweed, rush skeletonweed, leafy spurge, Canada thistle, musk thistle, Scotch thistle, dalmation toadflax, and field bindweed. Most of the noxious weeds occur in areas particularly susceptible to invasion by exotics — previously disturbed areas such as road rights-of-way, intensively grazed areas, and wildland fire burns.

Other invasive exotic species such as cheatgrass are as much of a concern as state-listed noxious weeds. Cheatgrass is extremely competitive and readily invades and dominates disturbed land. It is also a common component of undisturbed or otherwise healthy sagebrush steppe in an arid environment. Cheatgrass has been documented in several kipukas. This annual grass outcompetes native vegetation and perpetuates a frequent fire regime that further discourages regrowth of native species and encourages more cheatgrass. This has been a key management concern for the Bureau of Land Management and has driven the development of more effective disturbed land rehabilitation techniques.

Both the Bureau of Land Management and the National Park Service have implemented nationwide policies against invasive exotic species through integrated weed management programs. Selective herbicide programs to control these species are in effect. Limited biological control agents have been released. 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.

Desired Future Conditions:

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 (e.g., limber pine, aspen, and juniper) 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 (cheatgrass and other similar plants) 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 towards Fire Condition Class 1 (see Table 3).

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

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 habitats 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 materials 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 (see Figure 6; see also Jurs and Sands 2004).

VEG-8: Aggressive protection of existing sagebrush steppe communities and proactive restoration of areas with poor to fair biotic