

### *White Rock Canyon Reserve*

The White Rock Canyon Reserve was dedicated by DOE on October 30, 1999. It contains approximately 1,000 acres on the southeastern portion of LANL along the Rio Grande. The objective of the Reserve is to conserve, protect, and enhance the site's biological and cultural resources. Bandelier National Monument will co-manage it together with NNSA with input from UC/LANL, other state and federal agencies, nearby Pueblos, and the local community. A comprehensive resources management plan for the Reserve, to be developed by Bandelier National Monument with NNSA review and approval, will be completed by 2005 (DOE 1999c).

### *2.3.2 Regional Importance of LANL Resources*

Administrative boundaries do not necessarily coincide with ecological boundaries. LANL facilities, infrastructure, operations, and impacts (positive, negative, and undetermined) are immersed in the patterns and processes of a complex regional landscape making up the Pajarito Plateau. Major habitat types and canyon systems are continuous across this plateau, which encompasses jurisdictional boundaries of LANL, Bandelier National Monument, Santa Fe National Forest, Native American Pueblos, and other land management stewards. Seasonal migration routes for elk and deer and foraging, or hunting, ranges of black bears and mountain lions cross these jurisdictional boundaries. A

number of interagency organizations have been created to foster cooperation. The following describes current interagency organizations.

### *The East Jemez Resource Council*

The East Jemez Resource Council was established in 1998 with a goal of maintaining and enhancing the natural and cultural resources of the East Jemez Mountains so that they may be sustained and appreciated by current and future

generations. The Council has several technical working groups that focus and report on resource-specific issues and efforts. NNSA, UC, Santa Fe National Forest, US Fish and Wildlife Service, and Bandelier National Monument signed the Charter establishing the Council. Other participating government entities include San Ildefonso, Cochiti, and Santa Clara Pueblos, the New Mexico Environment Department (NMED), New Mexico State Forestry Division, and New Mexico Department of Game and Fish.

### *Pajarito Plateau Watershed Partnership*

In 1999, when the Watershed Management Plan was in development, regional landowners and managers with a common interest in the water quality of the Pajarito Plateau established the Pajarito Plateau Watershed Partnership (PPWP). The Partnership's mission is to protect, improve, and restore water quality in this watershed. Toward this end, the Partnership is preparing a multiagency program and plans to identify and resolve the primary regulatory and stakeholder issues affecting water quality. Partnership members include Bandelier National Monument, San Ildefonso Pueblo, Santa Clara Pueblo, Los Alamos County, NMED, Santa Fe National Forest, NNSA, and UC/LANL. In 2001, the PPWP became a new working group under the East Jemez Resource Council.



## B.1 INTRODUCTION

This appendix provides some of the resource-specific context necessary for understanding the purpose and intended use of the IRMP for managing the natural and cultural resources occurring at LANL. It includes information regarding the extent and condition, resource management considerations, and the current approach to resource management associated with each of the following resources: air, surface water, groundwater, biological resources (including soils), and cultural resources. The information in this appendix represents the current understanding and management status for each resource. It is based on historic and on-going studies and publications including the SWEIS for LANL (LANL 1997; LANL 1998b; LANL 1999), updated as appropriate.

### B.1.1 Background

A key component of managing natural and cultural resources at LANL are the relationships between resources on both a regional and site-specific scale. Consideration of the administration of LANL operations and activities within a site-specific and regional context is also important. Administrative boundaries, however, do not necessarily coincide with ecological boundaries. LANL facilities, infrastructure, operations, and impacts (positive, negative, and undetermined) are part of the patterns and processes of a complex regional landscape making up the Pajarito Plateau. Major watersheds (Figure B.1), canyon systems, and vegetation zones (Figure B.2) are continuous across this plateau, which encompass jurisdictional boundaries of LANL, Bandelier National Monument, Santa Fe National Forest, Native American Pueblos, and other land management stewards. Because of this ecological continuity

and interconnectedness, the site to be managed by this IRMP must be considered in its context as part of a larger regional ecosystem. Two landscape-based organizational themes may be used to place this larger regional ecosystem into perspective: watershed units and major vegetation zones.

### Watersheds

The regional ecosystem has been defined to include eight major watersheds, each of which has significant tributaries (Table B.1). Guaje Canyon bounds this regional ecosystem on the north, Frijoles Canyon on the south, the crest of the Jemez Mountains on the west, and the Rio Grande on the east. Because of their downstream hydrologic connection to LANL and the functional boundary of Cochiti Dam, the White Rock Canyon stretch of the Rio Grande

**Table B.1 Watersheds and Main Tributaries**

<b>Watersheds<sup>a</sup></b>	<b>Major Tributaries to the Watershed<sup>b</sup></b>
Los Alamos	Los Alamos Pueblo Barrancas Bayo Rendija DP Guaje
Mortandad	Ten-Site Mortandad Cañada del Buey Cedro
Water	Cañon de Valle S-Site (Martin) Potrillo Fence Indio
Sandia	Sandia
Pajarito	Pajarito Three-Mile Starmer Two-Mile
Ancho	North Ancho South Ancho
Chaquehui	Chaquehui
Frijoles	Frijoles

<sup>a</sup>These watersheds drain the Pajarito Plateau, some portion of NNSA property, and discharge to the Rio Grande.

<sup>b</sup>Many of these tributaries receive surface flow from other, lesser, named and unnamed, tributaries.

and Cochiti Lake are also included in this regional ecosystem.

Watersheds draining the Jemez Mountains and Pajarito Plateau are tributaries of the Rio Grande, which is the fifth largest watershed in North America. Approximately 11 miles of LANL's eastern boundary borders on the rim of White Rock Canyon or descends to the Rio Grande. The riverine, lake, and canyon environment of the Rio Grande as it flows through White Rock Canyon makes a major contribution to the biological resources and significantly influences ecological processes of the LANL region.

From their narrow, thickly forested beginnings on the flanks of the Jemez Mountains to their confluence with the Rio Grande, major canyons are associated with the eight major watersheds. The plateau canyons range in depth from about 200 to 600 feet. The steeply sloping, north-facing canyon walls and canyon bottoms are shadier and cooler and have higher levels of humidity and soil moisture than the often nearly vertical, south-facing canyon walls, which are sunnier, hotter, and more arid. These differences in slope, aspect, sunlight, temperature, and moisture cause a dramatic, localized shift in major vegetation zones on canyon walls and in canyon bottoms beyond their typical range of elevation. This "canyon effect" is responsible for fingers of coniferous forest extending down regional canyons.

Surface water flow occurs in canyon bottoms seasonally, or intermittently, as a result of spring snowmelt and summer rain. A few short sections of riparian vegetation of cottonwood and willow and other water-loving plants



are present in scattered locations on LANL as well as along the Rio Grande in White Rock Canyon. The relatively abundant moisture concentrated between the temperature-moderating canyon walls allows a diverse array of plant and animal species to exist in these canyons at elevations that exceed the normal upper and lower elevation limits for these species.

Wildlife is abundant and diverse in the canyons. The canyons contain a more complex mix of habitats than the adjacent mesa tops and provide nest and den sites, food, water, and travel corridors. Mammals and birds are especially evident in these environments.

### *Major Vegetation Zones*

While watersheds traverse all or part of the elevational gradient, major vegetation zones (Figure B.2) are organized into elevation- and aspect-defined bands across this gradient. Increasing temperature and decreasing moisture along the 12-mile-wide and 5,000-foot elevational gradient from peaks of the Jemez Mountains to the Rio Grande result in formation of six vegetative zones. The six major vegetative zones that characterize this regional ecosystem are montane grasslands, spruce-fir forest, mixed-conifer forest (with aspen forest), ponderosa pine forest, piñon-juniper woodland, and juniper savannah.

The montane grassland, spruce-fir, and mixed-conifer vegetation zones are located primarily west of LANL with little or no representation on LANL proper. The vegetation

zones and associated ecotones provide habitat, including breeding and foraging territory, and migration routes for a diversity of permanent and seasonal wildlife.

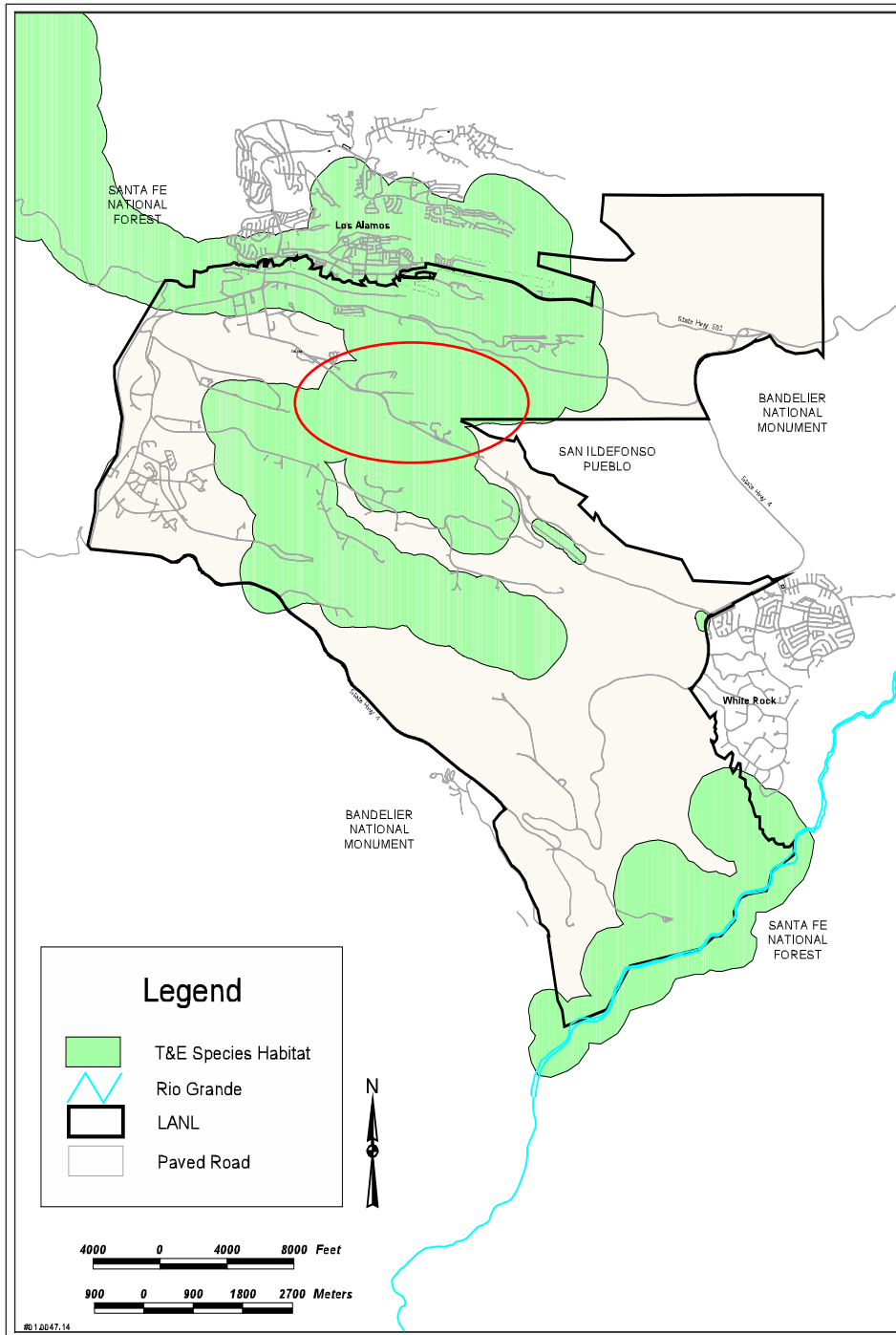


Figure B.5. Threatened and endangered species habitat at LANL.