DOE/EA-1431

Environmental Assessment for the Proposed Los Alamos National Laboratory Trails Management Program, Los Alamos, New Mexico

September 2, 2003

Department of Energy
National Nuclear Security Administration
Los Alamos Site Office

Contents

Figures

Tables

Acronyms and Terms

ac	acres
ADO	Associate Director of Operations
BMPs	best management practices
C&T EIS	Conveyance and Transfer EIS
cm	centimeter(s)
CEQ	Council on Environmental Quality
dB	decibels
dBA	A-weighted decibels
DOE	(U.S.) Department of Energy
DOI	Department of the Interior
EA	environmental assessment
EIS	environmental impact statement
EPA	(U.S.) Environmental Protection Agency
ER	Environmental Restoration (Project)
ESA	Endangered Species Act of 1973
FY	fiscal year
ha	hectares
HE	high explosives
in.	inches
IRMP	Integrated Natural and Cultural Resources Management Plan
JMVF	Jemez Mountains volcanic field
km	kilometers
km^2	square kilometers
LANL	Los Alamos National Laboratory
mi	miles
mi^2	square miles
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NERP	National Environmental Research Park
NHPA	National Historic Preservation Act
NMAAQS	New Mexico Ambient Air Quality Standards
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PRSs	potential release sites
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SHPO	State Historic Preservation Office(r)
SR	State Road
SWEIS	Site-Wide Environmental Impact Statement
SWPP	Storm Water Pollution Prevention (Plan)
TA	technical area
TCPs	traditional cultural properties
TLV	threshold limit value
U.S.	United States
yd^3	cubic yards

EXPONENTIAL NOTATION: Many values in the text and tables of this document are expressed in exponential notation. An exponent is the power to which the expression, or number, is raised. This form of notation is used to conserve space and to focus attention on comparisons of the order of magnitude of the numbers (see examples):

1×10^{4}	=	10,000
1×10^{2}	=	100
1×10^{0}	=	1
1×10^{-2}	=	0.01
1×10^{-4}	=	0.0001

Metric Conversions Used in this Document

Multiply	By	To Obtain
Length		
inch (in.)	2.50	centimeters (cm)
feet (ft)	0.30	meters (m)
yards (yd)	0.91	meters (m)
miles (mi)	1.61	kilometers (km)
Area		
acres (ac)	0.40	hectares (ha)
square feet (ft^2)	0.09	square meters (m^2)
square yards (yd^2)	0.84	square meters (m^2)
square miles (mi^2)	2.59	square kilometers (km^2)
Volume		
gallons (gal.)	3.79	liters (L)
cubic feet (ft^3)	0.03	cubic meters (m^3)
cubic yards (yd^3)	0.76	cubic meters (m^3)
Weight		
ounces (oz)	29.60	grams (g)
pounds (lb)	0.45	kilograms (kg)
short ton (ton)	0.91	metric ton (t)

Executive Summary

Los Alamos National Laboratory (LANL) workers, Los Alamos County residents, and visitors have all enjoyed using area trails since the earliest days of the Manhattan Project. Some recreational trails at LANL are culturally important to the neighboring Pueblos. Some LANL trails also link with trails on lands administered by other Federal agencies, the County of Los Alamos, and adjacent Pueblos. Lack of a trails policy at LANL has led to unsanctioned trails use, trespassing, and confusion regarding trails access at LANL. Some trails are listed as State cultural properties and may be eligible for National Register of Historic Places listing. Some trails traverse or are located near potential waste release sites. Some of the trails also cross the health, safety, and security buffer zones around research sites. Some trails traverse sensitive habitats for Federally listed threatened and endangered species.

At this time, the National Nuclear Security Administration (NNSA) must consider alternatives for trails management at LANL and make a decision regarding the implementation of a Trails Management Program at LANL. This programmatic environmental assessment (EA) provides decision makers and the public with an analysis of environmental impacts as required by the *National Environmental Policy Act of 1969* (NEPA). The U.S. Department of Energy (DOE) and NNSA must balance their Congressional mission requirements with other land use and stewardship considerations at LANL. The NNSA needs to determine the permissible public use of trails within LANL in order to facilitate the establishment of a safe, viable network of linked trails across the Pajarito Plateau that traverse land holdings of various private and government entities for recreational use and for alternate transportation purposes (such as riding bikes to and from residences and worksites). Additionally, in order to facilitate the appropriate use of trails by employees and officially invited guests at LANL, NNSA needs to determine the permissible use of trails within LANL for these users. The purpose of such action would be to provide acceptable access to trails within LANL where such use is desired and appropriate without posing a threat to DOE and NNSA mission support work at LANL or disrupting LANL operations. Public safety, operational security, and the protection of sensitive natural and cultural resources would be primary considerations in the establishment of such action at LANL.

The Proposed Action would consist of implementing a Trails Management Program at LANL to address LANL trails use by the public, LANL workers, and officially invited guests. A Trails Assessment Working Group would be established. Repair, construction, environmental protection, safety, and security measures would be formulated and implemented. End-state conditions and post-repair or post-construction assessments would be performed. The Proposed Action would have a minor effect on socioeconomics. This alternative would ideally foster a more balanced use of LANL trails while allowing some recreational use to continue. The establishment of a Trails Management Program would result in enhanced protection of cultural resources with minimal to negligible effects on the other LANL resources.

The Trails Closure Alternative would result in the closing of all existing trails to the public and LANL workers for recreational use purposes while allowing limited access by workers at LANL and officially invited guests. Similar to the Proposed Action Alternative the Trails Closure Alternative would have a minor effect on socioeconomics. There would be enhanced protection of cultural resources and minimal to negligible effects on the other LANL resources.

The No Action Alternative is presented to provide a baseline for comparative analysis as required by NEPA. Under the No Action Alternative, wildlife habitat degradation may slightly

increase but there would be no adverse effect. The possibility for damages to cultural resources would continue.

An overview of accident possibilities and probabilities associated with the three alternatives is also presented in this EA. Trail construction and use are relatively low-risk activities. Accident frequencies under the Trails Closure Alternative would be reduced compared to the Proposed Action, while the No-Action Alternative presents the highest accident risks.

Evaluation of cumulative effects for the three alternatives indicates that there would likely be only minimal and slight cumulative effects on affected resources as a consequence of the aggregate of the Proposed Action and past, present, and reasonably foreseeable future actions; and some positive cumulative effects to ecological and cultural resources as a consequence of the Proposed Action or the Trails Closure Alternative. The No Action Alternative could pose slightly negative cumulative effects to cultural and ecological resources and to environmental justice concerns. In conclusion, the effects of the Proposed Action, when combined with those effects of other actions would not result in cumulatively significant impacts.

Two alternatives were considered but dismissed: opening all existing trails at LANL to the public for unrestricted use would not be consistent with NNSA's primary mission; while reviewing individual trails in this EA to make specific recommendations for repair or closure was not considered to be as effective as the proposed Trails Management Plan.

1.0 Purpose and Need

Chapter 1 of this programmatic environmental assessment for a Trails Management Program presents the U.S. Department of Energy (DOE), National Nuclear Security Administration's (NNSA) requirements under the *National Environmental Policy Act of 1969* (NEPA), program objectives, background information on the proposal, relevant issues, the purpose and need for agency action, and a summary of public involvement activities.

1.1 Introduction

NEPA requires Federal agency officials to consider the environmental consequences of their proposed actions before decisions are made. In complying with NEPA, DOE and NNSA[1] follow the Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508) and DOE's NEPA implementing procedures (10 CFR 1021). The purpose of an environmental assessment (EA) is to provide Federal decision makers with sufficient evidence and analysis to determine whether to prepare an environmental impact statement (EIS) or issue a Finding of No Significant Impact.

At this time, the NNSA must make a decision regarding the establishment of an on-going Trails Management program to address the continuing use of existing social trails[2] at Los Alamos National Laboratory (LANL). This EA is therefore programmatic in nature. This program would consider the maintenance and upkeep of existing trails; the development of new trails; the reclamation of closed trails; and other associated actions. LANL is a Federal facility located at Los Alamos, New Mexico, that comprises 40 square miles (mi^2) (104 square kilometers [km^2]) of buildings, structures, and forested land. LANL is administered by NNSA for the Federal government and managed and operated under contract by the University of California. This EA has been prepared to assess the potential environmental consequences of initiating a LANL Trails Management Program; closing all social trails to further recreational use; and the No Action Alternative.

The general objectives of this EA are to (1) describe the underlying purpose and need for DOE action; (2) describe the Proposed Action and identify and describe any reasonable alternatives that satisfy the purpose and need for agency action; (3) describe relevant baseline environmental conditions at LANL; (4) analyze the potential indirect, direct, and cumulative effects to the existing environment from implementation of the Proposed Action, and (5) compare the effects of the Proposed Action with the No Action Alternative and other reasonable alternatives. For the purposes of compliance with NEPA, reasonable alternatives are identified as being those that meet NNSA's purpose and need for action by virtue of timeliness, appropriate technology, and applicability to LANL. The EA process provides NNSA with environmental information that can be used in developing mitigation actions, if necessary, to minimize or avoid adverse effects to the quality of the human environment and natural ecosystems should NNSA decide to proceed

[1] The NNSA is a separately organized agency within the DOE established by the 1999 *National Nuclear Security Administration Act* (Title 32 of the *Defense Authorization Act* for fiscal year (FY) 00 [Public Law 106-65]).

[2] The terms "social trails," "trails," and "unimproved trails and roads" are used within this EA to indicate trail treads that have developed at LANL with or without official DOE or NNSA approval. Trails are used primarily by walkers, but some are also used by runners, bicyclists, equestrians, and off-road motorized vehicles. "Pathways," as used in this EA, indicate routes that are improved with paving material, such as asphalt, gravel, or cement and are part of the approved and officially sanctioned pedestrian network within LANL. Pathways may include sidewalks, jogging paths, and other routes designed or designated primarily for foot traffic.

with implementing the Proposed Action. The ultimate goal of NEPA, and this EA, is to aid NNSA officials in making decisions based on an understanding of environmental consequences and in taking actions that protect, restore, and enhance the environment.

1.2 Background

The U.S. National Security Policy requires the NNSA to maintain core intellectual and technical competencies in nuclear weapons and to maintain a safe, and reliable, national nuclear weapons stockpile. NNSA fulfills its national security nuclear weapons responsibilities, in part, through activities performed at LANL. LANL is one of three national security laboratories that support DOE and NNSA responsibilities for national security, energy resources, environmental quality, and science.

The NNSA's national security mission includes the safety and reliability of the nuclear weapons in the stockpile; maintenance of the nuclear weapons stockpile in accordance with executive directives; stemming the international spread of nuclear weapons materials and technologies; developing technical solutions to reduce the threat of weapons of mass destruction; and production of nuclear propulsion plants for the U.S. Navy. The energy resources mission of DOE includes research and development for energy efficiency, renewable energy, fossil energy, and nuclear energy. The DOE's environmental quality mission for the DOE includes treatment, storage, and disposal of DOE wastes; cleanup of nuclear weapons sites; pollution prevention; storage and disposal of civilian radioactive waste; and development of technologies to reduce risks and reduce cleanup costs for DOE activities. DOE's science mission includes fundamental research in physics, materials science, chemistry, nuclear medicine, basic energy sciences, computational sciences, environmental sciences, and biological sciences, and often contributes to the other three DOE missions. LANL provides support to each of these departmental missions, with a special focus on national security.

The assignments of Congressionally mandated mission support functions have changed over the past 60 years as LANL has evolved from the original Manhattan Project, Project "Y" facility established in early 1943. The mission for the Manhattan Project was to develop the world's first nuclear weapon in support of the Nation's defense during World War II. The U.S. Army Corps of Engineers was responsible for the Manhattan Project and for choosing locations to conduct the various Project activities. The criteria established for choosing the Manhattan Project, Project Y site were as follows: (1) the site had to have adequate housing for 30 scientists; (2) the site had to be owned by the government or easily acquired in secrecy; (3) the site had to be large enough and uninhabited enough so as to permit safe separation of sites for experiments; (4) access to the site had to be easily controlled for security and safety reasons; and (5) there had to be enough cleared land free of timber to locate the main buildings at once. The site chosen for Project Y was the Los Alamos Ranch School, which consisted of several buildings, including a main school building (now known locally as Fuller Lodge) and several cabins and outbuildings. The location of the Los Alamos Ranch School was on one of the Pajarito Plateau mesa tops (now known as the Los Alamos town site mesa) situated along the eastern flank of the Jemez Mountains in northern New Mexico.

The area surrounding the Los Alamos Ranch School has been used for centuries. It was first populated by ancestors of modern day Pueblo People (Ancestral Puebloans migrated from the Mesa Verde Region surrounding the Four Corners Region and the Chaco Region of western New Mexico) including the Pueblos of San Ildefonso and Cochiti. It was used later by Spanish and

Mexican settlers and scattered American homesteaders. The Los Alamos area was used in the late 1800s and early 1900s to graze herds of cattle and sheep and to grow hay and other crops. Historic wagon roads and single-lane trails, some of which are centuries old, traverse the mesas and canyons of the region. A single unpaved roadway suitable for use by automobiles accessing the Los Alamos Ranch School was present in early 1943 when the U.S. Army Corps of Engineers took over the site.

> "Throughout the Pajarito Plateau there is a network of…trails, often connecting villages or leading to farming areas. They were cut and worn into the rock by generations of ancestral Pueblo people, barefooted or in sandals, passing back and forth from their mesa-top homes to the fields and to springs in the canyons below." (From the Tsankawi Trail pamphlet produced by Southwest Parks and Monuments Association for Bandelier National Monument).

After the end of World War II, the Manhattan Project, Project Y facility was assigned continuing nuclear-related activities and is operated today primarily as a nuclear research and development laboratory known as LANL. Los Alamos County residents and visitors alike have accessed LANL area trails for decades since the first scientists and their support personnel and family members made use of the already existing trails and wagon roads for recreational purposes and to move on foot between laboratory areas at a time when vehicles were not always the fastest means of travel in the area. New social trails have been created along with new footpaths and roads to facilitate the foot traffic and vehicle traffic. Many trails that link areas of significance to Pueblo People continue to exist, have been maintained since pre-European contact, and remain culturally important to the neighboring Pueblos.

Today, 60 years after the creation of the Manhattan Project, Project Y facility from the Los Alamos Ranch School, there are numerous social trails, footpaths, and roads that range over the mesas and canyons that make up LANL, Los Alamos County, and other nearby lands owned or administered by various private land holders, Federal agencies, and the Pueblo of San Ildefonso. LANL adjoins lands currently under the administrative control of the (U.S. Department of Agriculture) Santa Fe National Forest, the (U.S. Department of the Interior) Bandelier National Monument, the Pueblo of San Ildefonso, Los Alamos County, and various county-owned and private lands in Los Alamos and Santa Fe Counties. Figure 1 shows LANL in relation to the surrounding region and neighboring jurisdictions.

Lands located within the Pajarito Plateau, including LANL, host a complicated web of natural and cultural resources. LANL has many areas of suitable habitat for Federally protected threatened and endangered species of plants and animals. Big game species (such as elk [*Cervus elaphus nelsoni*], mule deer [*Odocoileus hemionus*]), and their natural predators (such as black bears [*Ursus americanus*] and mountain lions [*Felis concolor*]) make their homes at least part of the year within LANL boundaries. The major canyons at LANL have been mapped for 100-year floodplains, and scattered wetlands are present both within canyons and along mesa tops and canyon sides. There are many soil and geologic features of interest at LANL. LANL also has many unpaved forest access roads that are used and maintained for fire prevention and control and for security patrol purposes.

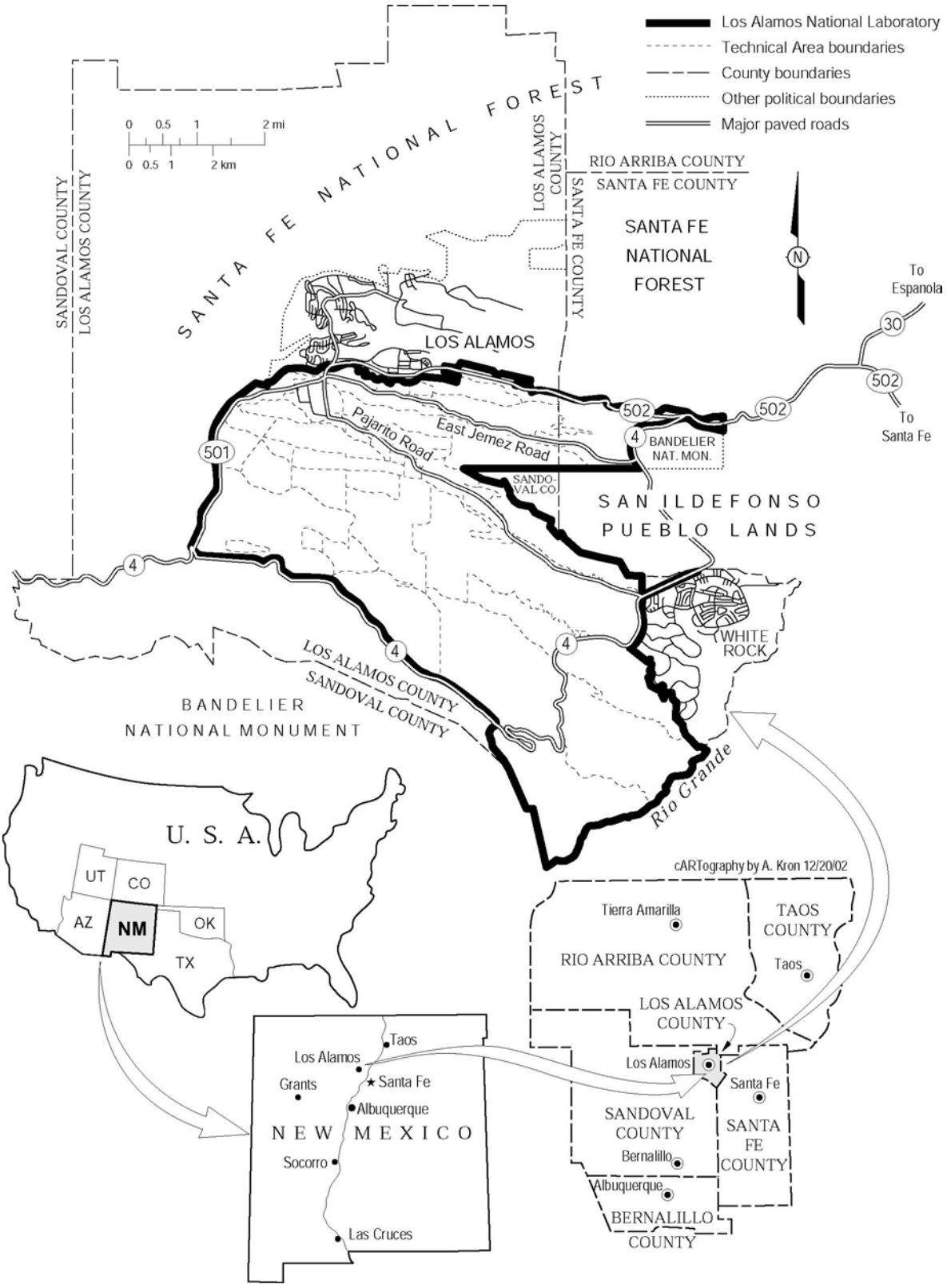

Figure 1. Location of Los Alamos National Laboratory.

LANL was designated in 1976 as a National Environmental Research Park (NERP) by the DOE with the goal of contributing to the understanding of how humans can best live in balance with nature, while enjoying the benefits of technology. This is accomplished by an integrated scientific approach for evaluation of the relevance of stressors to the environment and the mitigation of possible effects from these stressors. Trail use at LANL is one example of how this balance can be affected because lands within LANL have not been subject to some of the same stressors as lands adjacent to its boundaries in part due to the exclusion of grazing, hunting, and commercial activities for the past 60 years. Some adjacent landowners like the Pueblo of San Ildefonso have also excluded some of these same activities from their lands.

As previously stated, many of the social trails at LANL are important for their prehistoric and historic context and are of cultural significance to many people living and working in the area, including Pueblos nearby. Some of these trails have been evaluated for National Register of Historic Places (NRHP) significance, and the State Historic Preservation Office (SHPO) has determined that they are potentially eligible. In April 2003, the SHPO listed some of these roads and trails on the State Register of Cultural Properties (Slick 2003). Some trails fall within areas identified as potential release sites (PRSs) for wastes or areas of concern by the LANL Environmental Restoration Project. These areas may contain contamination as legacies of the Manhattan Project and from the early days of the facility's operation; many of the trails also are within the health, safety, and security buffer zones around research sites previously mentioned. Some of these trails are within sensitive habitat for Federally listed threatened and endangered species and may not be accessible during some portions of the year. Some of the LANL social trails are within or near the land tracts subject to or recently conveyed or transferred under the requirements of Public Law 105-119[3]. Conveyance of additional land to Los Alamos County under this act must occur before the end of the year 2007. Lands transferred to the Pueblo of San Ildefonso have been identified by the Pueblo as lands to be used exclusively by and at the discretion of the members of the Pueblo of San Ildefonso.

Both the Santa Fe National Forest and Bandelier National Monument support their respective Department's Congressionally assigned mission responsibilities for public recreation. These two Federal agencies have implemented land use plans establishing networks of trails on lands under their administrative control that are maintained for recreational use by the public. Bandelier National Monument had over 292,000 visitors in 2002, and has averaged about 344,000 annual visitors over the past decade.

At no time has DOE, or its predecessor agencies, been assigned any public recreational mission(s) by Congress. DOE and NNSA have no formal policy on public access to and recreational use of trails on DOE-administered land. However, individual facility programs for allowing workers and officially invited guests access to trails within facility boundaries for recreational use have been developed at some of the DOE Complex facilities (such as the Oak Ridge Reservation in Tennessee). At LANL, DOE has officially designated one trail for unlimited public hiking access, the commemorative Anniversary Trail, which is located on NNSA-administered land within Technical Area (TA) 74 at the eastern end of LANL near the Anderson Overlook along State Road (SR) 502. This trail was dedicated in 1993 to

[3] The potential conveyance and transfer of these 10 land tracts is the subject of the 1999 DOE/EIS-0293, *Final Environmental Impact Statement for the Conveyance and Transfer of Certain Land Tracts Administered by the U.S. Department of Energy and Located at Los Alamos National Laboratory, Los Alamos and Santa Fe Counties, New Mexico.*

commemorate the 50th anniversary of the Manhattan Project, Project Y through the cooperative efforts of the DOE, LANL, Los Alamos County, and community volunteers.

Inconsistent signing and fencing practices and the lack of a trail access policy at LANL have led to unsanctioned trail use and confusion regarding the approved use of trails and access to LANL lands by the public (Figure 2). The public has the impression that all trail use at LANL is condoned. There are popular trails that are posted with non-government issued signs. Non-DOE issued guidebooks and other sources, including sites on the World Wide Web, provide information about these trails, sometimes with and sometimes without cautionary caveats. Additionally, there are areas at LANL posted with government-issued signs indicating that daytime use is permitted that are also posted with conflicting "No Trespassing" signs. This situation has created ambiguity about permissible trail use, inconsistent trespass enforcement, and some confusion about exactly what constitutes trespassing, particularly from the perspective of the Pueblo of San Ildefonso whose ancestral lands comprise much of the east Pajarito Plateau region where LANL, Bandelier National Monument, the communities of White Rock and Los Alamos, and the Santa Fe National Forest are located. Additionally, the Pueblo of San Ildefonso and other nearby Pueblos are concerned about inappropriate trespassing by LANL trail users onto lands belonging to the Pueblos. The problem of confusing signs within LANL has been addressed in part with the initiation of a Way Finding and Signage Concept Plan that is intended to provide more uniform and helpful directions for visitors and employees. This plan is being phased in as part of revised design specifications and engineering standards, and as budgets permit.

Figure 2. Examples of inconsistent signing and fencing practices at LANL.

NNSA and the LANL management contractor recognize the importance that the social trails at LANL play in the use and enjoyment of the area by its inhabitants and LANL workers and officially invited guests. Many of the social trails are in daily use while others are used less frequently (Figure 3 shows some of these trails). A large number of the LANL research areas are remote and are scattered about LANL; these research areas may have large health, safety, or security designated buffer zones associated with them. Some of the more densely developed and improved areas of LANL lack adequate or convenient vehicle parking. In both instances, the social trails at LANL serve both recreational and work-related uses for foot and bicycle traffic at LANL.

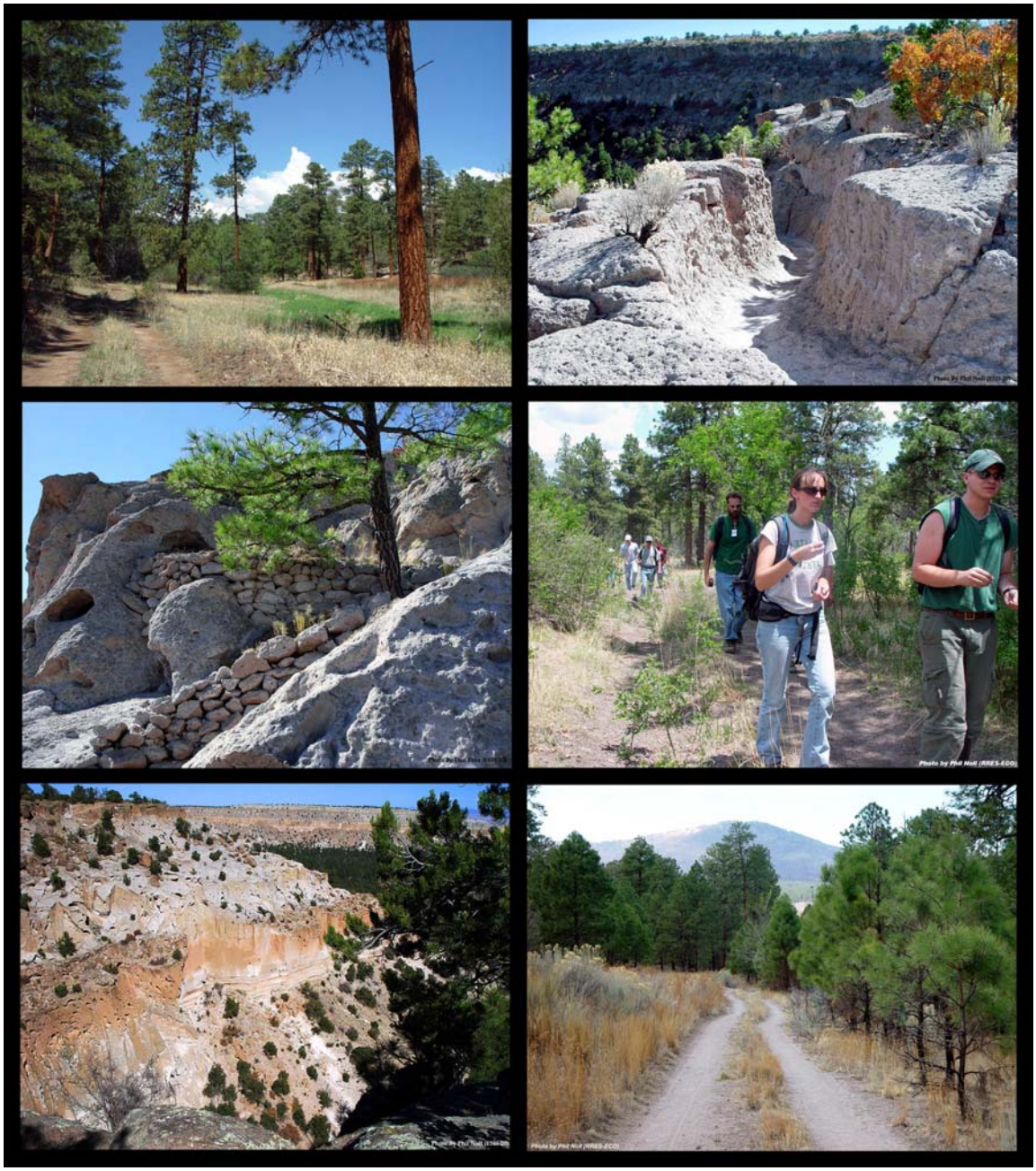

Figure 3. Views of trails at LANL.

Los Alamos County has established a Parks and Recreation Board that includes a Trails and Pedestrian Pathway Subcommittee. The purpose of this subcommittee is to consider the use and maintenance of a network of interconnecting trails around Los Alamos County that provides links to areas nearby. In 1994, Los Alamos County adopted a *Trails Management Plan for Los Alamos County* (LAC 1994). This Plan recognized the necessity of cooperation and participation with other area land owners and stewards that would be needed for successful implementation of an urban trail system connecting Los Alamos town site and White Rock communities with trails that reach into land administered by the NNSA, Santa Fe National Forest, and Bandelier National Monument. In July of 1995, the Subcommittee presented a formal report to DOE proposing that 17 trail corridors be established (LAC 1995). Subsequently, the Trails and Pedestrian Pathways Subcommittee has contacted DOE, NNSA, and LANL requesting information regarding DOE's public trail use policy and advocating for official sanction of public access to some LANL trails. This Federal action would require the NNSA to determine and formally designate trails for public use.

The May 2000 Cerro Grande Fire has caused NNSA and LANL to periodically close trail areas within LANL to recreational and unapproved worker use due to various threats. During extreme fire danger periods many trails and roads have been closed to both recreational and work-related uses in an effort to both prevent new wildfires and to protect members of the public and workers along the trails should a wildfire occur. Likewise, trails that traverse canyon bottoms have been periodically closed to the public during summer months due to the enhanced post-fire threat of flash flooding. Safe maintenance of LANL social trails has become a recent concern with regard to soil erosion occurring along the trails, most of which haven't been maintained in any routine fashion over the past 60 years. Other major LANL trail use concerns include the issue of appropriate trail use at LANL and security threats to LANL and its NNSA mission assignments.

Pertinent Trails Issues

- *DOE, NNSA does not have a public recreational mission established by Congress.*
- *Public gets conflicting messages because signs, access controls, and enforcement at LANL vary.*
- *Trespassing occurs from LANL onto adjacent lands where trail use is not permitted.*
- *Trail use poses threats to some cultural and natural resources.*
- *Trail use in certain LANL areas increases the risks of human exposure to PRSs and other operational and natural hazards. Some of the natural hazards have been magnified by the Cerro Grande Fire.*
- *Security concerns are posed by the use of certain LANL trails.*

1.3 Statement of Purpose and Need for Agency Action

DOE and NNSA must balance their Congressional mission requirements with other land use and stewardship considerations at LANL. The NNSA administers the 40-square-mile LANL property that adjoins lands under the administrative control of the Santa Fe National Forest;

Bandelier National Monument; the Pueblo of San Ildefonso; Los Alamos County; and various public and private lands in Los Alamos and Santa Fe Counties. There are many unimproved social trails at LANL that are used by its employees and officially invited guests[4], as well as by local residents and the general public, for work-related, cultural, and recreational reasons. Throughout the past six decades people have used these LANL social trails for getting to and from work and for recreational purposes such as hiking and riding horses, bicycles, and other mechanical and motorized devices. Many of these trails originate outside LANL boundaries and may traverse land administered or owned by several government entities or private parties. These social trails include unpaved trails, roads, and portions of prehistoric and historic trails and roads that may be eligible for inclusion in the NRHP. LANL social trails also traverse areas of potential contamination and areas where sensitive natural and cultural resources are present.

The NNSA needs to determine the permissible use of trails within LANL in order to facilitate the establishment of a safe, viable network of linked trails across the Pajarito Plateau that traverses land holdings of various private and government entities for recreational use and for alternate transportation purposes (such as riding bikes to and from residences and worksites). The purpose of such action would be to provide acceptable access to trails within LANL where such use is desired and appropriate without posing a threat to DOE and NNSA mission support work at LANL or disrupting LANL operations. Public safety, operational security, and the protection of sensitive natural and cultural resources would be primary considerations in the establishment of such action at LANL.

1.4 Scope of This EA

A sliding-scale approach (DOE 1993) is the basis for the analysis of potential environmental and socioeconomic effects in this programmatic EA. That is, certain aspects of the Proposed Action have a greater potential for creating environmental effects than others; therefore, they are discussed in greater detail in this EA than those aspects of the action that have little potential for effect. This EA, therefore, presents in-depth descriptive information on ecological resources such as threatened or endangered species to the fullest extent necessary for effects analysis. On the other hand, implementation of the Proposed Action would have no effect on land use or visual resources at LANL. Thus, no description of such effects is presented.

When details about a Proposed Action are incomplete, as a few are for the Proposed Action evaluated in this EA, a bounding analysis is often used to assess potential effects. When this approach is used, reasonable maximum assumptions are made regarding potential aspects of project activities (see Chapters 2.0 and 3.0 of the EA). Such an analysis usually provides an overestimation of potential effects. In addition, any proposed future action(s) that exceeds the assumptions (the bounds of this effects analysis) would not be allowed until an additional NEPA review could be performed. A decision to proceed or not with the action(s) would then be made.

1.5 Cooperating Agencies

The CEQ Regulations (40 CFR 1500-1508) define cooperating agency as any Federal agency other than lead agency which has jurisdiction by law or special expertise with respect to any

[4] "Officially invited guests" is intended by this EA to describe people who have been invited by DOE or the LANL contractor to be at LANL for any purpose deemed appropriate by DOE or the site contractor. These individuals may include the staff of regulatory agencies, members of Native American Pueblos and Tribes, and members of various search and rescue teams, emergency responders, or security teams.

environmental impact involved in a proposal, and specifically notes that a state or local agency or Indian tribe may also become a cooperating agency by agreement with the lead agency. Part 1501.6 provides specifics on the roles of a cooperating agency. On November 26, 2002, NNSA as the lead agency for the preparation of this EA invited Los Alamos County, the Santa Fe National Forest, Bandelier National Monument, and the four Accord Pueblos[5] to be cooperating agencies. Bandelier National Monument has become a cooperating agency while Los Alamos County, the Forest Service, San Ildefonso Pueblo, and Santa Clara Pueblo have instead chosen to participate less formally by attending scheduled management review team meetings, providing comments, and reviewing the draft document.

1.6 Public Involvement

DOE, NNSA provided written notification of the planned preparation of this EA to the State of New Mexico, the four Accord Pueblos, Acoma Pueblo, the Mescalero Apache Tribe, and to over 30 stakeholders in the LANL area on March 25, 2002. Upon issuance of the predecisional draft EA on July 11, 2003, NNSA again notified these parties of the availability of the EA for review and comment through August 5, 2003, by letter. Over the following week, notices of the availability of the EA for review and comment were also placed in three local newspapers and on the LANL electronic Daily NEWSBulletin, as well as the LANL-on-line Meeting Calendar. These notifications included information about a public information and EA comment opportunity meeting held in Los Alamos on July 30, 2003. Additionally, three days before the meeting public notice announcements of the meeting were aired on KRSN AM Radio and on the day of the meeting an article appeared on the front page of the Los Alamos Monitor newspaper. Comments on the draft EA received or postmarked before the end of the 21-day comment period were considered where appropriate and to the extent practicable in the preparation of the final EA; comments received after August 5, 2003, were considered to the extent practicable in the preparation of the final EA.

In total, 125 comment documents were received on the Trails Management Program EA. The comment documents included transcriptions of telephone calls, letters, and e-mail messages that have been reproduced and placed in Appendix A of this EA. Primary themes of the comments received on the predecisional draft EA included: *expressions of personal preferences regarding one or more of the three alternatives analyzed in the EA; concerns regarding adequate public notice of the proposed Trails Management Program, the meeting held on July 30th, and of the NEPA compliance process; concerns regarding the quality of life at Los Alamos and the health and well being of LANL workers and Los Alamos residents; concerns and suggestions for implementing a Trails Management alternative; concerns about trails access while a Trails Management Plan was being implemented; concerns about access to trails by emergency response teams, including their use by these teams for training purposes, if trails were closed*; and *suggested revisions to the Draft EA*. These major comment themes are elaborated upon in the following bulleted text and general NNSA responses are provided in the paragraphs that follow.

[5] Four Pueblos that have each executed formal accord documents with DOE setting forth the government-to-government relationship between each of the Pueblos and DOE. The four Pueblos are Cochiti, San Ildefonso, Santa Clara, and Jemez.

General Comments:

Many commenters expressed their personal preference for implementation of one of the alternatives analyzed. Reasons cited for preferring the Trails Management Program Alternative, the Trails Closure Alternative, or the No Action Alternative included: concerns that efforts to manage the trails would not receive adequate funding or staffing and that the management process would not include representation of certain user groups; fears that all or most trails would be closed to recreational opportunities or to certain user groups; a lack of any perceived problem with the status quo, and recognition that resources were being adversely effected in some areas and that repairs to some trails were needed.

NNSA Responses:

LANL management, taking into consideration the recommendations provided by the Trails Assessment Working Group and other stewardship priorities, would establish funding and staffing levels for implementing a LANL Trails Management Program. It would be expected that resources requested by that group would be commensurate with anticipated work identified as being needed over the next year and would be dependent upon the trail(s) being evaluated. The Trails Assessment Working Group would seek input or recommendations from various user groups as they determine necessary or advisable. With such a long-term, on-going effort, it is expected that over the years many people will be involved in the program at many different levels of involvement. As stated in Chapter 2.1 of the EA, one of the goals of the proposed Trails Management Program would be "to facilitate the establishment of a safe, viable network of linked trails across the Pajarito Plateau that traverse land holdings of various private and government entities for recreational use and for alternate transportation purposes without posing a threat to DOE and NNSA mission support work at LANL or disrupting LANL operations." Meeting this goal would be incompatible with closing all trails at LANL. This goal could be met, however, through the LANL Trails Management Program at LANL by one of at least three means: by rerouting segments of trails to avoid sensitive resources, by closing trails if segment rerouting were not possible, or by opening new trails that do not endanger sensitive resources. Since LANL operations to facilitate DOE and NNSA mission responsibilities shall be conducted in compliance with applicable environmental and cultural laws and regulations, most conflicts between meeting legal and regulatory needs can be resolved by rerouting segments of trails; or if this were not feasible, a trail may be closed. Under the program, new LANL trails could be planned and constructed as proposed or a need was identified. Chapter 1 of the EA identifies issues and concerns related to the status quo with regard to trail use at LANL. The information presented in the EA does not detail the specifics about existing individual trails that require correction in order for NNSA to meet some of our regulatory responsibilities. Continuation of the status quo does not meet NNSA's stated Purpose and Need for Agency Action, and it would not provide for circumstantial changes that may occur over time or reactions to altered environmental conditions that may be needed. While certain individuals may be happy with their preferred trails as they currently exist and not wish them to change, change in nature is inevitable and the status quo does not provide a mechanism to reasonably address changes as they become needed. Other individuals have recognized erosion along the trails they use and would like to see the situation addressed before significant damage or undesirable changes have occurred.

General Comments:

Reasons cited for concerns regarding adequate public notice of the proposed Trails Management Program, the meeting NNSA hosted on July 30th, and of the NEPA compliance process included: a perception of inadequate prior notification of the preparation of an EA or of the proposed Trails Management Program; a perceived lack of adequate advance notification effort on the part of NNSA for the meeting; a desire to have the draft EA document electronically publicly available; a desire for a longer comment period; and a lack of understanding of the NEPA compliance process, including the length of the comment period, the need to apply that process to the proposed program at LANL, and the need for consideration of the Trails Closure Alternative as a reasonable alternative to the Agency's purpose and need for action.

NNSA Responses:

As stated in the first paragraph of this section of the EA, the NNSA made reasonable attempts and put forth reasonable effort to notify interested parties about both the preparation of the EA and about the meeting it hosted on July 30th. In complying with NEPA, the NNSA adheres to the Council on Environmental Quality's NEPA implementing regulations (40 CFR 1500-1508), to the DOE's NEPA implementing regulations (10 CFR 1021), and to DOE's NEPA implementation order (DOE O451.1b). These regulations identify the NEPA compliance process and establish how DOE will undertake NEPA compliance actions, including what constitutes an "action" for which DOE must consider NEPA compliance, notification to be undertaken of the preparation of NEPA documents, the comment and review period allowed, the range of reasonable alternatives that need to be analyzed in NEPA documents, and so forth. For example, the DOE's NEPA implementing regulations establish that EA comment periods will be from 14 to 30 days long at DOE's discretion (10 CFR 1021. 301); in complying with NEPA, all reasonable alternatives for meeting the identified Agency purpose and need for action must be analyzed in an EA, even those that may not be popular or desirable due to other factors. NNSA places NEPA documents in DOE Reading Rooms and to the extent allowed, in public libraries. Before the tragic events of September 11, 2001, DOE routinely placed its NEPA documents on the World Wide Web for public review. Since that time, DOE has revised its policy of placing electronic versions of NEPA documents on the Internet and is carefully screening all documents its posts to its websites. As a result not all NEPA documents are available to the public via the Internet system or if available may not be posted in a timely fashion. We regret any inconvenience this may cause. Hardcopies of NEPA documents remain available upon request.

General Comments:

Reasons cited for concerns regarding the quality of life at Los Alamos and the health and well being of LANL workers and Los Alamos residents included: the perceived love of outdoor recreational opportunities that is believed to be pervasive in the Los Alamos community and among LANL workers; the perception that area trails are assets to recruiting and keeping LANL workers, serve as assets to the town, and enhance property values and local tourism efforts; concerns that recreational access to trails located within Santa Fe National Forest would be eliminated if certain trails were closed; fears that certain user groups would be excluded from using any of the LANL trails or the trails of their choice; concerns that LANL trail closures

could result in more people using roads and highways for commuting and recreational purposes resulting in elevated safety concerns; concerns that the Cerro Grande Fire and other LANL-related events have sufficiently reduced the quality of life for area workers and residents that trail closures would be a "final straw" resulting in people moving from the area and in leaving the local job force; and concerns that the temporary and permanent closure of trails due to high fire danger conditions, unsafe post-fire conditions in the general Los Alamos area, or the transfer of certain land away from DOE ownership, has enhanced the desirability of LANL trails for recreational use as trails on other properties have been closed and the cumulative loss of the use of LANL trails would further adversely affect the general quality of life for area residents and also the morale of LANL workers.

NNSA Responses:

As stated in Chapters 1 and 3 of the subject EA, there are many trails within the LANL area that reach across the Pajarito Plateau and pass through lands under the management, control or ownership of a variety of parties and entities. Many of these trails are centuries old; some of the trails are of very recent origin. A wide suite of natural and cultural resources is present along the trail reaches. The importance of the trails to various people living and working along the Pajarito Plateau is as varied as the individuals involved. As stated in Section 1.2, "NNSA and the LANL management contractor recognize the importance that the social trails at LANL play in the use and enjoyment of the area by its inhabitants and LANL workers and officially invited guests." Chapter 3.1 of the document, in describing the existing LANL environment, includes the statements: "Outdoor recreation is a significant component of tourism activity in Los Alamos County and adjacent counties. Trail access contributes in other ways to the local economy through contribution to overall quality of place. Outdoor recreational opportunity is an important component of what makes living in Los Alamos attractive to prospective residents and employees of LANL and other employers." The stated goals for proposed Trails Management Program would reinforce the acknowledged importance of trails to residents and workers of the Pajarito Plateau and further the use of trails by providing a mechanism for making necessary repairs and enhancements to the overarching system of trails. Many of the stated and unstated concerns about the quality of life and the health and well being of LANL and Los Alamos County workers and residents dovetail with the NNSA's proposal for a Trails Management Program to facilitate trails use for future generations to enjoy the use of trails as much or more than past generations have enjoyed them.

General Comments:

Reasons cited for concerns about and suggestions for implementing a Trails Management alternative included: concerns about adequate funding levels and staffing and fears of a de facto closure of all trails at LANL for recreational purposes due to a lack of adequate funding or staffing; the perceived desirability to community volunteer labor for performing trails maintenance and other work; concerns that a Trails Management Program should be implemented expeditiously rather than over a 10-year period; concerns about and suggestions for inviting the many user groups to participate in the management program implementation; suggestions for the need to provide adequate general public participation and comment in individual trail reviews, and suggestion that a formal DOE Trails Policy be written and adopted.

NNSA Responses:

Funding necessary to implement a trails management program, as already mentioned in this section, will be a function of work identified as being required. Requirements for implementing the Trails Management Program would be the subject of a Mitigation Action Plan (MAP). NNSA recommendations to the Trails Assessment Working Group for implementation of the Program could be provided through this Final EA, the MAP and subsequent Team discussions. How the trails are maintained, the level of maintenance required, the rate at which trails could be evaluated and actions implemented, and so forth, would be predicated by the intended user groups and the sensitivity of area resources to degradation by the users, among other factors. Establishment of a mechanism for inviting volunteer labor would be pursued as much for its desirable cost reduction benefit to the Program as for its desirable inclusion of the people who would benefit from the trails - the trails users. NNSA and DOE will not undertake a formal Trails Policy as suggested, however. Such a policy would not be germane to many DOE sites and is not needed in order to establish local use of trails at LANL.

General Comments:

Reasons cited for concerns about trails access while a Trails Management Plan was being implemented included: concerns about all of the trails being closed to recreational use while each individual trail is being reviewed and determinations about its closure or continuing use are made over the time it takes to complete a review of all the trails (about 10 years); concerns that certain trails could be closed for up to ten years while a particular trail awaits the management committee's review and determination; and concerns that trails closed to recreational use temporarily due to elevated level of wildfire danger would not be reopened when prevailing site conditions improved and the danger level returned to a more moderate state.

NNSA Responses:

Chapter 2 of the EA discusses the proposed Trails Management Program. Implementing the Program over a ten-year period was felt to be necessary given the complexity of the trail reaches and the issues surrounding the various trails reach areas, the difficulty of establishing a functional working group and other factors. The description of the Trails Management Program does not include the closure of all trails or the closure of any specific trails to recreational use pending their individual review and the completion of any repairs or other associated actions. The Program's description includes provision for temporary closures as needed, which would include closing a trail for the period of time needed to affect repairs or maintenance actions. Such closures are common with Bandelier National Monument and Santa Fe National Forest nearby and should not be of long duration. Trails within LANL were closed during the summer months of 2003 temporarily due to an enhanced level of fire danger as a result of the drought being experienced by the southwestern portion of the United States; these trails were reopened for recreational use in mid-August 2003. Temporary closures of trails over the Pajarito Plateau to recreational users may be necessary for a variety of reasons in the future and should not be confused with permanent trail closures that may also be necessary, but which would be clearly marked and refurbished as identified in the Proposed Action description.

General Comments:

Reasons cited for concerns about access to trails by emergency response teams, including the use of trails by these teams for training purposes, if trails were closed included: the need for multiple trail use to train search and rescue dogs for difficult terrain emergency search responses, the need for trails over a variety of terrain conditions to train dogs for emergency response work; and the need for firefighters and security personnel to have access to trails even if they were not LANL employees.

NNSA Responses:

Emergency response teams, groups and individuals, including any animals associated with their actions and training or testing exercises, would be accommodated at LANL and along trails at LANL under any of the alternatives considered in this EA. If a trail were closed to recreational use under the proposed Trails Management Program, the trail could remain open to LANL workers and officially invited guests. The definition of "officially invited guests" provided in Chapter 1 of the EA has been modified to provide examples of those individuals, teams, entities or organizations that comprise officially invited guests.

General Comments:

Reasons cited for revising the predecisional draft EA included: the need to change the tone of the EA so that it doesn't seem biased against trail users; the need to further consider the mental and physical health benefits derived from trails use and to expand the text regarding the benefits to LANL workers provided by the recreational opportunity of the trails network at LANL; the need to revise the impacts description of socioeconomic effects of the Trails Closure Alternative; the need to reconsider impact severity of trails use on some resources; the need to consider the benefits derived from trails use related to the security of LANL lands; and the need to include text to reflect the use of LANL trails by various community organizations or volunteer groups.

NNSA Responses:

NNSA is not of the opinion that the text of the EA is "biased against trail users" given that the Proposed Action specifically would facilitate recreational trail use at LANL, along with the other examples of EA text already repeated in this section. Nor is NNSA of the opinion that the text of the document requires major revision to change its overall "tone" of presentation. A review of the draft EA was undertaken and where appropriate, and to the extent practicable, minor text changes have been made in response to specific text changes recommended by those who commented.

This Page Intentionally Left Blank

2.0 Description of the Proposed Action and Associated Alternatives

This section describes three reasonable alternatives to address the NNSA's purpose and need stated in Chapter 1. The three alternatives are the Proposed Action (the Establishment of a Trails Management Program at LANL [LANL Trails Management Program Alternative]); the Trails Closure Alternative; and the No Action Alternative that reflects what is now happening and serves as a baseline with which to compare the consequences of the Proposed Action and the Trails Closure Alternative.

2.1 General Overview of Proposed Action (LANL Trails Management Program Alternative)

The Proposed Action would consist of implementing a Trails Management Program at LANL. This program would address both public use of social trails within LANL and also social trail use by workers at LANL and by officially invited guests. The five goals of this management program would be (1) to reduce the risk of damage and injury to property, human life, and health, and sensitive natural and cultural resources from social trail use at LANL; (2) to facilitate the establishment of a safe, viable network of linked trails across the Pajarito Plateau that traverse land holdings of various private and government entities for recreational use and for alternate transportation purposes without posing a threat to DOE and NNSA mission support work at LANL or disrupting LANL operations; (3) to maintain the security of LANL operations; (4) to respect the wishes of local Pueblos to maintain access to traditional cultural properties (TCPs) by Pueblo members while also preventing unauthorized public access to adjacent Pueblo lands and other lands identified as both religious and culturally sensitive areas to Native American communities; and (5) to adapt trail use at LANL to changing conditions and situations in a responsive manner.

There are about 57 miles (mi) (92 kilometers [km]) of social trails within LANL. A total of 13 major social trails have been identified and are known to be in general use at the LANL facility (see Table 1 for a list of these 13 trails). Under the Proposed Action, the 13 major social trails at LANL, and possibly others, would be reviewed through the Trails Management Program using uniform criteria to evaluate each in terms of the five program goals previously noted. Determinations to repair and maintain some social trails subject to specific controls, while

Table 1. Major Social Trails at LANL

Trail Name	Comments
Ancho Springs	Near White Rock Canyon Reserve
Anniversary	Easily accessible from Main Hill Road
Breakneck	Near Anniversary and Los Alamos Canyon Trails
Broken Mesa	Near White Rock Canyon Reserve
Dead Man Crossing	Crosses Los Alamos Canyon
Devaney-Longmire	Crosses Los Alamos Canyon
Los Alamos Canyon	Within Los Alamos Canyon
Mortandad Canyon	North of TAs 35, 50, and 55 and Pueblo land
Mattie Brook	Near TA-21 – a land transfer tract
Painted Cave Access	Close to San Ildefonso lands
Potrillo Canyon	Near White Rock Canyon Reserve
Water Canyon Loop	Near White Rock Canyon Reserve
Wellness Trails network	From TA-3 to TA-16, outside fence

closing other social trails to all recreational users would be made based on the evaluation criteria. Workers at LANL and officially invited guests performing tasks explicitly requiring use of a trail closed to recreational users, may be permitted to do so. Closed trail corridors would be reclaimed as appropriate through the Trails Management Program and signs would be posted to announce their closure. A public information and outreach program would be established to disseminate information about trail closures. Other existing social trails would be identified, considered for continuing use, and either repaired or reclaimed as appropriate. New trails proposed for development within LANL would undergo the same general review performed for the existing trails and may or may not be constructed based on the program assessment.

This Trails Management Program at LANL would initially be composed of a series of individual projects that would be conducted over about 10 years with ongoing, long-term trail maintenance projects conducted thereafter. These initial projects would be conducted to bring selected existing social trails at LANL to the desired end-state for appropriate use, followed by an on-going maintenance program to maintain the social trails in this desired state. One or two of LANL's social trails could be repaired or closed in any given year, contingent on funding. Individual initial and maintenance projects would be separately tailored to the specific needs and conditions of each social trail and would be composed of any or all of several different measures discussed below in this section. Individual projects would employ mechanical or manual repair methods.

New trail development would be considered after the known and identified existing social trails at LANL were evaluated and the trails designated for repair and long-term maintenance had been identified. Each project, for both new trails and for existing trails, would incorporate all of the planning measures listed in this EA section, along with the implementation of any or all of several different safety, security, environmental, and cultural resource protection, repair, and long-term maintenance measures for the identified trail. Additionally, each trail project may also include one or more of the post-repair monitoring and assessment measures detailed below. Measures may be employed either individually or in series for any given area at different time periods.

All program projects and their related activities would be conducted in compliance with LANL site permit requirements and all applicable local, state, and Federal laws and regulations. The Trails Management Program would be consistent with the LANL Comprehensive Site Plan and supporting planning and design standards and guidelines. The planning and implementation of individual projects would be coordinated with adjacent land managers and owners to optimize social trails management across the Pajarito Plateau.

The proposed LANL Trails Management Program would include the following project planning measures. Each of these measures is discussed in greater detail in Section 2.1.1.

- Individual Project Planning Measures
  - Establishment of a Trails Assessment Working Group
  - Trail Use Assessment and Needs Identification
  - Condition and Operational Assessment
  - Security Assessment
  - Identification of Resource Issues
  - Coordination with Land Management Agencies, Pueblos, and Land Owners
  - Development of End-State Conditions

- Formulation of Construction, Repair, and Environmental Protection Measures

After planning is completed and decisions made on which trails to repair or to close, the implementation of each project would include some or all of the following components of the repair and construction measures, environmental protection measures, safety measures, and security measures listed below and discussed in greater detail in Sections 2.1.2, 2.1.3, 2.1.4, and 2.1.5. Worker protection and health and safety measures would always be included for each project.

- Repair and Construction Measures
  - Equipment and Personnel Involved
  - Types of Repair or Construction Measures
- Environmental Protection Measures
  - Threatened and Endangered Species Protection Measures
  - Cultural Resources Protection Measures
  - Water Quality Protection Measures
- Safety Measures
  - Worker Protection and Health and Safety Measures
  - Public Safety Measures
- Security Measures
  - Types of Security Measures

Following the implementation of the repair measures, each individual project may also include one or more post-repair assessment measures and, at a minimum, would include assessment of the desired end-state conditions achieved by project implementation (discussed in detail in Section 2.1.6).

- End-State Conditions and Post-Repair or Post-Construction Assessment
  - Cultural and Ecological Field Studies
  - Watershed Assessment and Monitoring
  - Damages Assessment
  - Health and Safety Assessment
  - Security Assessment

Long-term maintenance projects would follow to maintain the desired end-state condition for each trail. Long-term maintenance measures would be planned according to the previously stated planning measures when it is determined that maintenance is necessary. Trail conditions would be reviewed about every five years or as needed. In addition to measures used initially to repair a trail, periodic mowing and grading of access roads and trail treads would also be employed during the long-term maintenance of some trails. Long-term maintenance measures would integrate environmental protection, public safety, and security measures in a similar manner as employed by the initial project. Engineering best management practices (BMPs) should be used to implement tasks addressing these issues.

A future trail maintenance project along a specific existing social trail might, for example, consist of all the listed planning measures; implementation of repair measures; implementation of measures for protection of environmental resources; post-repair end-state assessment and ecological field studies; and implementation of periodic long-term maintenance measures. A

future new trail might, for example, undergo all listed planning measures; undergo construction; and then undergo end-state assessment with cultural and ecological resources field studies.

2.1.1 Individual Project Planning Measures

The first step in the implementation of each project would be to formulate action plans that would identify potential trail uses and users and would assess potential risks and environmental concerns. Repair or construction plans would be developed later. The planning process would consist of several elements that are discussed as follows:

Establishment of Trails Assessment Working Group. LANL would lead and coordinate a standing committee that would include LANL cultural, ecological, health and safety, security, site planning, and facilities specialists and representatives from NNSA. Los Alamos County, Bandelier National Monument, the Santa Fe National Forest, and the four Accord Pueblos would be invited to participate. The Trails Assessment Working Group would convene as necessary to conduct trail assessments and needs identification and the health and safety, security, and resource assessments that are described below. The Trails Assessment Working Group would advise the LANL Associate Director of Operations (ADO) on trails management within LANL boundaries and, as appropriate, advise and represent the ADO on trails issues involving adjacent properties.

Use Assessment and Needs Identification. Trail users and uses of existing trails would be determined. This effort would be founded upon assessments conducted by the Trails Assessment Working Group. Existing and proposed trails would be inventoried and types of users identified using surveys of LANL workers and County residents. The need for future trails construction and use would be similarly assessed.

Condition and Operational Assessment. Trails at LANL present varying degrees of health and safety risks to users. Each trail would be evaluated to identify site conditions and for operational factors such as the presence of soils and vegetation contaminated with radioactive, organic, or high explosives products; and trail proximity to PRSs, waste storage areas, radiation buffers, high-explosives exclusion zones, or various experimental areas. Some trails may be suitable for general public use while others may be suitable only for workers at LANL and officially invited guests.

Security Assessment. Physical and operational security is essential to supporting LANL mission requirements. Trail use cannot create situations that would compromise this security. Each trail would be evaluated to determine security implications resulting from its continued use. A trail that may otherwise appear to be suitable for use by the public could be permanently or temporarily closed because of security concern issues.

Identification of Sensitive Resource Issues. Integral to the development of a Trail Management Program is the identification of resource issues particular to individual trail reaches within LANL. These resource issues or conditions can include the presence of threatened and endangered species in the area and associated potential or occupied habitat; the presence of cultural resources, including TCPs; the presence of wetlands; and susceptibility of the trail reach to erosion. Many of these resource issues are discussed in existing LANL documents. Management plans have been prepared for some of these individual resources, and when available, these plans would be prime information and guidance documents. For example, the LANL Threatened and Endangered Species Habitat Management Plan (LANL 1998) (currently

being modified to incorporate habitat changes as a result of the Cerro Grande Fire) is used to direct proposed activities away from areas of potential use by threatened and endangered species or to sufficiently impose mitigation measures on such activities so as to render them non-adverse in effect to the species or their potential habitat areas. Likewise, the presence of sensitive cultural resources on or near a trail could require all or a portion of the trail to be closed or rerouted. Additional regulator consultation with regard to the *Endangered Species Act of 1973* (ESA) and the *National Historic Preservation Act* (NHPA) may be required for trail projects planned within sensitive areas. Resource management plans for some sensitive resources at LANL are in development and will be completed over about the next five years. Identification of sensitive resource areas at LANL would be based on the current best available information and trail use would be considered for the trail reaches based on that information.

Coordination with Neighboring Land Management Government Agencies, Pueblos, and Other Land Owners. Coordination with neighboring land management entities would be integral to the trail use program planning process. Currently, coordination of issues spanning the Pajarito Plateau is accomplished through the East Jemez Resource Council, which is composed of regional governmental agencies, Pueblos, and other landowners who manage land along the east flank of the Jemez Mountains. This coordination would serve to maximize trail use planning and end-state conditions and could result in cooperative participation in the implementation of certain repair measures. The Trails Assessment Working Group could coordinate land management issues related to trails at LANL through working groups such as the East Jemez Resource Council. DOE's American Indian Tribal Government Policy (DOE 1992) outlines the process used to implement government-to-government consultations with neighboring Pueblos and Tribes. This policy would be employed when addressing the concerns of these communities.

Development of End-State Conditions and Recommendation to Close or Maintain Trails. One of the key planning objectives would be the ultimate trail condition that would be desired as the end-state of the projects initiated and maintained under the Trails Management Program. At most locations within LANL, the desired trail end-state condition for recreational use would be a trail with a minimum of readily visible engineered features that is appropriately accessible for its intended users. For LANL worker use, the desired end-state would be a trail that is in a safe condition and that perhaps minimized walking distances between two facility or use areas. In other cases, the desired end state would be to close and reclaim a trail and perhaps also to rehabilitate previously affected resources. Planning the exact end-state conditions desired for a trail would be accomplished through the steps previously mentioned and consideration of site and surrounding area conditions and the trail's identified cultural sensitivities. This could include either maintaining or closing a given trail or trail segment. End-state trail conditions would be regularly monitored and evaluated during post-treatment assessments. Options could include restricted use by workers at LANL for work-related purposes and by officially invited guests; or use could be open to the general public for recreational purposes. The appropriate options for end-state trail use would include non-motorized modes such as walking and hiking, horseback riding, cross-country skiing, and bicycling.

Formulation of Construction, Repair, and Environmental Protection Measures. Recognizing the planning considerations addressed above, construction and repair plans would be developed for each trail. Primary trail construction and repair measures would focus on enhancing the aesthetics of the trail for its intended users and those that address health and safety issues. These measures are further discussed in Section 2.1.2. The identification and inclusion of

environmental protection measures that would be taken to protect the quality of identified resources is discussed further in Section 2.1.3. These construction and repair plans would be referenced in any contract requirements.

Repair and construction work has the potential to disturb previously unknown hazardous waste disposal sites or previously unknown cultural resources. If excavation or construction activities disclose previously unknown or suspect disposal sites, work would be stopped and LANL's Environmental Restoration Project staff would review the site and identify procedures for working within that site area. Soils from PRSs may be returned to the excavated area after disturbance when feasible or would be characterized and disposed of appropriately. Should previously unknown cultural resources be discovered during construction or repair work, work would stop and LANL's cultural resources specialists would review the evidence, identify procedures for working in the vicinity of the cultural resources, and initiate any necessary consultation with Federal, state, and tribal entities.

2.1.2 Repair and Construction Measures

Initial repair, ongoing maintenance, and new construction measures would be identified for each trail project based on individual site conditions and the desired end-state results. Common to all projects would be the use of appropriate equipment and qualified personnel.

Equipment and Personnel Involved. A typical individual project would involve from 6 to 20 qualified personnel. One or two vehicles such as cars and light duty trucks may also be required. Areas with slopes that exceed 30 percent, and single-track trails, would not be repaired or constructed using vehicular equipment. Hand-held tools and equipment like shovels, axes, and chainsaws could be used to repair single-track trails and areas exceeding 30 percent slope. It may also be appropriate to use animals to bring equipment and supplies into such areas. Dust suppression requirements could necessitate the use of water spray trucks or hand-held spray equipment.

Types of Repair Measures. Typical repair and construction measures would be those normally associated with trails that have been frequently used but have lacked regular maintenance over the years. Access roads could be improved, or blocked and removed. A parking area might be expanded or improved, or closed off to use. A trail segment might be stabilized using engineering BMPs such as the use of silt fences, straw bales, organic mulch material, concrete, stones, or gravel to check erosion and improve trail safety. Signs and fencing or barriers would be installed to direct or redirect trails, or close off trails to future use. Trail segments could be repaired, reinforced, or reclaimed. Drainage elements, such as berms, check dams, drains, riprap, gabions or culverts, could be repaired, redirected, relocated, or installed. A site-specific National Pollutant Discharge Elimination System (NPDES) Storm Water Pollution Prevention (SWPP) Plan would be prepared, and a Notice of Intent (NOI) would be filed under the NPDES General Permit for construction activities, if necessary.

Some removal of individual trees and bushes along trails may occur during trail maintenance activities, such as the removal of damaged, dead, or so-called "hazard" trees. Additionally, some vegetation may be removed from small areas when these are cleared to enlarge existing or to construct new trailhead vehicle parking accommodations. Vegetation may also be selectively removed along new trail reaches as the construction of new trails occurred.

Repair and construction work would be planned, managed, and performed to ensure that standard worker safety goals are met and that work would be performed in accordance with good management practices, regulations promulgated by the Occupational Safety and Health Administration, and LANL resource management plans, including the Wildfire Hazard Reduction Program. To prevent serious work-related injuries, all site workers would be required to adhere to a construction safety and health plan reviewed by LANL staff before construction activities begin. Various DOE orders involving worker and site safety practices and environmental regulations and other laws may also apply. Engineering BMPs would also be employed.

2.1.3 Environmental Protection Measures

Integral to repair and construction measures for the Trails Management Program would be complementary measures to protect and enhance cultural and natural resources. The various environmental protection measures are discussed in more detail here. For any single project it would be unlikely that all the measures would be employed at the same time, but a single project may well use multiple protective measures to complement the chosen treatment measure(s).

Cultural Resources Protection Measures. The planning process would include the identification, as necessary, of cultural resources present along and near each trail and consideration of the historic significance of the trails. This identification process would include consultation with the four Accord Pueblos regarding the potential presence of TCPs and other traditionally or culturally sensitive areas as identified by these communities. Protective measures could include the following:

Repairs and Maintenance. Cultural resources would be avoided to the maximum extent practicable and may involve construction (or reconstruction) of trails (or segments of trails) around cultural resources (with the original trail being reclaimed in the case of existing trails). The perimeter of identified cultural features would be marked with flagging tape, or pin flags, or both. These sites would be field checked by trained archeologists with the repair or construction crews before field activities commence. If construction was necessary within an identified cultural resource feature, construction crews would be limited to performing work by hand. No tree cutting, piling, or dragging of materials across the surface of a cultural site would be permitted. The SHPO would be consulted as necessary, depending on the nature of the repair and maintenance.

Trail Construction. New trail alignments and ancillary drainage features would be planned to avoid cultural resources, including any TCPs. Cultural resources located near trail alignments would be identified with flagging tape, or pin flags, or both, to avoid inadvertent damage by equipment or personnel. These resources may also be fenced. Identification and protection measures would be removed following treatment activities to prevent the identification of the cultural resource and reduce the potential for vandalism.

Threatened and Endangered Species Protection Measures. The presence of threatened and endangered species and their potential or occupied habitats would be trail planning considerations. There are three Federal listed species that currently use LANL areas as habitat–the bald eagle (*Haliaeetus leucocephalus*), Mexican spotted owl (*Strix occidentalis lucida*), and the southwestern willow flycatcher *(Empidonax traillii extimus*). All features of planned trail actions and use would be developed and implemented in accordance with guidance and restrictions contained in the LANL Threatened and Endangered Species Habitat Management

Plan (LANL 1998) or developed in compliance with the ESA, and other pertinent laws and regulations.

Surface Water Quality Protection Measures. Trail-related environmental protection measures for avoiding potential adverse consequences to surface water quality would include the following:

- Pursuant to NPDES General Permit requirements for preconstruction activities, a SWPP Plan would be developed and implemented for trail projects and an NOI would be filed if required.
- Severely disturbed or denuded areas would be revegetated. Revegetation measures would use native species appropriate for the associated plant community.
- Storm water control structures would be constructed along trails as needed. These could include straw bales or log check dams during construction and repair and culverts, ditches, riprap, check dams, and similar permanent structures.
- Channel stabilization measures would be employed along trails as needed.
- Hand-held equipment would generally be used along trails to reduce the potential for erosion. Vehicular equipment would not be used in areas with slopes of greater than 30 percent, or on single-tread trails.
- Heavy machinery and vehicles would not be used during saturated soil conditions.
- Any new trail access roads would be constructed on slopes of less than 10 percent with bar ditches and turnouts, as appropriate.

2.1.4 Safety Measures

Safety measures would be put in place during trail repair, maintenance, and construction for worker and public protection and also when the trails are open for routine use.

Worker Protection and Health and Safety Measures. The following measures would be employed for the health and safety of trails workers:

- Trails workers would wear personal protective equipment suitable for the conditions of any given trail project.
- Trails workers would be appropriately trained when working in or near PRSs, radiological areas, and other hazardous areas.
- Access to trails being repaired or under construction would be restricted to involved personnel.
- Additional health and safety measures would be developed specific to site conditions as necessary.

Public Safety Measures. The following measures would be employed for public safety on LANL trails:

- Signs would be posted at trailheads declaring the rules and cautions for trail use. Signs prohibiting use would be placed at closed trailheads. Signs would have consistent appearance and be posted where they would be obvious pursuant to LANL Wayfinding design standards. Signs would list emergency phone numbers. Trail markers would be

placed along trails to be visible but not obtrusive. Appropriate signs would be used to preclude unauthorized public access during temporary trail closures.

- Physical barriers would be placed at trailheads or along trails to preclude inappropriate uses while permitting entry for intended users. These might employ structural or natural elements such as fences and gates, logs, or large rocks. In some cases, trails could be limited to specific uses such as only for walking or bicycling.
- Trail users on more remote trails not used for commuting purposes could be requested to sign in at the trailhead.
- Overnight use, smoking, camping, or campfires would not be allowed within LANL. Weapons, explosives, and other materials likely to cause substantial injury or damage to persons or property would not be permitted; nor would alcoholic beverages, controlled substances, lighters, or incendiary devices.
- Certain trails could be appropriate for equestrian use or for dog exercise or training use; access to these trails would be suitably provided and the trails would be appropriately posted. Other trails could be posted informing users that horses or dogs would not be permitted and trail access would exclude horses or dogs accordingly.
- Unauthorized motorized vehicles, including all terrain vehicles, scooters, mopeds, and motorcycles, would be prevented from using any trail within LANL boundaries.
- In order to minimize impacts to traffic, proper sizing and design of parking and gathering areas would consider ingress and egress from adjacent roads. Specific needs and designs would be assessed in the planning phase prior to construction to ensure minimal disturbance of traffic in critical areas.

2.1.5 Security Measures

The Trails Management Program cannot compromise LANL security. The following passive and active security measures would be incorporated into the Trails Management Program:

- Sign and fencing upgrades would be made around LANL.
- Signs would indicate where access is permitted and the use rules that apply. Other signs would prohibit entry to areas of LANL that are not publicly accessible.
- In certain instances, signs could preclude entry into areas that had previously been accessible by the general public.
- Fences could be installed in certain areas and at trailheads to help distinguish clearly those trails that would be open to the general public and those that would be closed to the general public.
- Security patrols would be enhanced contingent upon resources and funding. An interagency agreement could provide for enforcement (for example, by the National Park Service) based upon locations and the nature of the incursion or trespass.

2.1.6 End-State Conditions and Post-Repair or Post-Construction Assessment

The successful implementation of a Trails Management Program at LANL would be determined by assessing the achievement of resource goals and objectives listed in Section 2.1. A key

element of the Trails Management Program would be post-repair or post-construction assessments. This also refers to instances when a trail would be obliterated and closed. Field assessments would be conducted to monitor the effectiveness of measures undertaken to achieve the desired goals, the need to modify the measures used, and to help develop future management or repair strategies. The majority of post-repair or post-construction assessments would be conducted in the field. At a minimum, all trail projects would incorporate an end-state condition assessment. The following activities would compose the post-repair or post-construction assessments:

Cultural and Ecological Field Studies. Cultural and ecological studies are important tools for assessing the effects of employed protection measures on cultural resource sites and on the local fauna and flora. Based on need and funding, post-treatment studies would be initiated for archeological sites, historical sites, TCPs, threatened and endangered species and their habitat, large and small mammals, arthropods, birds, reptiles, amphibians, bio-contaminant availability, contaminant movement, and vegetation changes.

Field surveys for archeological and historical sites, as well as wildlife, and the vegetative characteristics of forests and woodlands are currently being conducted in the Los Alamos region. The results of these quantitative surveys are being used to develop cultural resources inventories, plant community classifications, and a more complete understanding of wildlife movements and populations in order to relate these classes to their respective environmental and topographic conditions. Information about the location and types of cultural resources present at LANL are useful to facilitate their protection from future activities or their restoration. Some of this information is protected under Federal and State of New Mexico regulations and laws and is not publicly available.

Watershed Assessment and Monitoring. The trail projects may require the development of a SWPP Plan per NPDES permit requirements. The SWPP Plan would list BMPs for monitoring and protecting watersheds for trails maintenance and use. Part of the monitoring program could be linked to the existing water-sediment discharge sampling station network located throughout the major drainages at LANL.

Damages Assessment. Trails would be monitored periodically for damage and treatments would be assessed to determine their effectiveness.

Health and Safety Assessment. Post-repair and post-construction trails assessments would be used to monitor and evaluate health and safety conditions, incidents, and occurrences.

Security Assessment. Security occurrences would be tracked for each trail and for the trail system to determine whether certain trails posed enforcement problems such as trespassing onto Pueblo lands or serious vulnerabilities to LANL operations.

2.2 Trails Closure Alternative

This alternative would result in the closing of all existing social trails to the general public and to LANL workers for recreational use purposes. Most LANL trails would be closed and reclaimed. Workers at LANL and officially invited guests engaged in official work and permitted activities would be allowed to continue using certain designated trails based upon the assessments and measures discussed previously in Section 2.1. DOE's American Indian Tribal Government Policy would be used to guide consultations with neighboring Pueblos in matters regarding trails closure. Trails designated for closure would be rendered inaccessible and undesirable by a

combination of physical barriers, enhanced security patrols, and penalties for trespassing. The closing of trails could include some of the components of repair and construction measures, environmental protection measures, safety measures, and security measures, as well as end-state conditions as described in Section 2.1 for the Proposed Action. Signs and fencing or manufactured or natural barriers might be installed to close off trails to future use. Trail beds and segments could be removed and restored to more natural conditions. Drainage elements, such as berms, check dams, drains, riprap, gabions, or culverts, could be repaired or installed to remediate closed trails. Cultural resources located near a trail being closed would be identified to avoid inadvertent damage by remediation equipment or personnel. Protection measures would be removed following treatment activities to prevent the identification of the cultural resource and potential for vandalism. Trail closures would be implemented in accordance with guidance and restrictions contained in the LANL Threatened and Endangered Species Habitat Management Plan (LANL 1998) or developed with further compliance with the ESA as necessary. Severely disturbed or denuded areas would be revegetated, and revegetation measures would use native species appropriate for the associated plant community. Trail workers would wear personal protective equipment suitable for the conditions of any given trail closure project. Trail workers would be appropriately trained when working in or near PRSs, radiological areas, and other hazardous areas, and access to trails being repaired or under construction would be restricted to involved personnel. Security patrols would be used according to need and budget. Post-closure field assessments would be performed.

2.3 No Action Alternative

The No Action Alternative describes existing conditions and serves as a baseline for comparing the potential environmental effects of the Proposed Action. It must be considered even if DOE is under a court order or legislative command to act (10 CFR 1021). Under this alternative, the existing social trails at LANL would continue to deteriorate and repairs would not be regularly performed. Over time, some trails may be closed for safety or security reasons. Closed trails would not be reclaimed or maintained. Limited repairs would continue to be made without an overall prioritization and without coordinating with adjacent landowners, Federal agencies, or tribal governments. New social trails would continue to be created. There would be no trails assessment, planning, or management process, nor would efforts to coordinate trails management with other jurisdictions occur. Signs, fencing, parking, and other trail-related improvements would not be made. Trespassing (both intentional and inadvertent) onto areas at LANL that are not intended for public access via unchecked trail use would continue with uneven enforcement. LANL operational and security concerns affected by trails would continue to be addressed on an incremental and uncoordinated basis.

2.4 Alternatives Considered but Dismissed

2.4.1 Open All Existing Trails at LANL for Unrestricted Recreational Use

Opening all existing trails at LANL to the public for unrestricted recreational use would be inconsistent with the primary mission assigned to NNSA by Congress. Trails management objectives would not be met by opening all existing trails at LANL to unrestricted recreational uses; such an action would compromise certain environmental and cultural resources, public health and safety, LANL security perimeters, and, ultimately, it would compromise LANL national security operations. This alternative was not analyzed further in this EA.

2.4.2 Individual Specific Trails for Repair or Closure (non-programmatic)

Another alternative that was considered during scoping this EA was to review individual trails at LANL and to make specific recommendations for a proposed action based upon an analysis of affected resources. This alternative was not considered further because it was not considered to be as effective over the long-term as the Proposed Action (establishing a Trails Management Program). Specifically, the Proposed Action establishes an ongoing program; such a program would allow for greater flexibility as laws, rules, regulations, DOE orders, and national and local conditions change. Considering specific individual trails with the intent of performing one-time maintenance or closing some of them was therefore not analyzed in this EA.

2.5 Related NEPA Actions and Documents

2.5.1 Final Site-Wide Environmental Impact Statement (SWEIS)

The Final LANL Site-Wide Environmental Impact Statement (SWEIS) (DOE 1999a), dated January 1999, was issued in February of that year. A Record of Decision (ROD) was issued in September 1999, and a Mitigation Action Plan was issued in October 1999. The SWEIS considered ecological, natural, and cultural resources at LANL and analyzed how they would be impacted by four alternative operating scenarios, but it did not specifically address trail use. This EA tiers from the SWEIS.

The SWEIS Mitigation Action Plan also establishes a commitment to develop and implement a Natural Resources Management Plan. The Natural Resources Management Plan would be used to effectively "manage natural resources in a fashion that directly supports DOE's Land and Facility Use Planning Policy by integrating mission, economic, ecological, social, and cultural factors into a comprehensive process for guiding land and facility use decisions at LANL" (DOE 1999a). In September 2002, NNSA issued the *Integrated Natural and Cultural Resources Management Plan* (IRMP) for LANL. The IRMP provides the conceptual framework for developing and implementing a Trails Management Program as part of appropriate management of natural and cultural resources at LANL.

2.5.2 Final Environmental Impact Statement for the Conveyance and Transfer of Certain Land Tracts Administered by the U.S. Department of Energy and Located at Los Alamos National Laboratory, Los Alamos and Santa Fe Counties, New Mexico (C&T EIS)

On November 26, 1997, Congress passed PL 105-119, the *Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Act,* 1998 (42 USC 2391). Section 632 of the Act directs the Secretary of Energy to convey to the Incorporated County of Los Alamos, New Mexico, or to the designee of Los Alamos County, and to transfer to the Secretary of the Interior, in trust for the Pueblo of San Ildefonso, parcels of land under the jurisdictional administrative control of the Secretary at or in the vicinity of LANL that meet certain identified criteria. A ROD for this action was issued in December 1999. DOE prepared the C&T EIS (DOE 1999b) to examine potential environmental impacts associated with the conveyance or transfer of each of the land parcels tentatively identified in the DOE's *Land Transfer Report to Congress Under Public Law 105-119, A Preliminary Identification of Parcels of Land in Los Alamos, New Mexico, for Conveyance or Transfer* (DOE 1998). Trail use was a concern considered in the C&T EIS analysis because changing the jurisdictions for some of the social trails could result in changes to how they are managed, or if they would remain open for

public use. Trails on lands conveyed or transferred would not be included in the Trails Management Program.

2.5.3 Special Environmental Analysis–Cerro Grande Fire

NNSA prepared a special environmental analysis (DOE 2000a) that documents its assessment of impacts associated with emergency activities conducted at LANL in response to major disaster conditions caused by the Cerro Grande Fire. NNSA would normally have prepared an EIS in compliance with NEPA to analyze potentially significant beneficial or adverse impacts that could occur if a proposed action was implemented. However, because of the urgent nature of the actions required to address the effects of the Cerro Grande Fire as it burned over LANL and the need for immediate post-fire recovery and protective actions, NNSA had to act immediately and was therefore unable to comply with NEPA in the usual manner. NNSA invoked the CEQ's emergencies provision of its NEPA Implementing Regulations (40 CFR 1500-1508) and the emergency circumstances provision of DOE's NEPA Implementing Regulations (10 CFR 1021). Pursuant to those provisions, NNSA consulted with CEQ about alternative arrangements for NEPA compliance for its emergency action. Consistent with agreements reached during those consultations, NNSA prepared the DOE/SEA-03 (DOE 2000a) of known and potential impacts from wildfire suppression, post-fire recovery, and flood control actions. The DOE/SEA-03 can be found in DOE Reading Rooms in Albuquerque (at the Government Information Department, Zimmerman Library, University of New Mexico), and in Los Alamos (at the Community Relations Office located at 1619 Central Avenue). Trail use was affected by the Cerro Grande Fire and the remediation that followed.

2.5.4 Wildfire Hazard Reduction and Forest Health Improvement Program at Los Alamos National Laboratory

This EA was completed in August 2000, just two months after the Cerro Grande Fire, and analyzed alternatives for implementing a Wildfire Hazard Reduction and Forest Health Improvement Program at LANL that would not use fire as a treatment measure. This ecosystem-based management program, which was implemented immediately, is a series of individual, small-scale projects using mechanical and manual thinning methods that includes ongoing, long-term maintenance projects. Following the Cerro Grande Fire, LANL implemented an aggressive forest-thinning project to address the immediate threat of wildfire to the site. As a result, an estimated 30 percent, approximately 7,500 acres (ac) (3,035 hectares [ha]), of LANL has been treated under this program using forest thinning and the construction of access roads and fuel breaks as treatment measures. Some of the trails subject to a Trails Management Program traverse these treated areas.

This Page Intentionally Left Blank

3.0 Affected Environment

This section describes the natural and human environment that could be affected by the Proposed Action, the General Public Trails Closure Alternative, and the No Action Alternative. The potential environmental consequences of those actions are presented in Section 4. Environmental issues are identified and addressed based on the "Sliding Scale Approach" discussed earlier in this EA (Subsection 1.4). Table 2 identifies the subsections in Sections 3 and 4 where potential environmental issues are discussed and notes those issues that are not affected by the Proposed Action.

Table 2. Potential Environmental Issues

Environmental Category	Applicability	Subsections
Socioeconomics	Yes	3.1, 4.1
Ecological Resources (biological resources and wetlands)	Yes	3.2, 4.2
Cultural Resources	Yes	3.3, 4.3
Water Quality	Yes	3.4, 4.4
Environmental Restoration	Yes	3.5, 4.5
Transportation, Traffic, and Infrastructure	Yes	3.6, 4.6
Health and Safety	Yes	3.7, 4.7
Environmental Justice	Yes	3.8, 4.8
Geology and Soils	Yes	3.9, 4.9
Waste Management	Yes	3.10, 4.10
Air Quality	Yes	3.11, 4.11
Noise	Yes	3.12, 4.12
Visual Resources	The Proposed Action, the Trails Closure Alternative, and the No Action Alternative would not affect visual resources.	NA
Land Use	The Proposed Action, the Trails Closure Alternative, and the No Action Alternative would not alter current land use designations at LANL.	NA

The Proposed Action would be implemented within the area of Los Alamos County that includes LANL. LANL comprises a large portion of Los Alamos County and extends into Santa Fe County. LANL is situated on the Pajarito Plateau along the eastern flank of the Jemez Mountains and consists of 49 technical areas spread out over 40 mi^2 (104 km^2). The Pajarito Plateau slopes downward towards the Rio Grande along the eastern edge of LANL and contains several fingerlike mesa tops separated by relatively narrow and deep canyons that are prone to flooding.

Commercial and residential development in Los Alamos County is confined primarily to several mesa tops lying north of the core LANL development, in the case of the Los Alamos town site, or southeast, in the case of the communities of White Rock and Pajarito Acres. Approximately 12 percent of the land in Los Alamos County is privately held. The lands surrounding Los Alamos County are largely undeveloped wooded areas with large tracts located to the north, west, and south of LANL that are administered by the Department of Agriculture, Santa Fe National Forest, and by the U.S. Department of the Interior (DOI), National Park Service, Bandelier National Monument. Lands to the east of LANL are administered by the DOI, Bureau of Land Management or San Ildefonso Pueblo.

Detailed descriptions of LANL's natural resources environment, cultural resources, socioeconomic, waste management, regulatory compliance record, and general operations are described in detail in the SWEIS (DOE 1999a). Additional information is available in the most recent annual Environmental Surveillance Report (LANL 2001a) and the *Special Environmental Analysis for the Department of Energy, National Nuclear Security Administration, Actions taken in Response to the Cerro Grande Fire at Los Alamos National Laboratory, Los Alamos, New Mexico* (DOE 2000a). These documents are available at the Public Reading Room at 1619 Central Avenue, Los Alamos, New Mexico.

3.1 Socioeconomics

About 20,000 people live in Los Alamos County and another 6,000 or so commute to work there. Bandelier National Monument had nearly 300,000 visitors in 2002. Tourism in Los Alamos County, although not a major component of the local economy, is nonetheless very important to businesses that derive trade from it. Outdoor recreation is a significant component of tourism activity in Los Alamos County and adjacent counties. Trail access contributes in other ways to the local economy through contribution to overall quality of place. Outdoor recreational opportunity is an important component of what makes living in Los Alamos attractive to prospective residents and employees of LANL and other employers. The Los Alamos area is home to several active volunteer search and rescue teams that provide important emergency services throughout the state. Canine search teams, equestrian mounted search personnel, communications, high angle rescue and medical teams contribute to the overall safety and security of state citizens. These teams and groups use LANL area trails for training and testing purposes. Several hundred miles of trails and unimproved roads traverse the Jemez Mountains, of which the Pajarito Plateau is a small part. The new Valles Caldera National Preserve will also draw visitors from the region and the nation.

LANL and Los Alamos County operations have a notable and positive influence on the economy of north-central New Mexico. Specifically, in FY01 (the latest year for which such information is available) LANL had an operating budget that was $1.667 billion and a total workforce of 13,570. Salaries and benefits accounted for $880 million. This translated into a $3.8 billion impact on the tri-county region that includes Los Alamos, Santa Fe, and Rio Arriba Counties. In effect, nearly one of every three jobs in the tri-county region was created or supported by LANL FY01 procurements in northern New Mexico which were $357 million (LANL 2002). Approximately 80 percent of the jobs created indirectly by LANL in the region occurred in the trade, finance, insurance, real estate, and services sectors (DOE 1999a). The FY03 budget for Los Alamos County proposed $205.5 million in expenditures, predominantly for operations and labor costs (LAC 2003).

One of the beneficial results of being home to LANL is that Los Alamos County has one of the highest median household incomes in the nation at $78,993 according to the 2000 Census. Families living below the poverty level in Los Alamos County accounted for just 1.9 percent of all families. This compares with a median household income of $34,133 for the State of New Mexico, which has 14.5 percent of all families living below the poverty level (USCB 2000a). Nearly 95 percent of a total of 7,937 housing units were occupied in Los Alamos County, and 79 percent of the total units were owner-occupied. The rental vacancy rate was about 11 percent as reported in the 2000 Census (USCB 2000b).

3.2 Ecological Resources

Biological resources include all plants and animals, with special emphasis on Federally listed threatened and endangered species protected by the ESA (16 USC 1531), and floodplains and wetlands. The Los Alamos region is biologically diverse. This diversity is due partly to the pronounced 5,000-ft (1,500-m) elevation gradient from the Rio Grande to the Jemez Mountains and partly to the many canyons that dissect the region. Five major vegetation cover types are found within LANL: juniper (*Juniperus monosperma* [Engelm.] Sarg.) savannas; piñon (*Pinus edulis* Engelm.) juniper woodlands; ponderosa pine (*Pinus ponderosa* P. & C. Lawson) forests, mixed conifer forests (Douglas fir [*Pseudotsuga menziesii* (Mirbel) Franco] ponderosa pine, white fir [*Abies concolor* (Gord. & Glend.) Lindl. ex Hildebr.], and grasslands. In addition, wetlands and riparian areas enrich the diversity of plant and animal life at LANL. The majority of the wetlands in the LANL region are associated with canyon stream channels or are present on mountains or mesas as isolated meadows often in association with springs or seeps. There are also some springs within White Rock Canyon.

Plant communities range from urban and suburban areas to grasslands, wetlands, shrubland, woodland, and mountain forest and provide habitat for a variety of animal life. Animal life includes herds of elk (*Cervus elaphus*) and deer (*Odocoileus hemionus),* bear (*Ursus americanus),* mountain lions (*Puma concolor),* coyotes (*Canis latrans*), rodents, numerous species of bats, reptiles, amphibians, invertebrates, and a myriad of resident, seasonal, and migratory birds. In addition, Federally listed threatened and endangered species occur at LANL. Because of restricted access to certain LANL areas, lack of permitted hunting, and management of contiguous Bandelier National Monument and Forest Service lands for natural biological systems, much of the region functions as a refuge for wildlife.

The juniper savanna community type is found along the Rio Grande and extends upward on the south-facing sides of canyons at elevations between 6,200 and 5,200 ft (1,860 and 1,560 m). The piñon-juniper cover type occupies large portions of the mesa surfaces in the 6,000- to 6,200-ft (2,070- to 1,860-m) elevation range, as well as north-facing slopes at lower elevations. The piñon-juniper woodland community type is the dominant vegetation type of both the Pajarito Plateau and the Caja del Rio Plateau. Ponderosa pine forests are found in the western portion of the Pajarito Plateau in the 7,500- to 6,900- ft (2,250- to 2,070-m) elevation range.

Conifer forest mixed with aspen forest, at an elevation of 9,500 to 7,500 ft (2,850 to 2,250 m), intermix with the ponderosa pine forests in the deeper canyons and on the north slopes and extend from the higher mesas onto the slopes of the Jemez Mountains. Grasslands occur in the western and central region at LANL, generally in areas that have been previously burned or disturbed.

Wetlands are transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. More than 95 percent of the identified wetlands at LANL are located in watersheds of the Sandia, Mortandad, Pajarito, and Water Canyons (DOE 1999c). Wetlands in the general LANL region provide habitat for reptiles, amphibians, and invertebrates (such as insects). Wetlands also provide habitat, food, and water for many common species such as deer, elk, small mammals, and many migratory birds and bats.

3.3 Cultural Resources

Cultural resources include any prehistoric sites, buildings, structures, districts, or other places or objects considered to be important to a culture or community for scientific, traditional, religious, or any other reason. They combine to form the human legacy for a particular place (DOE 1999a). To date, more than 2,000 archaeological sites and historic properties have been recorded at LANL.

The criteria used for evaluating cultural resources depends upon their significance as sites eligible for listing to the NRHP as described in the NHPA (16 USC 470). These determinations of significance are met by evaluating each cultural resource based on it meeting any one or more of the following criteria:

Criterion A association with events that have made a significant contribution to the broad pattern of our history;

Criterion B association with the lives of persons significant in our past;

Criterion C illustration of a type, period, or method of construction; for its aesthetic values or for its representation of the work of a master; or if it represents a significant and distinguished entity whose components may lack individual distinction; and

Criterion D it has yielded, or may be likely to yield, information important in prehistory or history.

Prehistoric resources at LANL refer to any material remains and items used or modified by people before the establishment of a European presence in the upper Rio Grande Valley in the early seventeenth century. Archaeological surveys have been conducted of approximately 90 percent of the land within LANL (with 85 percent of the area surveyed receiving 100 percent coverage) to identify the cultural resources. The majority of these surveys emphasized prehistoric Native American archaeological sites, including Pueblos, rock shelters, rock art, water control features, trails, and game traps. A total of 1,777 prehistoric sites have been recorded at LANL, of which 439 have been assessed for potential nomination to the NRHP. Of these, 379 sites were determined to be eligible, 60 sites ineligible, and two of undetermined status. The remaining 1,338 sites, which have not been assessed for nomination to the NRHP, are protected as eligible sites until assessed and their actual status is determined.

The Cerro Grande Fire directly affected 215 prehistoric sites. Effects to cultural resource sites included effects originating from burned-out tree root systems forming conduits for modern debris and water to mix with subsurface archaeological deposits and for entry by burrowing animals. Also, snags or dead or dying trees have fallen and uprooted artifacts (DOE 1999a). Areas at LANL burned by the Cerro Grande Fire have been surveyed for effects and mitigation measures have been implemented.

Historic resources present within LANL boundaries and on the Pajarito Plateau can be attributed to nine locally defined Periods: U.S. Territorial, Statehood, Homestead, Post Homestead, Historic Pueblo, Undetermined historic, Manhattan Project, Early Cold War, and Late Cold War. A total of 706 historic sites have been identified at LANL.

The Cerro Grande Fire directly affected 11 historic buildings and 56 historic sites. Structures and artifacts from the Homestead Period, Manhattan Project Period, and Cold War Period were adversely affected. The fire destroyed virtually all of the wooden buildings associated with the

Homestead Period, and the burned properties were largely reduced to rubble. V-Site, one of the last vestiges of the Manhattan Project Period remaining at Los Alamos, was the location where work was conducted on the Trinity device. This important historical site was partially destroyed by the fire (DOE 2000a).

3.4 Water Quality

Surface water at LANL occurs primarily as short-lived or intermittent reaches of streams. Perennial springs on the flanks of the Jemez Mountains supply base flow into the upper reaches of some canyons, but the volume is insufficient to maintain surface flows across LANL. Runoff from heavy thunderstorms or heavy snowmelt can reach the Rio Grande. Effluents from sanitary sewage, industrial water treatment plants, and cooling tower blow-down enter some canyons at rates sufficient to maintain surface flows for varying distances (DOE 1999a). Surface waters at LANL are monitored by LANL and the New Mexico Environment Department (NMED) to survey the environmental effects of LANL operations. Planned releases from industrial and sanitary wastewater facilities within LANL boundaries are controlled by NPDES permits.

Data and analysis of LANL surface and groundwater quality samples taken from test wells indicate that LANL operations and activities have affected the surface water within LANL boundaries and some of the alluvial and intermediate perched zones in the LANL region. Details on the surface and groundwater quality can be found in the annual LANL Environmental Surveillance Report (LANL 2001a).

3.5 Environmental Restoration

DOE and LANL are jointly responsible for implementing the DOE Environmental Restoration (ER) Project at LANL. The ER Project is governed primarily by the corrective action process prescribed in the *Resource Conservation and Recovery Act* (RCRA), but it is also subject to LANL policies and to other applicable laws and regulations. The NMED administers RCRA in New Mexico. DOE, through the Los Alamos Site Office, conducts site characterization and waste cleanup (corrective action) activities at PRSs at LANL. Site characterization and cleanup are needed to reduce risk to human health and the environment posed by potential releases of contaminants at ER Project sites.

PRSs at LANL include septic tanks and lines, chemical storage areas, wastewater outfalls (the area below a pipe that drains wastewater), material disposal areas (landfills), incinerators, firing ranges and their impact areas, surface spills, and electric transformers. PRSs are found on mesa tops, in material disposal areas, in canyons, and in a few areas in the Los Alamos town site.

The primary means of contaminant release from these sites are surface water runoff carrying potentially contaminated sediments and soil erosion exposing buried contaminants. The main pathways by which released contaminants can migrate are infiltration into alluvial aquifers, airborne dispersion of particulate matter, and sediment migration from surface runoff. The contaminants involved include volatile organic compounds, semivolatile organic compounds, polychlorinated biphenyls, asbestos, pesticides, heavy metals, beryllium, radionuclides, petroleum products, and high explosives (HE). The 1999 LANL SWEIS (DOE 1999a) contains additional information on contaminants.

3.6 Transportation, Traffic, and Infrastructure

LANL is situated on approximately 25,000 ac (10,000 ha) of land administered by NNSA. Only about 30 percent of this land is developable and suitable for research and development and office facilities, because of topographic, environmental, operational, and buffering constraints. Utility systems at LANL include electrical service, natural gas, telecommunications, steam, water, sanitary sewer, and a radioactive liquid waste system. Section 4.10 of the 1999 LANL SWEIS (DOE 1999a) describes transportation services at LANL. The impacts on transportation in and around LANL under the Preferred Alternative selected in the SWEIS ROD are described in detail in Section 5.3.10 of the SWEIS. Regional and site transportation routes including East and West Jemez Roads, Pajarito Road, and SR 4, are the primary conduits used to transport LANL-affiliated employees, commercial shipments, and hazardous and radioactive material shipments. There are sidewalks in the more developed LANL technical areas and walkways and pathways that link technical areas to one another. Some LANL workers and visitors use the network of social trails to travel to and from the town site and between LANL technical areas. Bladed (unpaved) fire roads are located in many areas of LANL and some are used as walking paths and access roads for maintaining utility services. Some trails begin at, follow, or intersect vehicle transportation routes and utility corridors. However, users of LANL trails sometimes park vehicles adjacent to trail entrances and alongside roads. These areas have typically not been designed for parking and are not improved parking sites.

3.7 Health and Safety

The health and safety setting for trail maintenance workers and users at LANL can vary depending upon the condition and location of each trail. Some of LANL's trails traverse remote and undeveloped locations that pose particular human health and safety risks. There are risks associated with human encounters with wildlife and physical hazards such as steep slopes, falling tree limbs, rockslides, and inclement weather conditions. These factors could affect trail maintenance workers and recreational users. In addition, there are potential chemical and radiological hazards from PRSs and radiological or HE operations at LANL. PRSs may contain hazardous materials, HE, and radioactive materials in small amounts that pose minimal threats to trail users. Hazardous operations occur across LANL and in proximity to some trails. These operations could pose radiation, chemical, and explosive hazards to trail users. Areas with operational hazards and human health and exposure risks are generally marked with signs, are announced through sirens or other alerts, or are conducted in security areas with restricted access and barriers.

Workers involved in trail development and maintenance are generally considered to be in good health. They also receive training in emergency preparedness and response and the proper use of hazardous equipment in outdoor settings. Trail users would generally be people that are also in good health and knowledgeable about potential outdoor hazards but may not be familiar with LANL operational hazards.

3.8 Environmental Justice

Presidential Executive Order 12898 (EO 12898) requires that Federal agencies consider environmental justice when complying with NEPA. Environmental justice is concerned with possible disproportionately adverse health and socioeconomic effects of proposed Federal actions on minority and low-income populations. Communities with people of color, exclusive

of white non-Hispanics, and low-income households earning less than $15,000 per year, must be identified and considered by DOE when preparing an EA. About 54 percent of the population is of minority status within a 50-mi (80-km) radius of LANL while 24 percent of the households have annual incomes below $15,000. The New Mexico median household income in 2000 was $34,133 (USCB 2000a). Los Alamos County has a higher median family income and a much lower percentage of minority residents than the four surrounding counties, being approximately 18 percent minority (the percentage of non-whites, including Hispanics, defined by the US Census) and having a median household money income of $78,993 (USCB 2000b).

The Pueblo of San Ildefonso is adjacent to Los Alamos County and LANL and meets the environmental justice criteria for minority (Native American) populations; however, the median household income was $30,457 in 2000, while 12.4 percent of the families at the Pueblo were below the poverty level. The three other nearby Accord Pueblos of Santa Clara, Cochiti, and Jemez have median household incomes of $30,946, $35,500, and $28,889, respectively, and 16.4 percent, 13.2 percent, and 27.2 percent, respectively, of the families live below the poverty level at these three Pueblos. Pojoaque Pueblo, also located near LANL, has a median household income of $34,256, and 11.3 percent of families there live below the poverty level (USCB 2000c).

3.9 Soils and Geology

Several distinct soil types have developed at LANL as a result of interaction between the bedrock, topography, and local climate. Mesa-top soils on the Pajarito Plateau include series that are well drained and range from very shallow 0 to 1 inch (in.) (0 to 25 centimeters [cm]) to moderately deep 2 to 4 in. (51 to 102 cm). The geochemistry, geomorphology, and formation of soils at LANL have been characterized and surveyed. Soil erosion rates vary considerably on the mesa tops at LANL, with the highest rates occurring in drainage channels and areas of steep slopes. The lowest rates tend to occur on gently sloping portions of the mesa tops away from channels. Studies at Bandelier National Monument indicate that erosion rates are high across widespread portions of local piñon-juniper woodlands that predominate in the eastern areas of LANL. Areas where runoff is concentrated by roads and other structures (such as trails if they aren't properly located, constructed, and maintained) are especially prone to high erosion rates. Even light summer rainstorms have resulted in erosion exceeding 12 tons (10.9 tons metric) per acre. Soil erosion can have serious consequences to the maintenance of biological communities and may also be a mechanism for moving contaminants across LANL and off site (DOE 1999a).

LANL is part of the Jemez Mountains volcanic field (JMVF) located at the intersection of the western margin of the Rio Grande Rift and the Jemez Lineament (Gardner et al. 1986, Heiken et al. 1996). The Jemez Lineament is a northeast-southwest-trending alignment of young volcanic fields ranging from the Springerville volcanic field in east-central Arizona to the Raton volcanic field of northeastern New Mexico (Heiken et al. 1996). The JMVF is the largest volcanic center along this lineament (LANL 1992). Volcanism in the JMVF spans a roughly 16-million-year period beginning with the eruptions of numerous basaltic lava flows. Various other eruptions of basaltic, rhyolitic, and intermediate composition lavas and ash flows occurred sporadically during the next 15 million years with volcanic activity culminating in the eruption of the rhyolitic Bandelier Tuff 1.79 and 1.23 million years ago (Self and Sykes 1996). Most of the bedrock on LANL property is composed of the salmon-colored Bandelier Tuff.

The geologic structure of the LANL area is dominated by the north-trending Pajarito Fault system. The Pajarito Fault system consists of three major fault zones (Pajarito, Guaje Mountain, and Rendija Canyon fault zones) and numerous secondary faults with vertical displacements ranging from 80 to 400 ft (24 to 120 m). Estimates of the timing of the most recent surface rupturing paleoearthquakes along this fault range from 3,000 to 24,000 years ago (LANL 2001b, 1999). Although large uncertainties exist, an earthquake with a Richter magnitude of 6 is estimated to occur once every 4,000 years; an earthquake of magnitude 7 is estimated to occur once every 100,000 years (DOE 1999a).

3.10 Waste Management

LANL generates solid waste[6] from construction, demolition, and facility operations. These wastes are managed and disposed of at appropriate solid waste facilities. Both LANL and Los Alamos County use the same solid waste landfill located within LANL boundaries. The Los Alamos County Landfill also accepts solid waste from other neighboring communities. The Los Alamos County Landfill receives about 52 tons per day (47 metric tons per day), with LANL contributing about 8 tons per day (7 metric tons per day), or about 15 percent of the total. The current Los Alamos County Landfill is scheduled to close in about 2007; the identification of a replacement disposal facility and other waste management options are currently being investigated.

Building debris storage yards on Sigma Mesa (TA-60) or other approved material management areas are used at LANL to store concrete rubble, soil, and asphalt debris for future use at LANL. Low-level radioactive waste is disposed of at LANL, TA-54, Area G, or is shipped offsite to appropriate permitted facilities. Hazardous waste[7] regulated under RCRA is transported to TA-54 at LANL for proper management, which is carried out in accordance with applicable laws, regulations, and DOE Orders. Hazardous wastes and mixed wastes both are treated and disposed of offsite since LANL has no onsite disposal capability for these waste types. The offsite disposal locations are located across the U.S. and are audited for regulatory compliance before being used for LANL waste disposal.

3.11 Air Quality

Air quality is a measure of the amount and distribution of potentially harmful pollutants in ambient air[8]. Air surveillance at Los Alamos includes monitoring emissions to determine the air quality effects of LANL operations. LANL staff calculates annual actual LANL emissions of regulated air pollutants and reports the results annually to the NMED. The ambient air quality in

[6] Solid waste, as defined in the Code of Federal Regulations (40 CFR 261.2) and in the New Mexico Administrative Code (20 NMAC 9.1), is any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities.

[7] Hazardous waste, as defined in 40 CFR 261.3, which addresses RCRA regulations, and by reference in 20 NMAC 4.1, is waste that meets any of the following criteria: a) waste exhibits *any* of the four characteristics of a hazardous waste: ignitability, corrosivity, reactivity, or toxicity; b) waste is specifically *listed* as being hazardous in one of the four tables in Subpart D of the Code of Federal Regulations; c) waste is a mixture of a *listed* hazardous waste item and a nonhazardous waste; d) waste has been *declared* to be hazardous by the generator.

[8] Ambient air is defined in 40 CFR 50.1 as "that portion of the atmosphere external to buildings, to which the public has access." It is defined in the New Mexico Administrative Code Title 20, chapter 2, part 72, as "the outdoor atmosphere, but does not include the area entirely within the boundaries of the industrial or manufacturing property within which the air contaminants are or may be emitted and public access is restricted within such boundaries."

and around LANL meets all U.S. Environmental Protection Agency (EPA) and DOE standards for protecting the public and workers (LANL 2001a).

LANL is a major source of air emissions (source that has the potential to emit more than 100 tons per year of certain nonradioactive substances) under the State of New Mexico Operating Permit program. Specifically, LANL is a major source of nitrogen oxides, emitted primarily from the TA-03 steam plant boilers. Combustion units are the primary point sources of criteria pollutants (nitrogen oxides, sulfur oxides, particulate matter, carbon monoxide, and volatile organic compounds) emitted at LANL.

Mobile sources, such as automobiles and construction vehicles, are additional sources of air emissions; however, mobile sources are not regulated by NMED. Diesel emissions from conveyance vehicles are not regulated as stationary sources of emissions. Mechanical equipment including bulldozers, excavators, backhoes, side booms, tamper compactors, trenchers, and drill rigs are exempt from permitting under Title 20 of the New Mexico Administrative Code Part 2.72, *Construction Permits*. This type of exemption does not require notification to NMED.

Both EPA and NMED regulate nonradioactive air emissions. NMED does not regulate dust from excavation or construction, but LANL employees take appropriate steps to control fugitive dust and particulate emissions during construction activities. Best Achievable Control Measures such as the use of water sprays or soil tacifiers are used to reduce fugitive dust emissions from cleared areas. Excavation and construction activities are not considered stationary sources of regulated air pollutants under the New Mexico air quality requirements; these activities are not subject to permitting under 20 NMAC, Parts 2.70 and 2.72. Annual dust emissions from daily windblown dust are generally higher than short-term, construction-related dust emissions. LANL would ensure that the New Mexico Ambient Air Quality Standards (NMAAQS) and the National Ambient Air Quality Standards (NAAQS) for particulate emissions are met throughout any construction activities.

3.12 Noise

Noise is defined as unwanted sound. Noise is categorized into two types: *continuous noise,* which is characterized as longer duration and lower intensity, such as a running motor, and *impulsive* or *impact noise,* which is characterized by short duration and high intensity, such as the detonation of HE. The intensity of sound is measured in decibel (dB) units and has been modified into an A-weighted frequency scale (dBA) for setting human auditory limits.

Noise measured at LANL is primarily from occupational exposures that generally take place inside buildings. Occupational exposures are compared against an established threshold limit value (TLV). The TLV is administratively defined as the sound level to which a worker may be exposed for a specific work period without probable adverse effects on hearing acuity. The TLV for continuous noise is 85 dBA for an 8-hour workday. The TLV for impulsive noise during an 8-hour workday is not fixed because the number of impulses allowed per day varies depending on the dBA of each impulse, however, no individual impulse should exceed 140 dBA. An action level (level of exposure to workplace noise that is below the TLV but the use of personal protective equipment is recommended) has been established for noise in the workplace at LANL. The action level for both continuous and impulsive noise is 82 dBA for an 8-hour workday.

Environmental noise levels at LANL are measured outside of buildings and away from routine operations. These sound levels are highly variable and are dependent on the generator. The

following are typical examples of sound levels (dBA) generated by barking dogs (58), sport events (74), nearby vehicle traffic (63), aircraft overhead (66), children playing (65), and birds chirping (54). Sources of environmental noise at LANL consist of background sound, vehicular traffic, routine operations, and periodic HE testing. Measurements of environmental noise in and around LANL facilities and operations average below 80 dBA.

The averages of measured values from limited ambient environmental sampling in Los Alamos County were found to be consistent with expected sound levels (55 dBA) for outdoors in residential areas. Background sound levels at the White Rock community ranged from 38 to 51 dBA (Burns 1995) and from 31 to 35 dBA at the entrance of Bandelier National Monument (Vigil 1995). The minimum and maximum values for the County ranged between 38 dBA and 96 dBA, respectively.

4.0 Environmental Consequences

This section describes the potential environmental consequences to the natural and human environment that could be affected by the Proposed Action, the Trails Closure Alternative, and the No Action Alternative. Table 3 provides a summary of the effects to resources and compares how they are affected by the Proposed Action, the Trails Closure Alternative, and the No Action Alternative.

Table 3. Comparison of Alternatives on Affected Resources

Affected Resource	Proposed Action: Trails Management Plan	Trails Closure Alternative	No Action Alternative
Socioeconomics	Would foster more balanced use of LANL trails while allowing some recreational use to continue	Would limit LANL trail use to workers at LANL and officially invited guests	LANL trails remain open without environmental, cultural, and operational protections
Ecological Resources (species, habitat, wetlands)	Certain trails would be closed at specific times to protect habitat and sensitive species. Negligible effects on some sensitive species	More trails would be closed all of the time. Negligible to slightly beneficial effects on most sensitive species	No trail closings or restrictions. Habitat degradation may slightly increase but no adverse effects to existing sensitive species
Cultural Resources	Enhanced protection of cultural resources	Enhanced protection of cultural resources	Cultural resources would continue to be damaged and destroyed
Water Quality	Negligible effect on surface water quality	Negligible effect on surface water quality	Slight adverse effects on surface water quality
Environmental Restoration	PRSs would be avoided by trail rerouting or closure	PRSs would be avoided by trail closure	PRSs would not be avoided—users possibly exposed to low levels of contamination
Transportation and Infrastructure	Some trails remain open to public. Limited effect on transportation or infrastructure	Most trails would close. Limited effect on transportation or infrastructure	All trails would remain open. No effect on transportation or infrastructure
Health and Safety	Minimal adverse effects	Minimal adverse effects	Minimal adverse effects
Environmental Justice	Would address some Pueblo concerns related to trail use	Would address most Pueblo concerns related to trail use	Would not address Pueblo concerns
Geology and Soils	Soil impacts minimized with BMPs and restoration	Soil impacts minimized due to trail closures and restoration	Soil degradation continues without BMPs or restoration
Waste Management	Could generate up to 120 cubic yards (yd^3) per year	Less wastes over time then Proposed Action	No additional wastes generated
Air Quality	Temporary and localized effects related to construction, maintenance, or closure	Temporary and localized effects related to construction, maintenance, or closure	No changes to ambient air quality
Noise	Limited short-term increases in noise levels from trail construction, repair, or closure	Limited short-term increases in noise levels from trail repair or closure	Ambient noise levels would remain unchanged

4.1 Socioeconomics

4.1.1 Proposed Action

The proposed Trails Management Program at LANL would not have a long-term effect on socioeconomic conditions in north-central New Mexico. There could be some short-term benefits derived from trail construction, maintenance, and closure activities. LANL workers or contractors who are part of the existing regional workforce would likely accomplish these tasks. Consequently, there would be no effect on local or regional population or an increase in the demand for housing or public services in Los Alamos or the region as a result of the Proposed Action. The proposed Trails Management Program would also address the concerns about trespassing onto adjacent San Ildefonso Pueblo lands and the concerns regarding cultural properties at LANL, while providing appropriate trail access to Los Alamos residents, workers at LANL, and officially invited guests.

The proposed Trails Management Program would address certain social concerns regarding visitor and local residential use of trails at LANL. Implementing the Proposed Action could result in the systematic closure of some trails at LANL; this action could in turn affect social recreational opportunities within LANL that are currently enjoyed by visitors to the LANL area and by residents of Los Alamos County alike. Loss of trail access would reduce perceptions of quality of place and likely result in a decrease in the attractiveness of Los Alamos as a place to live to current residents. This could contribute somewhat to an already difficult task of obtaining and retaining the highest quality workforce possible. LANL workers, tourists and visitors, and local residents that hike, ride horseback, bicycle, and otherwise use LANL trails could be excluded from engaging in these recreational activities along some trails within LANL and may, in turn, choose to shift their trail use onto neighboring lands. This shift in use of trails to those within the County of Los Alamos, Santa Fe National Forest, Bandelier National Monument, and on lands managed by the Bureau of Land Management could result in a correspondingly slight increase in the stresses placed on natural and cultural resources located within those lands. With this shift in trail user locations away from LANL, there would also likely be a slight increase in the number and location of unendorsed social trails created on those properties and also an increase in the incidence of trespassing onto private and Pueblo lands where recreational trail use has not been deemed appropriate. Over time, new trails might be created within LANL and this could result in some trail-use shifts back onto LANL land. New trails would likely be short in overall distance, and their locations would be carefully chosen to avoid or minimize adverse effects to all natural and cultural resources.

4.1.2 Trails Closure Alternative

The Trails Closure Alternative would not have a long-term effect on socioeconomic conditions in north-central New Mexico. There could be some short-term benefits derived from trail maintenance or closure activities. LANL workers or contractors who are part of the existing regional workforce would likely accomplish these tasks. Consequently, there would be no effect on local or regional population or an increase in the demand for housing or public services in Los Alamos or the region.

This alternative would address certain social concerns regarding visitor and local residential use of trails at LANL. Implementing the Trail Closure Alternative would result in the systematic closure of all trails at LANL to recreational users; this action would in turn affect social

recreational opportunities within LANL that are currently enjoyed by visitors to the LANL area and by residents of Los Alamos County alike. Loss of trail access would reduce perceptions of quality of place and likely result in a decrease in the attractiveness of Los Alamos as a place to live to current residents. This could contribute somewhat to an already difficult task of obtaining and retaining the highest quality workforce possible. LANL workers, tourists and visitors, and local residents that hike, ride horseback, bicycle, and otherwise use LANL trails would be excluded from engaging in these recreational activities along all trails within LANL and would likely choose to shift their trail use onto neighboring lands. This shift in use of trails to those within the County of Los Alamos, Santa Fe National Forest, Bandelier National Monument, and on lands managed by the Bureau of Land Management could result in a corresponding increase in the stresses placed on natural and cultural resources located within those lands. With this shift in trail-user locations away from LANL, there would also likely be an increase in the number and location of unendorsed social trails created on those properties and also an increase in the incidence of trespassing onto private and Pueblo lands where recreational trail use has not been deemed appropriate. No new LANL trail construction would be initiated under this alternative.

4.1.3 No Action Alternative

There would be no change to the socioeconomic condition of northern New Mexico if the No Action Alternative were implemented. Visitors to LANL, local area residents, and LANL workers could continue to use LANL trails for recreational purposes; no shift of trail use away from LANL onto neighboring lands would likely occur. New social trails would continue to be created at LANL in an ad hoc fashion.

4.2 Ecological Resources

4.2.1 Proposed Action

No long-term or permanent changes to ecological resources would be expected from implementing the Proposed Action with regard to existing trails. Short-term, temporary effects to animals that live along trail reaches could result from trail construction, maintenance, or closure activities. Small animals, including mammals, insects, and amphibians, occupying habitat areas along trail reaches could be temporarily displaced during trail caretaking activities; however, these species would be expected to return to the area as soon as work activities ended. In areas where trails were closed under this alternative, some increase in animal diversity might occur. Vegetation removal would be expected to be limited and would not likely affect the habitat along the trail reach.

Federally-listed threatened or endangered species, or other sensitive species currently present at LANL, would not likely be adversely affected, nor would their critical habitat be adversely affected, by activities associated with implementation of the Proposed Action. Trail maintenance work or work needed to permanently close a trail would be scheduled to accommodate the needs of identified sensitive species using habitat located along certain trail reaches as identified by the Threatened and Endangered Species Habitat Management Plan. Trails slated to remain available to recreational users would be chosen based on the ability of NNSA to adequately protect any sensitive species using habitat along those trails through the implementation of periodic trail closures or based on there being no identified sensitive species present to use potential habitat located along the trail reaches. As changes are made to the list of plants and animals protected under the ESA, the use of specific trails would need to be reassessed. Some sensitive species

may slightly benefit from some trail closures or limitations of trail users (hikers only) on a temporary or permanent basis. No new trails would be constructed in locations where existing sensitive species would be adversely affected. The overall effect of implementing the Proposed Action to most existing sensitive species would be expected to be negligible.

4.2.2 Trails Closure Alternative

Few long-term or permanent changes to ecological resources would be expected from implementing the Trail Closure Alternative. Short-term, temporary effects to animals that live along trail reaches could result from trail maintenance or trail closure activities. Small animals, including mammals, insects, and amphibians, occupying habitat areas along trail reaches could be temporarily displaced during trail caretaking activities; however, these species would be expected to return to the area as soon as work activities ended. Some increase in animal diversity might occur after certain trails were closed to all recreational users or the trails were closed to all users and reclaimed. Some selected vegetation along trails remaining intact with restricted use may be removed during trail maintenance activities, such as the removal of damaged, dead, or so-called "hazard" trees. No vehicle parking accommodations would likely be constructed under this alternative, nor would any new trails be built; therefore, no vegetation removal for clearing areas would be expected. As changes are made to the list of plants and animals protected under the ESA, the use of specific trails would need to be reassessed.

Federally-listed threatened or endangered species, or other sensitive species currently present at LANL, would not likely be adversely affected, nor would their critical habitat be adversely affected by activities associated with implementation of the Trail Closure Alternative. As changes are made to the list of plants and animals protected under the ESA, the use of specific trails would need to be reassessed. Trail maintenance work or work needed to permanently close a trail would be scheduled to accommodate the needs of sensitive species that use habitat located along certain trail reaches. Some sensitive species may slightly benefit from trail closures or the limitation of trail use to non-recreational users. The overall effect of implementing the Trail Closure Alternative to most sensitive species would be expected to be negligible to slightly beneficial

4.2.3 No Action Alternative

No changes to biota would be expected to occur through the implementation of the No Action Alternative. Some species of animals may not presently occupy areas of potentially suitable habitat along trail reaches due to the existing level of human intrusion into those locations; this status of species diversity would be expected to continue. Habitat degradation may slightly increase over time due to unchecked erosive forces and trail-user-incurred damages under the No Action Alternative. No adverse effect to sensitive species currently present at LANL or to the critical habitat for sensitive species would be expected due to the implementation of this alternative. As changes are made to the list of plants and animals protected under the ESA, the use of specific trails would need to be reassessed.

4.3 Cultural Resources

4.3.1 Proposed Action

Trail construction, maintenance, and closure activities associated with the implementation of the Proposed Action could provide some benefit to cultural resources protection. Activities would be coordinated with LANL archeologists in consultation with appropriate Native American tribes to minimize damages to any cultural resources present along trail reaches. Trails may be temporarily closed to recreational users during trail caretaking activities because of the need to flag or otherwise denote these resources to maintenance workers so that their actions can be adjusted to avoid any damages to the resources. In the event that a cultural resource is present along an existing trail such that it would be adversely affected by certain user group activities or would be unavoidably damaged by maintenance workers, the trail may be slated for permanent closure to all or certain users or it may be closed until the involved segment of trail can be rerouted around the cultural resource. Alternately, certain trail segments could be closed periodically for Native American use. If work necessary to close a trail to all user groups would result in an adverse effect to a cultural resource, a data recovery plan would be prepared and the SHPO and appropriate Native American tribes would be consulted before such work commenced. New trails would not be constructed in locations that would result in adverse effects to cultural resources either from trail users or maintenance workers.

4.3.2 Trails Closure Alternative

Implementing the Trail Closure Alternative would enhance the protection of cultural and historic resources from trail-user-incurred damages at LANL since all trails would be closed to recreational users and some trails would be closed to all user groups. If work necessary to close a trail to all user groups would result in an adverse effect to a cultural resource, a data recovery plan would be prepared and the SHPO and appropriate Native American tribes would be consulted before such work commenced.

4.3.3 No Action Alternative

Implementing the No Action Alternative would result in the likely continuation of insidious trail-user-incurred damages to cultural resources along the various LANL trails and within nearby areas. The risk that there would be violations by trail users of various Federal and State laws and regulations protecting archeological resources would likely increase over time as the location of the trails at LANL become known to a wider audience of people due to their advertisement on the World Wide Web and in trail guide books and various publications targeting tourists and area guests.

4.4 Water Quality

4.4.1 Proposed Action

The proposed Trail Management Program would have a negligible effect on surface water quality. Existing erosion problems along trails would be corrected through trails maintenance activities and the use of BMPs during maintenance and construction. Some minimal silting could occur as a consequence of the same activities. There would be no effects on groundwater quality.

4.4.2 Trails Closure Alternative

The Trails Closure Alternative would have a negligible effect on surface water quality. Existing erosion problems would be corrected through trails maintenance activities on selected trails that remain available for use by workers at LANL and officially invited guests. BMPs to prevent further erosion would be used on trails being closed. Some minimal silting could occur as a consequence of the same activities. There would be no effects on groundwater quality.

4.4.3 No Action Alternative

The No Action Alternative would have a slight adverse effect to surface water quality because erosion along trails would continue in some cases unchecked or would not be corrected on a routine basis. The No Action Alternative would not affect groundwater quality.

4.5 Environmental Restoration

4.5.1 Proposed Action

Implementing the Proposed Action would not likely affect ER Project sites because these are fenced, closed off, or otherwise identified where human health concerns are at issue. There would be no new trail construction in areas of contaminant concern. Trail or trail segments may be closed, restricted to only certain users, or rerouted around areas of concern as more contaminant information becomes available, and when areas are identified where continued or new use might be likely to exacerbate contaminants spreading into the environment.

4.5.2 Trails Closure Alternative

The Trails Closure Alternative would not likely affect ER Project sites because these are fenced, closed off, or otherwise identified where human health concerns are at issue. Closure of all existing trails to the public would eliminate the problem of non-LANL trail users possibly disturbing and destabilizing existing PRSs.

4.5.3 No Action Alternative

The No Action Alternative would not likely affect PRSs where human health concerns are at issue because these are fenced, closed off, or otherwise identified. Trails would not be routed around existing unfenced PRSs and this could result in potential contaminant exposures and spread of contaminants into the environment.

4.6 Transportation, Traffic, and Infrastructure

4.6.1 Proposed Action

Transportation patterns within LANL and the surrounding areas would be expected to slightly change; there would be no infrastructure changes expected, however, as a result of implementing the Proposed Action. A Trails Management Plan could result in closure of some LANL trails or restrictions to certain recreational user groups. This may result in an inconvenience with regards to recreational movement along trails between certain locations for some LANL workers or members of the public because they would have to seek other routes or means of transportation. Some trails remaining available for recreational users could be somewhat enhanced as existing impediments were removed over time as part of a routine maintenance program. This

enhancement could be slightly beneficial to some recreational trail users. Use patterns at LANL along existing trails would be expected to change slightly to accommodate users blocked from closed trails. The construction of new trails could create linkages in the network that would be attractive to trail users and this may result in shifts by users away from other trails. Parking for trail users could be slightly enhanced at LANL.

Transportation of materials, wastes, or recyclables would mostly be limited to transportation actions within LANL. Wastes would be transported to LANL waste management facilities, and recyclable materials would be transported to LANL storage yards via dump trucks or in pickup trucks. Since only one to two trails would likely receive attention in any given year, transportation needs would be limited to about two to twelve extra truck trips per year on internal LANL roads.

4.6.2 Trails Closure Alternative

Transportation patterns within LANL and the surrounding areas would be expected to slightly change. There would be no infrastructure changes as a result of implementing the Trails Closure Alternative. This alternative would result in the closure of all trails to recreational users and some trails to all user groups. Such closures could change traffic patterns both for recreational users and LANL workers and could inconvenience some trail users because they would have to choose alternative transportation routes and means.

4.6.3 No Action Alternative

Transportation patterns within LANL and the surrounding areas would not be expected to change nor would there be infrastructure changes as a result of implementing the No Action Alternative. Existing trailhead areas would continue to be used in the current manner; safety issues, a lack of informational signs, and inadequate parking capacity would persist.

4.7 Health and Safety

4.7.1 Proposed Action

The Proposed Action would have a minimal adverse effect on worker and public health. Workers involved in trail development, construction, and management would be trained to safely perform their tasks. Trail construction and management could require the use of handheld digging and vegetation removal equipment, pack animals (such as horses or mules), or small construction vehicles or trucks that could present minor but generally avoidable health and safety concerns. Trail users would include workers at LANL, officially invited guests, and members of the public. Trail activities would occur outdoors on uneven topography and would include exposure to changing weather conditions, such as lightning and flash floods; the potential for exposure to hazardous materials; and encounters with animals and plants that could cause injuries. Warning signs, alarms, or physical barriers would be used to alert trail workers and users to potentially hazardous situations.

4.7.2 Trails Closure Alternative

The Trails Closure Alternative would have a minimal adverse effect on worker and public health similar to the Proposed Action. Workers involved in trail maintenance and closure would be trained to safely perform tasks that could require the use of handheld digging and vegetation

removal equipment, pack animals (such as horses or mules), and small construction vehicles or trucks that could present minor but generally avoidable health and safety concerns. There would be less exposure to trail users because there would be no trails ultimately that would allow recreational users; use would be restricted to workers at LANL with work related trails use needs and to officially invited guests. Trail closure activities would occur outdoors on uneven topography and would include exposure to changing weather conditions, including lightning and flash floods; the potential for exposure to hazardous materials; and the potential for encounters with animals and plants that could cause injuries. Warning signs, alarms, or physical barriers would be used to alert trail workers and users to potentially hazardous situations. The closure of all LANL trails to recreational users would result in a negative effect to the health and well being of people who currently use the trails for recreational purposes.

4.7.3 No Action Alternative

Under the No Action Alternative, there would be minimal potential for adverse effects to worker and public health. Limited essential maintenance or closure activities could pose minimal hazards to workers. LANL workers and the public would continue to use existing trails and to create new and potentially unsafe trails. Trail users could be exposed to various physical, natural, and operational hazards because activities would occur outdoors on uneven topography; exposure to changing weather conditions, including lightning and flash floods; the potential for exposure to hazardous materials; and the potential encounters with animals and plants that could cause injuries. Continued erosion and trail-user-incurred damages over time would likely increase human health and safety risks along trails to trail users. Trail closure or trail segment closure could occur if safety issues or health issues arise under this alternative.

4.8 Environmental Justice

4.8.1 Proposed Action

There are no concentrations of minority or low-income populations in Los Alamos County, which is the county that would be most directly affected by the Proposed Action. Pueblo members of San Ildefonso and Santa Clara believe that adverse direct and indirect environmental effects to cultural resources could result if some trails remain open for public use and also if some trails were closed at LANL because trespassing could increase on lands belonging to these Pueblos. Tribal policing of their properties, the posting of signs warning against trespass that would accompany implementation of this alternative, and the public information and outreach activities that are part of the Proposed Action would limit such potential disproportionate effects to area Pueblo members and their lands. Nevertheless, this alternative has the potential to interfere with the use of TCPs by members of surrounding Pueblos.

4.8.2 Trails Closure Alternative

Pueblo members of San Ildefonso and Santa Clara believe that adverse indirect environmental effects to cultural resources could result if all trails at LANL were closed to the public because trespassing could increase on lands belonging to these Pueblos. Tribal policing of their properties, the posting of signs warning against trespass that would accompany implementation of this alternative, and the public information and outreach activities that are part of the Trails Closure Alternative would limit such potential disproportionate effects. Nevertheless, this

alternative has the potential to interfere with the use of TCPs by members of surrounding Pueblos.

4.8.3 No Action Alternative

San Ildefonso and Santa Clara Pueblos members believe that the existing situation (No Action Alternative) results in direct, indirect, and adverse environmental effects on cultural resources within LANL. They also believe that the No Action Alternative results in trespassing onto their lands, including sacred areas, and has the potential to adversely affect cultural resources within the boundaries of their lands. This alternative has the potential to interfere with the use of TCPs by members of surrounding Pueblos.

4.9 Soils and Geology

4.9.1 Proposed Action

Construction and maintenance activities associated with the proposed Trail Management Program would have minimal effects on soils in certain areas of LANL. Siltation and stabilization controls would limit or control soil erosion and rockfalls. Trails on mild slopes and on weathered tuff would require BMPs to minimize erosion. No effect on the local geology is anticipated from implementing the Proposed Action. Seismic activity could affect trails; however, the probability of a seismic event is very low.

4.9.2 Trails Closure Alternative

Maintenance and closure activities associated with the Trails Closure Alternative would have minimal effects on soils in certain areas of LANL. No effect on the local geology is anticipated from implementing this alternative. Seismic activity could affect trails; however, the probability of a seismic event is very low. These effects would be less than the Proposed Action because many if not most of the social trails at LANL would be closed and appropriate BMPs and other techniques would be used to preclude further erosion damage.

4.9.3 No Action Alternative

The No Action Alternative would result in continued unmanaged trail use at LANL. There would not be an ongoing and coherent approach designed to repair existing soil damage or to preclude further erosion caused by trail use.

4.10 Waste Management

4.10.1 Proposed Action

Implementation of the Proposed Action would not require the construction of any new waste landfills. The reuse of existing recyclable materials stockpiled at LANL would be a beneficial effect to the overall waste management program at LANL. The Proposed Action would generate a very small amount of solid waste from construction, maintenance, or closure activities that would be disposed of at the Los Alamos County Landfill or its replacement facility in accordance with practices required by LANL's Laboratory Implementing Requirement for General Waste Management (LANL 1998). It is expected that all excavated material (such as soil and rocks) would either be used in the construction, repair, or closure activities performed for individual trails or at new parking areas or along new trails. Any excess soil or rocks, or

removed or excess asphalt or concrete materials, generated during the various trails activities would be crushed and recycled for use as road base or for landscaping materials at LANL or offsite. It may be necessary to use construction debris staging areas for a short period of time to stockpile these materials until they are reused in other projects.

Trees and woody vegetation could be removed from various locations along trails or new parking areas. Brush, trees, or vegetation could be chipped onsite and spread along trail corridors or may be removed to the Los Alamos County Landfill for chipping and reuse as mulch. Chipped material would not be spread in or near any floodplain or waterway.

About one to six truckloads of recyclables or wastes would be expected to be generated per year. This would amount to a maximum of about 120 yd^3 (91 m^3) per year of wastes requiring disposal. This quantity of waste is well within the waste management capabilities of LANL facilities.

4.10.2 Trails Closure Alternative

Implementation of the Trails Closure Alternative would result in waste management and waste recycling impacts similar in character and quantities to those described for the Proposed Action. Most wastes would be generated as a result of trail closure activities; trail maintenance activities along trails that would remain open to limited user groups would generate less wastes over time than would be expected to be generated by the Proposed Action.

4.10.3 No Action Alternative

There would be no additional waste generated under the No Action Alternative, since there would be no trails construction activities. The construction debris waste shipments to landfills or recycling centers would not occur.

4.11 Air Quality

4.11.1 Proposed Action

Construction, repair, or trail closure activities conducted as a result of implementing the Proposed Action could result in temporary, localized emissions associated with vehicle and equipment exhaust as well as in particulate (dust) emissions from excavation and construction activities. Effects on air quality in the LANL area would be expected to be temporary and localized as well. There would be no long-term degradation of regional air quality. The air emissions would not be expected to exceed either the NAAQS or the NMAAQS. Effects of the Proposed Action on air quality would be negligible compared to potential annual air pollutant emissions from LANL as a whole.

Implementing appropriate control measures would mitigate fugitive dust. Frequent watering with watering trucks would be used to control fugitive dust emissions at new parking lot sites. Despite the use of soil watering during excavation to control dust emissions, some soil could potentially be suspended in the air prior to paving activities. Emissions from diesel engine combustion products could result from excavation and construction activities involving heavy equipment. Emissions would not cause an exceedence of any NAAQS or NMAAQS. All air emissions associated with the operation of excavation and construction equipment would be below ambient air quality standards. Total emissions of criteria pollutants and other air emissions associated with the operation of heavy equipment for excavation and construction activities would contribute greater emissions than other vehicles due to the types of engines and

their respective emission factors. Heavy equipment would emit small quantities of criteria pollutants subject to the NAAQS and NMAAQS as adopted by the State of New Mexico in its State Implementation Plan[9].

4.11.2 Trails Closure Alternative

Implementation of the Trails Closure Alternative would be expected to result in temporary, localized emissions associated with vehicle and equipment exhaust as well as in particulate (dust) emissions from trail repair or closure activities. The air emissions would not be expected to exceed either the NAAQS or the NMAAQS. Effects on air quality from implementing the Trails Closure Alternative would be negligible compared to potential annual air pollutant emissions from LANL as a whole. All air emissions associated with the operation of excavation and construction equipment would be below ambient air quality standards.

4.11.3 No Action Alternative

There would be no change from ambient air quality effects associated with implementing the No Action Alternative. Trail maintenance, construction, and closure activities would not be expected to occur except in an ad hoc fashion and on a very small scale.

4.12 Noise

4.12.1 Proposed Action

The Proposed Action would be expected to result in limited, short-term increases in noise levels associated primarily with various construction activities and, in a more limited fashion, with trails repair or closure activities. Following the completion of these activities, noise levels would return to existing levels. Noise generated by the Proposed Action is not expected to have an adverse effect on either LANL workers or members of the public or on wildlife that may be using forested trail areas. Noise generated by trail maintenance, repair, construction, or closure activities would be very short term in duration and highly localized and would be consistent with noise levels in nearby developed areas at LANL. Some startle response may be experienced by area wildlife from trails work and, possibly, from trails use, but it is not expected that any adverse wildlife effects would be associated with unusual, loud, and potentially startling noises.

Earth-moving activities and some trail construction activities could require the use of heavy equipment for removal of debris, dirt, and vegetation and for paving of new parking areas. Heavy equipment such as front-end loaders and backhoes would produce intermittent noise levels at around 73 to 94 dBA at 50 ft (15 m) from the work site under normal working conditions (Canter 1996, Magrab 1975). Truck traffic would occur frequently but would generally produce noise levels below that of the heavy equipment. Personal protective equipment would be recommended if site-specific work produced noise levels above the LANL action level of 82 dBA. Based upon a number of physical features, such as attenuation factors, noise levels should return to background levels within about 200 ft (66 m) of the noise source (Canter 1996). Since sound levels would be expected to dissipate to background levels before reaching most publicly accessible areas (the trails would be closed to use while trail work using heavy machinery was being conducted) and seasonal timing restriction would apply to trail stretches at or near

[9] The purpose of the State Implementation Plan is to ensure that Federal emission standards are being implemented and NAAQs are being achieved.

sensitive wildlife habitats, noise generated by implementing the Proposed Action should not be expected to be noticeable to members of the public or to disturb local wildlife. Traffic noise from commuting workers would not be expected to noticeably increase the present traffic noise level on roads at LANL. The vehicles of workers would remain parked during the day and would not contribute to background noise levels. Therefore, noise levels are not expected to exceed the established TLV.

4.12.2 Trails Closure Alternative

Implementing the Trails Closure Alternative would be expected to result in limited, short-term increases in noise levels similar to those described in the previous subsection regarding the Proposed Action. Most noise would be generated during trail closure activities and there would not likely be any associated noise generated during construction activities using heavy equipment.

4.12.3 No Action Alternative

Under the No Action Alternative, ambient noise levels would remain unchanged at LANL. Potential noise from trail repair, construction, or closure activities would not occur with any frequency as trail repairs or closure activities would be performed rarely and in an ad hoc fashion. Environmental noise levels in and around LANL would be expected to remain below 80 dBA on average.

5.0 Accident Analysis

5.1 Introduction

Trail construction and use are relatively low-risk activities that can be expected to have minimal effects from accidents on workers and trail users. This chapter analyzes potential accidents associated with the three alternatives for trails management at LANL. The Proposed Action (establishment of a Trails Management Program) is discussed first, followed by a comparison of the Trails Closure Alternative and the No Action Alternatives. This section considers the activities of trails development and maintenance under construction hazards and trail use under operational hazards. Guidance used for the development of this section is primarily from the document titled *Analyzing Accidents Under NEPA* (DOE 2002).

An accident is an unplanned event or sequence of events that results in undesirable consequences. Accidents may be caused by equipment malfunction, human error, or natural phenomena. Accidents have an estimated frequency of occurrence of once per ten years to once per one million years (1×10^{-1}/yr to 1×10^{-6}/yr); whereas, occupational health incidences are expected, occurring at an estimated frequency of greater than or equal to once per year ($\geq 1 \times 10^{0}$/yr). For example, an occupational health incident might be a cut or animal bite; an accident might be a worker being struck by lightning. Accident impacts are often, but not always, much greater than occupational health impacts. The accidents of highest consequence that are likely to receive the most complete analyses are exposure to radiological or hazardous materials and lightning strikes.

Under NEPA, the purpose of performing accident analyses for this programmatic EA is to weigh accident issues among the trails alternatives such that the DOE can consider this information for making their decision on which alternative to pursue. The objectives are to (1) characterize the overall risk of injury, illness, or death to workers or the public resulting from accidents and (2) realistically qualify and/or quantify the increment in risk among the alternatives. The level of complexity of the analyses needs to be commensurate with the significance of the hazards.

The SWEIS (DOE 1999a) established the baseline risk for operations at LANL, and the accident analyses in this section tiers from the SWEIS to the extent possible. For example, the risk to trail users of an exposure to radiation or hazardous chemicals from an accident at LANL can be based on existing source terms in the SWEIS, but the main difference to be considered is the distance from the facility to persons on the trails.

Following DOE guidance, the process used to ultimately analyze accidents for trails activities included the identification and screening of accidents, the estimation of accident likelihood and potential consequences and health effects, and the estimation of risk. A limited spectrum of accidents was established that enabled the analysis of incremental risk, if any, for each alternative. Under the Proposed Action, it is anticipated that only standard industrial activities and processes would be performed, resulting primarily in potential accidents that are common to many other agencies nationwide that manage forested lands. As such, postulated accidents that occur on LANL trails are expected to affect only persons using or working on the trails.

5.2 Construction Accidents

Potential accidents were identified as being associated with the maintenance and upkeep of existing trails; the development of new trails; and the reclamation of trails. Accident

identification considered those hazards associated with cutting and vegetation removal, including the use of chainsaws, chipping, hand-held digging, and other mechanical processes; falling tree limbs, rockslides, and flash floods; lightning, wildfire, and other natural hazards; and the use of small construction vehicles and trucks. Workers developing or maintaining trails could potentially be exposed to radiation or hazardous chemicals in or from a PRS or from a release from an accident at a LANL facility. This accident type is considered under Operations Accidents.

Accidents were screened on the basis of suggested DOE criteria (DOE 2002). A wide range of effects can result from these activities, including minor perturbations such as scrapes, cuts, and bruises as well as more serious injury, illness, and death. These minor perturbations were screened out. Statistics on rates of illness, injury, and death are available for the occupation of forestry and were consulted and applied to this project (NSC 1994). In general, the risk of injury or death is extremely low so no serious accidents are expected from potential construction activities.

5.3 Operations Accidents

Operations are considered to be the phase of the Proposed Action or alternatives where trails are used by the general public or LANL workers. The traditional approach of accident analyses performed at LANL under NEPA has been to postulate accidents that originate at a facility, operation, or activity that is specifically and directly associated with the Proposed Action and to analyze effects that could occur to receptors located outwardly from the facility of origin. Trail using members of the public would be within the LANL boundary, so this NEPA analysis considers effects that could result from LANL's industrial setting upon these people, specifically effects that could occur in the vicinity of subject facilities of concern (DOE 1997).

Accidents involving the potential release of radiological or hazardous materials are somewhat unique to DOE facilities and were given special consideration for the Proposed Action because of public interest in this subject. Trail users represent receptors that could potentially be out of hearing range of LANL sirens or alarms; therefore, trails users would not necessarily be subject to DOE/LANL evacuation procedures. The potential effects from this type of accident are applicable to trails construction and maintenance workers as well as the public and other classes of users. However, in general, the risk of injury to the public from an operations accident at LANL is extremely low so no serious consequences are expected from potential operations accidents.

5.4 Comparison of Alternatives

5.4.1 Proposed Action

Trail construction and use are relatively low-risk activities that can be expected to have minimal effects on workers and trail users from accidents. Trails development, construction, management, and use are not inherently risky activities because the frequency of high-consequence accidents such as a person being struck by lightning or being consumed by wildfire is low. Under the Proposed Action there would be more trails work, maintenance, and, possibly, trail use, creating more opportunities for accidents; however, the risk would be reduced by enhanced training and worker protection, a safer design to the trail system, better maintenance,

and more safety information such as warning signs and alarms; all of which would occur under a Trails Management Program.

5.4.2 Trails Closure Alternative

As previously discussed, under this alternative there would be fewer trails and use would be restricted to workers at LANL and officially invited guests. Accident frequencies would be even less than with the Proposed Action. Generally, this alternative is the safest with regard to potential accident impacts because there would be fewer trails and less use of the remaining trails. In addition, fewer worker hours would be spent on trails. This alternative would most likely have a lower likelihood of accidents than the Proposed Action, which is expected to be minimal.

5.4.3 No Action Alternative

The No Action Alternative would include the continuation of current minimal trail maintenance and current use rates. No approved new trails would be constructed and only minimal improvements would be made to existing trails. Workers at LANL and some members of the public would continue to use existing trails and they may create new, unapproved trails. This alternative has the highest risk, comparatively, with regard to potential accidents because the controls that are applied under the proposed Trails Management Program that mitigate hazards are either non-existent or less effectively applied under this alternative. Nevertheless, like the other alternatives, trail use under this alternative is a relatively safe activity with high-consequence accidents likely to be absent.

This Page Intentionally Left Blank

6.0 Cumulative Effects

Cumulative effects on any affected resources as a consequence of the Proposed Action (a Trails Management Program at LANL) are expected to be negligible. Cumulative effects are caused by the aggregate of past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes them. These effects can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR 1500-1508). The cumulative effects analysis in the LANL SWEIS already documents the regional effect of the Expanded Operations Alternative and provides context for this EA. This section evaluates the cumulative effects of implementing the Proposed Action, the Trails Closure Alternative, and the No Action Alternative with the effects resulting from common issues of other actions that have, are, and will be taken at LANL or by adjacent jurisdictions.

Land use and visual resources are dismissed from cumulative effects consideration because it was determined they would not be affected by the Proposed Action, the Trails Closure Alternative, or the No Action Alternative and therefore could not contribute collectively to ongoing or reasonably foreseeable actions (see Table 2). Eight other resources analyzed in Chapter 4 of this EA would have a minimal contribution to cumulative effects, because neither the Proposed Action, the Trails Closure Alternative, or the No Action Alternative would have long-term direct, indirect, or irreversible effects on environmental restoration, geology and soils, transportation and infrastructure, water quality, health and safety, waste management, air quality, or noise.

Ecological resources, cultural resources, environmental justice, and socioeconomics are the affected resources that are discussed further in this section, because the analysis in Chapter 4 and the scoping for this EA indicated that there could be some minor direct or indirect effects on ecological, cultural, socioeconomic resources, and environmental justice as a consequence of the Proposed Action and the Trails Closure Alternative; and some irreversible effects on cultural resources as a result of the No Action Alternative, as well as some minor direct and indirect effects on environmental justice.

Cultural Resources. NNSA and LANL are preparing a Cultural Resources Management Plan in accordance with the Mitigation Action Plan set forth in the SWEIS ROD. The Proposed Action would implement a Trails Management Program with a process to identify cultural resources present along each trail and the trails designated as cultural properties by the State of New Mexico. This would include consultation with the four Accord Pueblos regarding the potential presence of TCPs and other traditionally or culturally sensitive areas as identified by these communities. NNSA would seek concurrence from the SHPO regarding mitigation plans for affected cultural resources and trails. If trail closure or trails use continuance would result in an unavoidable adverse effect to a cultural resource, a data recovery plan would be prepared and the SHPO and appropriate Native American tribes would be consulted before commencing work or identifying the trail for continued use.

Environmental Justice. The Proposed Action could partially address issues raised by local Pueblos during the scoping process. A Trails Management Program could result in a slight increase in trespassing and inappropriate activities that currently affect the Pueblos in a disproportionate manner because of the existence of TCPs at LANL and the proximity of Pueblo lands to some LANL trails.

Ecological Resources. An Integrated Resources Management Plan is being implemented at LANL to coordinate responsible environmental stewardship at LANL that is consistent with its missions. This management plan will also help LANL management operate the facility without incurring adverse cumulative environmental effects pursuant to the SWEIS ROD. The Proposed Action would have a minimal contribution to adverse cumulative effects on ecological resources. The Proposed Action would enhance LANL stewardship of critical habitat and sensitive species. Some trails could be closed during certain times, and others would be rerouted or repaired in a fashion so as to minimize habitat disruption or damage; other trails may be closed to recreational users or to certain user groups such that habitat use may be enhanced along the trails reach.

Socioeconomics. The Proposed Action would seek to strike a balance between the desire to use LANL trails for recreation, the need for LANL to foster environmental stewardship of ecological and cultural resources on lands that are also part of a NERP, and the need to address the concerns of local Pueblos and other adjoining neighbors regarding trails use at LANL.

The activities discussed in the LANL SWEIS and recently approved projects within the boundaries of LANL are considered here for the cumulative effects assessment. As stated in the LANL SWEIS and ROD, ecological and biological resources would not be adversely affected by ongoing and certain expanded operation at LANL (DOE 1999a). The ROD for the *EIS for the Conveyance and Transfer of Certain Land Tracts Administered by the U.S. Department of Energy and Located at Los Alamos National Laboratory, Los Alamos and Santa Fe Counties, New Mexico* (DOE 1999b) concluded that habitat could be fragmented, wildlife migration corridors could be disrupted, and that the disposal of land to the identified parties, particularly where it would be conveyed outside of Federal government control, could result in less-rigorous environmental review and protection processes. However, most of the land to be conveyed would be preserved or used for recreation; only a small portion is planned for development. According to the EA and Finding of No Significant Impact for the *Electrical Power System Upgrades at Los Alamos National Laboratory* (DOE 2000b, c), less than 25 ac (10 ha) of land would be disturbed by that project. The Finding of No Significant Impact for the *Wildfire Hazard Reduction and Forest Health Improvement Program at Los Alamos National Laboratory Environmental Assessment* (DOE 2000d, e), concluded that the Proposed Action (No Burn Alternative) would implement a Wildfire Hazard Reduction and Forest Health Improvement Program at LANL that would not use fire as a treatment measure to treat approximately 30 percent, (10,000 ac or 4,000 ha), of LANL. The Wildfire Hazard Reduction and Forest Health Improvement Program would use mechanical forest thinning and the construction of access roads and fuel breaks as treatment measures. The Wildfire Hazard Reduction and Forest Health Improvement Program would have a long-term beneficial effect on a variety of resources at LANL. Correspondingly, there would also be long-term beneficial contributions to any cumulative effects on resources resulting from actions at LANL or by surrounding land managers.

On July 25, 2000, the Federal government purchased approximately 89,000 ac (35,600 ha) of the Baca Ranch in northern New Mexico, located approximately 6.5 mi (10.5 km) west of LANL. The *Valles Caldera Preservation Act* designated these spectacular lands as the Valles Caldera National Preserve, a unit of the National Forest System. It was established to "…protect and preserve the scientific, scenic, geologic, watershed, fish, wildlife, historic, cultural, and recreational values of the Preserve, and to provide for multiple use and sustained yield of renewable resources within the Preserve," consistent with *Valles Caldera Preservation Act*

(http://www.vallescaldera.gov /about.php). The Preserve is administered under the Valles Caldera Trust by a Board of Trustees that is responsible for establishing and enforcing the conditions that apply to its management and use. The Preserve is accessible to the public for limited recreational use under specific restrictions and conditions.

This analysis concludes that there would be only minimal and slight cumulative effects on these resources as a consequence of the aggregate of the Proposed Action and past, present, and reasonably foreseeable future actions. There could be some positive cumulative effects to ecologic and cultural resources as a consequence of the Proposed Action or the Trails Closure Alternative. Both these alternatives would also tend to lessen disproportionate effects of trespassing and inappropriate use upon adjacent Pueblos and therefore foster environmental justice. The Trails Closure Alternative could also have a slightly negative effect on recreation and tourism in Los Alamos County and affect local socioeconomics. The No Action Alternative could pose slightly negative cumulative effects to cultural and ecological resources and to environmental justice. In conclusion, the effects of the Proposed Action, when combined with those effects of other actions defined in the scope of this chapter, would result in negligible cumulative effects.

This Page Intentionally Left Blank

7.0 Agencies Consulted

NNSA, as the lead agency for the preparation of this EA, invited Los Alamos County, Santa Fe National Forest, Bandelier National Monument, and the four Accord Pueblos of San Ildefonso, Santa Clara, Jemez, and Cochiti to be cooperating agencies. The National Park Service is a cooperating agency and staff from Bandelier National Monument participated in the scoping and preparation of this EA. Representatives from the U.S. Department of Agriculture, Forest Service also participated in the preparation of the EA, but not as an official cooperating agency. This was also the case for Los Alamos County, which had parks and open space staff and appointed board members participate in the EA's preparation. San Ildefonso and Santa Clara Pueblos were also consulted and participated by attending scoping meetings and providing comments that were incorporated into this EA.

The Proposed Action would establish a Trails Assessment Working Group comprised of representatives from LANL's management and operations contractor and NNSA; representatives of Los Alamos County, Bandelier National Monument, the Santa Fe National Forest, and the Four Accord Pueblos would be invited to participate. The Trails Assessment Working Group would coordinate land management issues related to trails at LANL through working groups such as the East Jemez Resource Council and would convene as necessary to consult and advise appropriate LANL management personnel on trails management issues.

The Proposed Action would implement a Trails Management Plan that would address cultural resources astride certain trails and some of the trails that are also designated as historic properties on the State Register of Cultural Properties. The planning process would include the identification of cultural resources present along and near each trail. This identification process would include consultation with the four Accord Pueblos regarding the potential presence of TCPs and other traditionally or culturally sensitive areas as identified by these communities. NNSA would seek concurrence from the SHPO regarding mitigation plans for affected cultural resources and trails. If keeping a trail open to recreational use or closing a trail would result in an unavoidable adverse effect to a cultural resource, a data recovery plan would be prepared and the SHPO and appropriate Native American tribes would be consulted before such work commenced.

NNSA has determined that no consultation with the U.S. Fish and Wildlife Service regarding the potential effect of the Proposed Action on Federally protected threatened or endangered species or their critical habitat is necessary as there would be no adverse effect to individuals of sensitive species or their critical habitat from the Proposed Action. Actions proposed would be undertaken in accordance with the LANL Threatened and Endangered Species Habitat Management Plan for which all necessary ESA compliance has been completed. Should new species be listed under the ESA that occur at LANL, or if areas of LANL become occupied by listed species in the future, these changes to the LANL setting could result in the need for further consultation with the U.S. Fish and Wildlife Service.

This Page Intentionally Left Blank

References

(10 CFR 1021) U.S. Department of Energy, "National Environmental Policy Act Implementing Procedures," *Code of Federal Regulations*, Washington, D.C. Revised as of January 1, 1999.

(40 CFR 1500-1508) Council on Environmental Quality, "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act," *Code of Federal Regulations*, Washington, D.C. Revised as of July 1, 2001.

(16 USC 470) *National Historic Preservation Act*, 16 United States Code, Chapter 1A, Subchapter II, Section 470.

(16 USC 1531) *Endangered Species*, 16 United States Code, Chapter 35, Section 1531.

(42 USC 2391) *The Public Health and Welfare, Disposal of Atomic Energy Communities, Assistance to governmental entities*, 42 United States Code, Chapter 24, Subchapter VIII, Section 2391.

(Burns 1995) Memorandum from M.J. Burns, Los Alamos National Laboratory regarding, "White Rock Noise Measurements during PHERMEX Tests, 11," Memorandum no. DX-DO:DARHT-95-31. Los Alamos, NM. March 13, 1995.

(Canter 1996) L. Canter, *Environmental Impact Assessment*, 2nd edition, McGraw-Hill Inc., New York, NY. 1996.

(DOE 1992) U.S. Department of Energy, *American Indian Tribal Government Policy*, DOE O 1230.2, Washington, D.C. April 8, 1992.

(DOE 1993) U.S. Department of Energy, *Recommendations for the Preparation of Environmental Assessments and Environmental Impacts Statements*, Office of NEPA Oversight. Washington, D.C. May 1993.

(DOE 1997) U.S. Department of Energy, *Environmental Assessment for Lease of Land for the Development of a Research Park at Los Alamos National Laboratory*, DOE/EA-1212, Los Alamos Area Office, Los Alamos, NM. October 8, 1997.

(DOE 1998) U.S. Department of Energy, *Land Transfer Report to Congress under Public Law 105-119, A Preliminary Identification of Parcels of Land in Los Alamos, New Mexico for Conveyance or Transfer*, Los Alamos, NM. 1998.

(DOE 1999a) U.S. Department of Energy, *Site-Wide Environmental Impact Statement for the Continued Operation of Los Alamos National Laboratory*, DOE/EIS-0238, Albuquerque Operations Office, Albuquerque, NM. January 1999.

(DOE 1999b) U.S. Department of Energy, *Environmental Impact Statement for the Conveyance and Transfer of Certain Land Tracts Administered by the U.S. Department of Energy and Located at Los Alamos National Laboratory, Los Alamos and Santa Fe Counties, New Mexico*, DOE/EIS-0293. October 1999.

(DOE 1999c) U.S. Department of Energy, "Record of Decision: Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory in the State of New Mexico," *Federal Register*, Volume 64, p 50797. Washington, D.C. September 20, 1999.

(DOE 2000a) U.S. Department of Energy, *Special Environmental Analysis for the Department of Energy, National Nuclear Security Administration, Actions Taken in Response to the Cerro Grande Fire at Los Alamos National Laboratory*, DOE/SEA-03, Los Alamos, NM. September 2000.

(DOE 2000b) U.S. Department of Energy, *Environmental Assessment for Electrical Power System Upgrades at Los Alamos National Laboratory*, DOE/EA-1247, Los Alamos Area Office, Los Alamos, NM. March 9, 2000.

(DOE 2000c) U.S. Department of Energy, *Finding of No Significant Impact for the Electrical Power System Upgrades at Los Alamos National Laboratory*, Los Alamos Area Office, Los Alamos, NM. March 9, 2000.

(DOE 2000d) U.S. Department of Energy, *Environmental Assessment for the Wildfire Hazard Reduction and Forest Health Improvement Program at Los Alamos National Laboratory*, DOE/EA-1329, Los Alamos Area Office, Los Alamos, NM. August 10, 2000.

(DOE 2000e) U.S. Department of Energy, *Finding of No Significant Impact for the Wildfire Hazard Reduction and Forest Health Improvement Program at Los Alamos National Laboratory*, Los Alamos Area Office, Los Alamos, NM. August 10, 2000.

(DOE 2002) U. S. Department of Energy/Environment, Safety and Health, *Recommendation for Analyzing Accidents under the National Environmental Policy Act*, Office of NEPA Policy and Compliance. July 2002.

(EO 12898) Office of the President, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," *Executive Order*, No. 12898, Washington, D.C. February 11, 1994.

(Gardner et al. 1986) J. N. Gardner, Goff, F., Garcia, S., and Hagan, R. C., "Stratigraphic Relations and Lithologic Variations in the Jemez Volcanic Field, New Mexico, " *Journal of Geophysical Research*, Volume 91, No. B2, pp. 1763-1778. 1986.

(Heiken et al. 1996) G. K. Heiken, Wohletz, K., Fisher, R. V., and Dethier, D. P., "Part II: Field Guide to the Maar Volcanoes of White Rock Canyon, " *in Field Excursions to the Jemez Mountains, New Mexico* (eds. S. Self, G. Heiken, M.L. Sykes, K. Wohletz, R.V. Fisher, and D.P. Dethier), *New Mexico Bureau of Mines and Mineral Resources*, 1996.

(LAC 1994) Los Alamos County, *Trails Management Plan for Los Alamos County*, July 19, 1994.

(LAC 1995) *Report to DOE, Los Alamos County Trail Network*, Trails and Pathways Subcommittee, Parks and Recreation Board, Los Alamos County, New Mexico. July 6, 1995.

(LAC 2003) Los Alamos County, "2003 Budget for the County of Los Alamos as adopted by the County Council on May 21, 2002," ONLINE 2003, available: http://losalamos.govoffice.com/index.asp?Type=B_BASIC&SEC={9b50CBB0-F6D0-4987-8FC1-BA4151455224

(LANL 1992) Los Alamos National Laboratory, Environmental Restoration Program, *RFI Work Plan for Operable Unit 1129*, LA-UR-92-800, Los Alamos, NM. 1992.

(LANL 1998) *Threatened and Endangered Species Habitat Management Plan*, LA-CP-98-96, Ecology Group (ESH-20), Los Alamos, NM. December 1998.

(LANL 1999) Los Alamos National Laboratory, *Structural Geology of the Northwestern Portion of Los Alamos National Laboratory, Rio Grande Rift, New Mexico: Implications for Seismic Surface Rupture Potential from TA-3 to TA-55*, LA-13589-MS, Los Alamos, NM. 1999.

(LANL 2001a) Los Alamos National Laboratory, *Environmental Surveillance and Compliance at Los Alamos During 2000*, LA-13861-ENV, Los Alamos, NM. October 2000.

(LANL 2001b) Los Alamos National Laboratory, *Geology of the Pajarito Fault Zone in the Vicinity of S-Site (TA-16), Los Alamos National Laboratory, Rio Grande Rift, New Mexico*, LA-13831-MS, Los Alamos, NM. 2001.

(LANL 2002) Los Alamos National Laboratory, *Environmental Surveillance at Los Alamos during 2001*, LA-13979-ENV, Los Alamos, NM. September 2002.

(Magrab 1975) E. B. Magrab, *Environmental Noise Control*, Wiley-Interscience Publication, John Wiley & Sons, New York, NY. 1975.

(NSC 1994) National Safety Council, *Accident Facts*, 1994 Edition, Itasca, IL. 1994.

(Self and Sykes 1996) S. Self, and Sykes, M. L., "Part I: Field Guide to the Bandelier Tuff and Valles Caldera, " *in Field Excursions to the Jemez Mountains, New Mexico* (eds. S. Self, G. Heiken, M.L. Sykes, K. Wohletz, R.V. Fisher, and D.P. Dethier), *New Mexico Bureau of Mines and Mineral Resources*, 1996.

(Slick 2003) Letter from Katherine Slick, State Historic Preservation Officer (Office of Cultural Affairs, Historic Preservation Division), to John S. Isaacson, Los Alamos National Laboratory (Cultural Resources Team Leader, Ecology Group) regarding, "Homestead Era Roads and Trails of Los Alamos, New Mexico- Camp Hamilton Trail Road and Roybal Road," April 14, 2003.

(USCB 2000a) U.S. Census Bureau, "DP-3. Profile of Selected Economic Characteristics: 2000," ONLINE April 24, 2003, available: http://factfinder.census.gov/bf/_lang=en_vt_name=DEC_2000_SF3_U_DP3_geo_id=05000US35028.html

(USCB 2000b) U.S. Census Bureau, "Census 2000 Summary File 1 (SF-1) Los Alamos County, New Mexico: 2000," ONLINE April 24, 2003, available: http://factfinder.census.gov/bf/_lang=en_vt_name=DEC_2000_SF1_U_DP1_geo_id=05000US35028.html

(USCB 2000c) U.S. Census Bureau, "Profile of Selected Economic Characteristics: Census 2000 Summary File 3 (SF-3) Cochiti Pueblo, NM, Jemez Pueblo NM, Pojoaque Pueblo NM, San Ildefonso Pueblo NM, Santa Clara Pueblo NM," ONLINE May 1 2003, available: http://factfinder.census.gov/bf/_lang=en_vt_name=DEC_2000_SF3_U_DP3_geo_id=25000US0680.html for Cochiti, http://factfinder.census.gov/bf/_lang=en_vt_name=DEC_2000_SF3_U_DP3_geo_id=25000US1685.html for Jemez, http://factfinder.census.gov/bf/_lang=en_vt_name=DEC_2000_SF3_U_DP3_geo_id=25000US2880.html for Pojoaque, http://factfinder.census.gov/bf/_lang=en_vt_name=DEC_2000_SF3_U_D

P3_geo_id=25000US3495.html for Santa Clara, http://factfinder.census.gov/bf/_lang=en_vt_name=DEC_2000_SF3_U_DP3_geo_id=25000US3415.html for San Ildefonso

(Vigil 1995) Memorandum from E.A. Vigil regarding, "Noise Measurement at State Road 4 and Bandelier Turn-Off at State Road 4 during PHERMEX Test on March 11, 1995," Memorandum no. ESH-5:95-11825. Los Alamos. NM. March 17, 1995.

This Page Intentionally Left Blank

Department of Energy
National Nuclear Security Administration
Finding of No Significant Impact
for the
Los Alamos National Laboratory
Proposed Trails Management Program,
Los Alamos, New Mexico

U. S. Department of Energy
National Nuclear Security Administration
Los Alamos Site Office
528 35th Street
Los Alamos, NM 87544

DEPARTMENT OF ENERGY,
NATIONAL NUCLEAR SECUIRTY ADMINISTRATION
FINDING OF NO SIGNIFICANT IMPACT

Proposed Los Alamos National Laboratory Trails Management Program ,

Los Alamos, New Mexico

FINAL ENVIRONMENTAL ASSESSMENT: The *Environmental Assessment (EA) for Proposed Los Alamos National Laboratory Trails Management Program, Los Alamos, New Mexico* (DOE/EA-1431) and the accompanying Mitigation Action Plan (MAP) (both attached) provides sufficient evidence and analysis to determine that a Finding Of No Significant Impact is appropriate for the Proposed Action (Los Alamos National Laboratory (LANL) Trails Management Program Alternative). The EA documents the evidence and analysis in the following chapters: 1, Purpose and Need; 2, Description of Proposed Action and Associated Alternatives; 3, Affected Environment; and 4, Environmental Consequences.

Analyses performed in the subject EA allow National Nuclear Security Administration to conclude that potential adverse environmental effects of the Proposed Action, under normal conditions, would be minimal. Engineering and administrative controls or considerations that serve to lessen any potential for adverse environmental effects have been incorporated as integral features of the Proposed Action Alternative. Examples of this type of mitigating feature include the use of Best Management Practices to prevent surface soil erosion and sediment migration where soil disturbance is unavoidable, and the installation of site appropriate surface water drainage and control measures. These actions are discussed in the EA document within Chapter 2.1. The MAP documents potential adverse environmental effects that could result from implementation of the Proposed Action, identifies commitments made to mitigate those effects to render them non-significant, and establishes the responsible National Nuclear Security Administration or LANL organizations.

The EA considered the type of potential accidents that might occur from trails construction activities and use, as well as possible cumulative effects from implementing the Proposed Action together with past, present and reasonably foreseeable future actions. Trails development, construction, management, and use are not inherently risky activities. Additional trails work, maintenance and enhanced trail use could create additional opportunities for accidents to occur. Risk reduction measures are addressed in the MAP.

PREDECISIONAL DRAFT REVIEW & COMMENT: On July 11, 2003, the Department of Energy, National Nuclear Security Administration invited review and comment on the predecisional draft EA from the State of New Mexico; four nearby American Indian Tribes: Cochiti, Jemez, Santa Clara and San Ildefonso (sometimes referred to as the four Accord Pueblos because each tribe has entered into an accord with the Department of Energy); the Pueblo of Acoma; and the Mescalero Apache Tribe. The National Nuclear Security Administration also made the predecisional draft EA available to the general public at the

same time it was provided to the State and Tribes for review and comment. The general availability of the predecisional draft EA to the public was accomplished by placing it in the Department of Energy Public Reading Rooms located within the Los Alamos National Laboratory's Community Relations Office and Reading Room, and in the University of New Mexico's Zimmerman Library in Albuquerque. Additionally, over 30 local stakeholder groups and individuals that have identified themselves as interested parties with regards to LANL activities were notified by letter of the availability of the predecisional draft EA on July 11, 2003. Notice of the availability of the predecisional draft EA for review was also published in three local newspapers. Over the following week, notices of the availability of the predecisional draft EA for review and comment were also placed in three local newspapers and on the LANL electronic Daily NEWSBulletin, as well as the LANL-on-line Meeting Calendar. Copies of the predecisional draft EA were provided to all interested parties for their review. The review and comment period was 21 days long and ended on August 5, 2003. A public information meeting on the Proposed Action that provided an additional forum for public comment was held in Los Alamos, New Mexico on July 30, 2003.

About 125 parties provided comments to the predecisional draft EA. Neither the State of New Mexico, nor any of the American Indian Tribes offered comment on the predecisional draft EA. Comments received were addressed through changes to the Final EA, and through general comment responses provided in Chapter 1.6 of the EA; copies of the comments are provided in Appendix A of the EA. Copies of the Final EA have been sent to the respondents.

AGENCY CONSULTATIONS: NNSA determined that the activities associated with implementing the action alternatives would either not affect individual threatened or endangered species that may be present at LANL or their critical habitat, or might affect, but would likely adversely affect individual threatened or endangered species that may be present at LANL or their critical habitat. Trail maintenance and repair actions would be conducted in accordance with the LANL Threatened and Endangered Species Habitat Management Plan. Therefore, no consultation was required with the U.S. Fish and Wildlife Service under the provisions of section 7 of the Endangered Species Act of 1973 (16 USC 1531 *et seq.*). The Proposed Action has the potential to affect cultural resources astride certain trails and some of the trails that are also designated as historic properties on the State Register of Cultural Properties. The planning process involved in the Proposed Action would include the identification of cultural resources present along and near each trail, and would include appropriate consultation with the New Mexico State Historic Preservation Officer according to section 106 requirements of the National Historic Preservation Act for these resources, and with the four Accord Pueblos. Treatment plans to resolve any adverse effects would be negotiated between the State Historic Preservation Officer and the NNSA through an interagency Memorandum of Agreement as necessary.

FINDING: The United States Department of Energy, National Nuclear Security Administration finds that there would be no significant impact from proceeding with its proposal to implement a Los Alamos National Laboratory Trails Management Program as described in the Proposed Action description within the subject Environmental Assessment. This finding is based on the Environmental Assessment, which analyzes the consequences of the relevant issues of environmental concern, together with the Mitigation Action Plan that identifies mitigations and makes commitments to implement these mitigation features

so as to render them not significant. The Department of Energy, National Nuclear Security Administration makes this Finding of No Significant Impact pursuant to the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.], the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act [40 CFR 1500] and the Department of Energy National Environmental Policy Act Implementing Procedures [10 CFR 1021]. Therefore, no environmental impact statement is required for this proposal.

Signed in Los Alamos, New Mexico this 2 day of ~~August~~ September, 2003.

Ralph E. Erickson
Manager
Los Alamos Site Office

FOR FURTHER INFORMATION: For further information on this proposal, this Finding Of No Significant Impact (FONSI), or the Department of Energy, National Nuclear Security Administration's National Environmental Policy Act (NEPA) review program concerning proposals at Los Alamos National Laboratory, please contact:

Elizabeth Withers, NEPA Compliance Officer

Los Alamos Site Office

U.S. Department of Energy

National Nuclear Security Administration

528 35th Street

Los Alamos NM 87544

(505) 667-8690

Copies of this FONSI (with the Environmental Assessment and Mitigation Action Plan attached) will be made available for public review at the DOE Public Reading Room within the Los Alamos National Laboratory Community Relations Office, 1619 Central Avenue, Los Alamos, New Mexico, 87544 at (505) 665-4400 or (800) 508-4400. Copies will also be made available within the DOE Public Reading Room at the Zimmerman Library, University of New Mexico, Albuquerque, New Mexico, 87131 at (505) 277-5441.

DOE/EA 1431

Mitigation Action Plan

for the

Proposed Los Alamos National Laboratory Trails Management Program

Department of Energy
National Nuclear Security Administration
Los Alamos Site Office
Los Alamos, New Mexico

MITIGATION ACTION PLAN
FOR THE
LOS ALAMOS NATIONAL LABORATORY
TRAILS MANAGEMENT PROGRAM

Background Information: The U. S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) has issued a Finding of No Significant Impact (FONSI) and a Final Environmental Assessment (EA) (*Final Environmental Assessment for the Proposed Los Alamos National Laboratory Trails Management Program, Los Alamos, New Mexico,* DOE/EA-1431) on a proposal to establish and implement a management program for the continued use of social trails at Los Alamos National Laboratory (LANL), Los Alamos, New Mexico. The NNSA is concurrently issuing this Mitigation Action Plan (MAP) and now plans to implement the LANL Trails Management Program (the Program).

As described in the subject EA, the LANL Trails Management Program would be implemented in a step-wise fashion through individual projects. These project steps would include: Individual Project Planning Measures; Repair and Construction Measures; Environmental Protection Measures; Safety Measures; Security Measures; and End-State Conditions and Post-Repair or Post-Construction Assessment. Long-term maintenance measures would be followed to support the desired end-state condition of each trail, and each trail would be reviewed about every five years or as needed to determine what, if any, further measures are needed. As part of the Individual Project Planning Measures, a standing LANL Trails Assessment Working Group would be formed. This Trails Assessment Working Group would minimally include LANL staff and NNSA staff, augmented by invited representatives from the Incorporated County of Los Alamos, Bandelier National Monument, the Santa Fe National Forest, and the four Accord Pueblos; these invited representatives would participate in the Trails Assessment Working Group at their own discretion. Other individuals and entities may be invited to participate in the planning or implementation of individual trail projects on an ad hoc basis as the need arises and is identified by the Trails Assessment Working Group.

Function of the Mitigation Action Plan: The function of this Mitigation Action Plan (MAP) is to document potential adverse environmental effects that could result from site activities as a result of implementing this Program, to identify commitments made to mitigate those effects, to establish Action Plans to carry out each commitment, and to identify responsible NNSA or LANL organizations.

Environmental Effects: The EA and FONSI indicate that potential adverse effects of the Proposed Action under normal conditions would be minimal. The EA, however, includes certain project provisions within the analysis of the environmental effects of the proposed Trails Management Program to mitigate any potential adverse effects that could result from future site activities that are related primarily to trails repair, maintenance, and construction or associated activities.

Potential adverse environmental effects are as follows:

(1) Trails maintenance, repair, construction and associated activities within LANL may adversely affect potential habitat for Federally threatened or endangered species, such as the Mexican spotted owl.

(2) Trails maintenance, repair, construction, and associated activities within LANL may also adversely affect cultural resources located within or near LANL boundaries.

(3) Trails maintenance, repair, construction, and associated activities within LANL may also adversely affect areas of concern for legacy contamination.

Commitments To Mitigate Adverse Environmental Effects: NNSA's commitment to mitigate the possibility for adverse site effects from implementing the LANL Trails Management Program related to potential sensitive habitats, cultural resources, or contaminant spread, shall be included within the LANL Integrated Natural and Cultural Resource Management Plan (the Integrated Management Plan or IRMP), Environmental Protection Programs (EPPs) as a part of LANL's overarching Integrated Safety Management System (ISMS). Natural and cultural resource management plans supporting the IRMP are currently scheduled for completion by no later than 2005.

Mitigations for adverse environmental effects will take the form of natural and cultural resource surveys, evaluations, sample and data recovery actions, and necessary reports and consultation efforts. Additionally, the mitigations will include the establishment of a public outreach and information project element not specifically identified in the subject EA.

Action Plans and Responsible Parties: Specific Action Plans to be conducted will be identified through the LANL Trails Management Program's individual project planning measures, identification of sensitive resource issues step for each trails project. As explained later in the text of this MAP, as Action Plans are determined for each project, the MAP will be amended to include these specific project actions to be undertaken.

The NNSA, Los Alamos Site Office Manager will have the overall responsibility for insuring the adequate and timely completion of all actions associated with the MAP. The LANL Associate Director of Operations (ADO), as a LANL University of California Management and Operations (M&O) contractor representative, will be responsible for conducting the mitigation measures performed by their personnel (or sub-contractors) and conducting project specific activities identified for each trail; the LANL Risk Reduction Environmental Stewardship–Ecology (RRES-ECO) Group Leader will be responsible for data collection and monitoring activities.

Mitigation Action Plan Annual Report: Activities associated with the MAP will be reported in a NNSA Mitigation Action Plan Annual Report (MAPAR) to be issued by January 31st of each year for the preceding LANL fiscal year (October through September), beginning one year after the implementation of the LANL Trails Management Program; implementation of the LANL Trails Management Program is expected to commence at the beginning of the LANL 2004 fiscal year. The MAPAR will be continued annually thereafter until all existing LANL trails have undergone review and associated actions have been completed and reported on; the MAPAR may then be suspended until such time that new or follow-on actions are identified as being required and then the MAPAR may be resumed as needed.

The MAPAR will reflect new information or changed site circumstances. If major changes to mitigations identified in project-specific action plans or the MAP are necessary, these changes will be reflected in the MAPAR. The

MAPAR will be placed in the Los Alamos and the Albuquerque DOE Public Reading Rooms for public and stakeholder information.

A Mitigation Tracking System (MTS) will be developed to document the progress of fulfilling commitments described in the MAP. Results of the MTS will be reported in the MAPAR. The MTS will continue until all individual project mitigation commitments are approved, verified and are considered closed. A completion Report will be issued by the NNSA at the time of completion of all mitigation. NNSA will approve and verify progress or closure on mitigation measures and evaluate the success of various mitigation measures over time. These efforts will be reported, as appropriate in the MAPAR.

The MAPAR may be prepared in the form of a letter report. The complexity of the report document will be expected to reflect the extent of and complexity of the mitigations.

MAP Amendments: NNSA may amend this MAP at any time. As individual projects are planned, this MAP will be amended to include Albuquerque DOE Public Reading Rooms for public and stakeholder information.

Provisions of this MAP will be effective immediately.

September 2, 2003
MAP Authorization Date

Manager, Los Alamos Site Office