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Los Alamos, New Mexico 87545

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BIOLOGICAL ASSESSMENT
FOR
SANITARY WASTE DISPOSAL AREAS
IN TAs 60 AND 65,
LOS ALAMOS NATIONAL LABORATORY

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Biological Resources Evaluation Team
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Los Alamos National Laboratory
Revision 1, February 3, 1994

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ABBREVIATED BIOLOGICAL ASSESSMENT FOR THE SANITARY WASTE DISPOSAL AREAS TA-60 AND TA-65

SUMMARY

Los Alamos National Laboratory is proposing to operate disposal areas for treated sanitary sludge generated by the Sanitary Wastewater Systems Consolidation Treatment Plant at Technical Area (TA) 46. Sludge is presently being disposed in TA-54, Area G, which is primarily used for storage of hazardous and mixed waste. Because the sludge is neither hazardous nor radioactive, the group that operates Area G is requiring a separate disposal area. The proposed disposal areas would consist of two sites of approximately 8 ha (20 acres) each in TA-60 and TA-65. Based on previous studies in and adjacent to the project areas, the areas affected by the proposed facility may include habitat utilized by northern goshawk, Mexican spotted owl, spotted bat, peregrine falcon, and wood and checker lilies. Regular consultation with the Laboratory's Biological Resources Evaluation Team and other mitigation measures will ensure that the proposed project does not directly affect these threatened, endangered, and species.

Previous research also shows that within the project area there are both palustrine and riverine wetlands supporting wetland vegetation. The only potential impact to wetlands would come from contaminated runoff; this is unlikely, however, because contamination will be removed before application. However, mitigations are included. In addition, the Biological Resources Evaluation Team recommends long-term monitoring of biological, chemical, and physical parameters be initiated throughout the proposed project.

1 INTRODUCTION

1.1 Proposed Action

Los Alamos National Laboratory (LANL) is proposing to operate two sanitary sludge disposal areas (SWDAs) for land application of treated sanitary sludge. The sludge is generated by the Sanitary Wastewater Systems Consolidation (SWSC) Treatment Plant at TA-46 and is placed in TA-54, Area G, an area used primarily for storage of hazardous and mixed waste. The Siting Committee of the Engineering group at LANL approved two sites for the sludge disposal, one on Sigma Mesa in TA-60 and one south of Pajarito Road in TA-65. Disposal at the proposed sites would reduce the overhead costs that incur from disposing nonhazardous and nonradioactive waste in an area designated for hazardous and radioactive waste. Other benefits include enhancement of natural vegetative growth and accelerated revegetation of eroded or disturbed areas.

Each site would be approximately 8 hectares (ha) (20 acres) in area. The plots would be divided into 4 - 5 subplots of 1.6 - 2.8 ha (4 - 7 acres) each. Subplots would receive 0.25-cm (1/10-inch) thick applications of sludge from a high-flotation (low impact) vehicle (Williams 1994). Each subplot would receive one application of approximately 92 cubic meters/year (m^3/yr) (120 cubic yards/year [yd^3/yr]), not more than

one time within 3 - 5 years of initiation of the project. The sludge would be applied at a rate limited by the total nitrogen uptake of the native grasses. This low application rate would assure that the amount of nitrogen in the sludge did not exceed the nitrogen demand of the vegetation. Thus, the sludge would not have contaminate runoff with excess nitrogen. One year after final sludge application, all sludge would be consumed. There would be no residual material and the sites could be used for other development (DOE 1993).

The sludge would be applied at a rate of 1.3×10^{-4} kg N/ha·year (150 lbs N/acre·yr) (Caslin 1993). This rate falls within 40 CFR 503, sludge loading rate criteria for land application, and it has a successful history in New Mexico based on revegetation of tailing piles at Phelp's Dodge Tyrone Mine. Also, it contains only 5.4 % TKN (Total Kjeldahl Nitrogen), which is equivalent to a low-grade fertilizer.

This project would be in compliance with all applicable local, state, and federal regulations and orders (Williams 1991). Before it would be applied to the disposal areas, the sludge would go through a 90-day drying process, as required by 40 CFR 257, at the treatment plant to meet stringent quality requirements . The siting committee chose sites with topography that would not be subject to erosion. The slopes do not exceed 12% and consist of well-drained soil, and a subsurface of impermeable, nonfractured material above ground water tables; they are 91 m (300 ft) from floodplain areas and drainage ways, and are 610 m (2000 ft) from water wells, as required by the 1983 EPA Process Design Manual for Land Application of Municipal Sludge. A Stormwater Pollution Prevention Plan and a Groundwater Discharge Plan would be developed and implemented. These would call for periodic inspections and sampling of runoff quality. Because the sludge would be thoroughly tested for metals, organics, radioactivity, and pathogens prior to application, these contaminants are not expected to pose any threats to runoff quality. Other monitoring would include shallow soil moisture, metal concentration, and nitrogen profiles; plant tissue studies, productivity, and diversity; and runoff quality.

Much research has been done on the effects of dried sanitary sludge. The literature shows that most nutrient levels (including nitrogen, phosphorus, and potassium, and micronutrients), and populations of soil bacteria, fungi, and ammonium oxidizers increased linearly with increased sludge application rates (Dennis and Fresquez 1989; Fresquez, et al. 1990a and b; Fresquez and Dennis 1990). Usually, no apparent adverse effects on native vegetation occurred at sludge rates up to 45 Megagrams/hectare (Mg/ha) on degraded grasslands in the semiarid southwest. The increased nutrient levels and microorganism populations improved soil aggregation and water holding capacities, which increased total plant foliar cover and total herbaceous production. In one study, these increases occurred at low and intermediate sludge rates (22.5 and 30 Mg/ha, respectively) (Fresquez and Dennis 1990). Another study obtained the same results from rate of 22.5 and 45 Mg/ha (Fresquez et al. 1990b).

Numerous abandoned waste dumps, sewer lines, and other areas that may be contaminated by radioactive and/or hazardous materials have been identified in the project area. These areas are designated as Solid Waste Management Units (SWMUs). There are seven SWMUs in the proposed area in TA-60. These consist of container storage areas, a solar pond, a drilling mud pit, oil- and grease-stained soil, and asphalt rubble. None of these SWMUs are releasing hazardous or radioactive substances, although the Environmental Restoration Project review recommends maintaining a 15.2-m (50-ft) berth between the solar pond and the work area and avoiding the area west of the mud pit and the asphalt rubble (Gonzales n.d.). There are no SWMUs at the proposed site in TA-65.

1.2 Previous Studies

Few studies had been completed in the project area prior to 1991. However, in 1991 and 1992, the LANL Biological Resource Evaluations Team (BRET) conducted studies in the general area in Operable Unit (OU) 1114 and 1093, administrative units of the Environmental Restoration Program. The project areas are situated within these OUs. Level 1 (reconnaissance), Level 2 (habitat evaluation), and Level 3 (species-specific) surveys were conducted in both OUs. Because no studies were done for the SWDAs specifically, the two OU reports were used to compile information for this report. Documents used and surveys completed for the OU reports are listed in Table 1.

Although none of the OU studies was designed specifically to address the impacts of the SWDAs, taken together they cover most of the area that would be affected by the project. The 1991-92 BRET survey was particularly thorough, summarizing information from all previous work, and, in addition, conducting new surveys in the project area. The purpose of the field surveys was: 1) to determine if species protected by the state or federal government were present; 2) to determine if sensitive habitats were present; and 3) to gather baseline data for future studies on plant and wildlife species in the area. BRET also noted all wetlands and floodplains within the area and observed vegetation characteristics of wetlands, floodplains, and riparian areas. The 91-92 BRET survey is the primary document used to compile this biological assessment.

2 AFFECTED ENVIRONMENT

2.1 General Setting

The Los Alamos National Laboratory, on DOE property, and the communities of Los Alamos and White Rock are situated in Los Alamos County in north-central New Mexico. This region is located approximately 60 miles (100 km) north-northeast of Albuquerque and 25 miles (40 km) northwest of

Santa Fe. Most of Los Alamos County is situated on the eastern slope of the Jemez Mountains on the Pajarito Plateau (see Figure 1).

Sloping gently downward to the east-southeast for more than 15 miles (24 km) and ending in a scarp that drops to the Rio Grande, the Pajarito plateau is comprised of numerous alternating narrow mesas and canyons at the base of the Jemez Mountains. The upper reaches of the Plateau are approximately 2380 m (7000 ft) above sea level, and its lower edge, on the rim of White Rock Canyon, is 1890 m (6200 ft) in elevation. Plateau canyons are 46-91 m (150-300 ft) deep and 91-183 m (300-600 ft) wide.

2.2 Project Area

The project area is situated in the central portion of DOE property in TAs 60 and 65, and covers approximately 16.2 ha (40 acres) total (see Figure 2). In TA-60, approximately 8 ha (20 acres) are available on Sigma Mesa. The project would be located adjacent to existing vegetation composting operations performed by Johnson Controls, Inc. (JCI), Grounds Maintenance Department, and may eventually be integrated with sludge operations for LANL reclamation projects. The site would not require access improvement. One palustrine, temporarily flooded wetland and eight SWMUs are present near the project area (see Figure 3). In TA-65, approximately 8 ha (20 acres) are also available. This location is close to the SWSC Treatment Plant, and thus offers convenience for sludge transport. It may require fencing to limit public access. Grading for road access would not be required. Sludge would not be applied over an underground water line that runs through the area. One riverine, temporarily flooded wetland is present at this site (see Figure 4).

The proposed facilities would be confined to generally level mesa tops at elevations of approximately 2216 m (7270 ft) on Sigma Mesa. The vegetation on Sigma Mesa, TA-60, is dominated by ponderosa pine (*Pinus ponderosa*), piñon pine (*Pinus edulis*), and one-seed juniper (*Juniperus monosperma*), intermixed with a shrub layer composed primarily of various oak species (*Quercus*), mountain mahogany (*Cerocarpus montanus*), and wax currant (*Ribes cereum*). Dominant forbs and grasses include blue grama (*Bouteloua gracilis*) and mountain muhly (*Muhlenbergia montana*). On north-facing slopes of the surrounding canyons, Douglas fir (*Pseudotsuga menziesii*), an indicator of the mixed conifer zone, and ponderosa pine are codominants. Vegetation also includes small amounts of Rocky Mountain maple (*Acer glabrum*), limber pine (*Pinus flexilis*), and white fir (*Abies concolor*). Various shrub species include Gambel oak (*Quercus gambelii*), barberry (*Berberis fendleri*), cliffbush (*Jamesii americana*), and wax currant. On the south-facing slopes of the surrounding canyons, which tend to be dryer and more exposed than north-facing slopes, ponderosa pine and Douglas fir are the overstory dominants, while the shrub species consists of only three species.

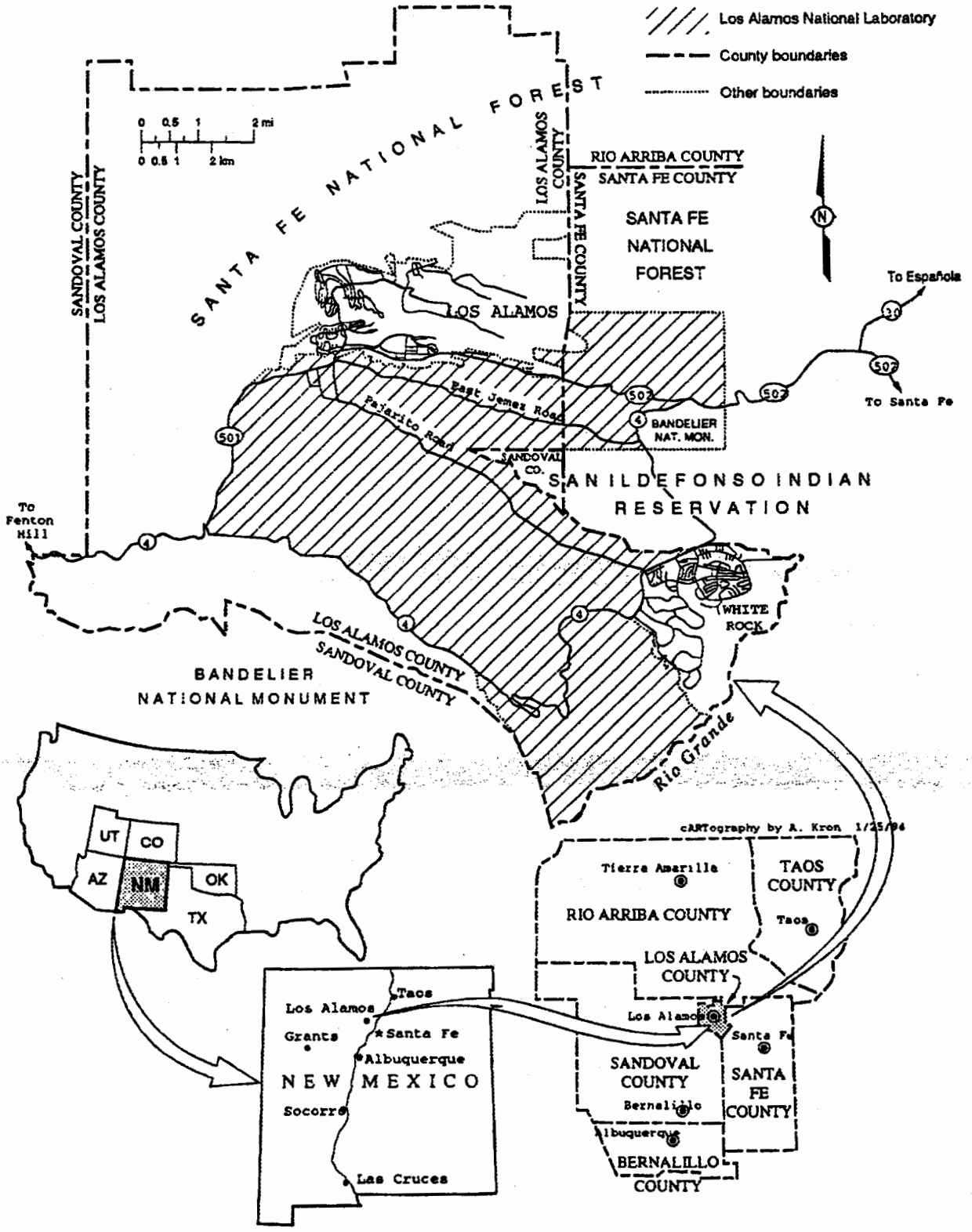

Fig. 1. Location of Los Alamos National Laboratory with respect to surrounding lands.

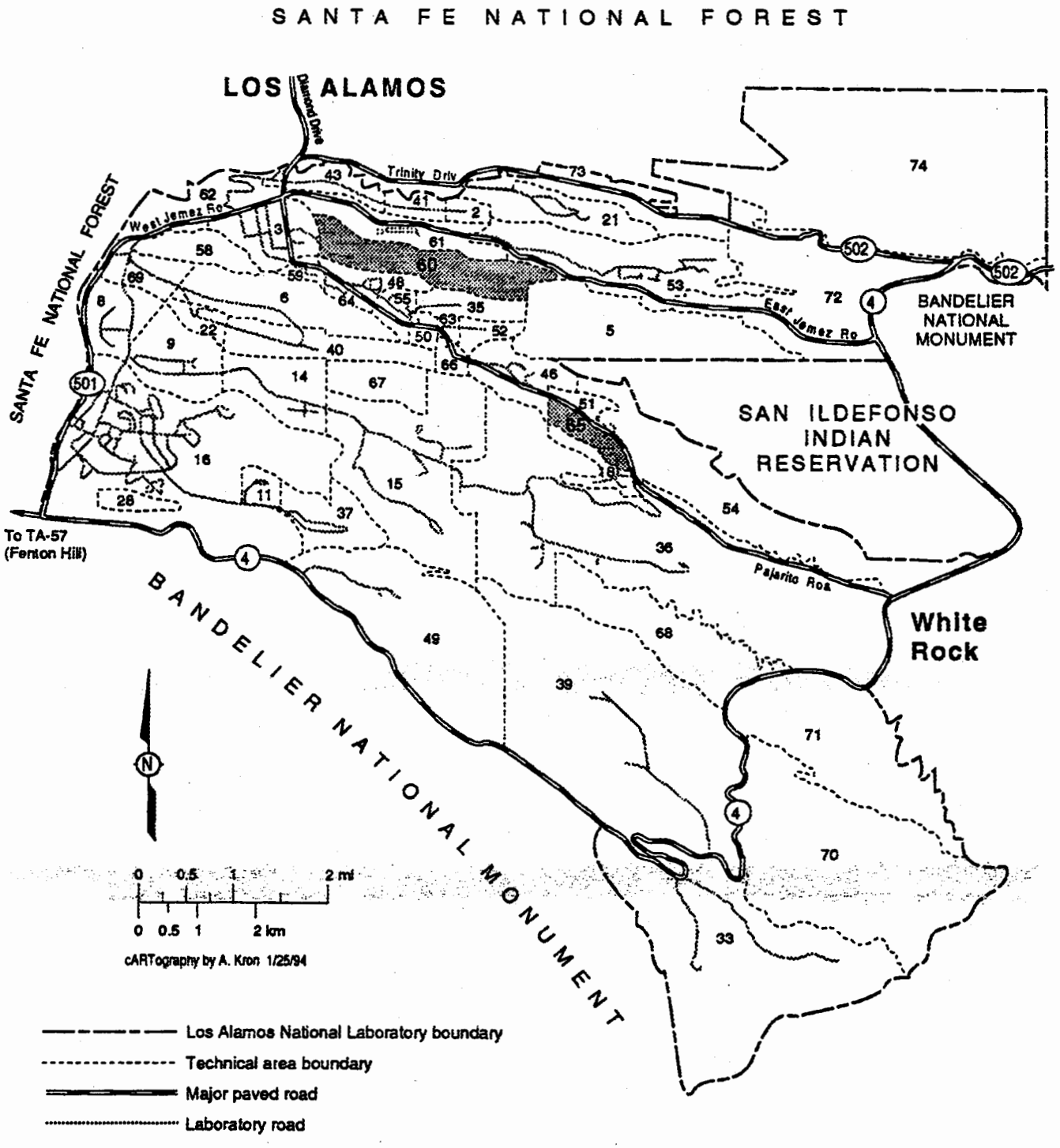

Fig. 2. Location of TAs 60 and 65 within Los Alamos National Laboratory.

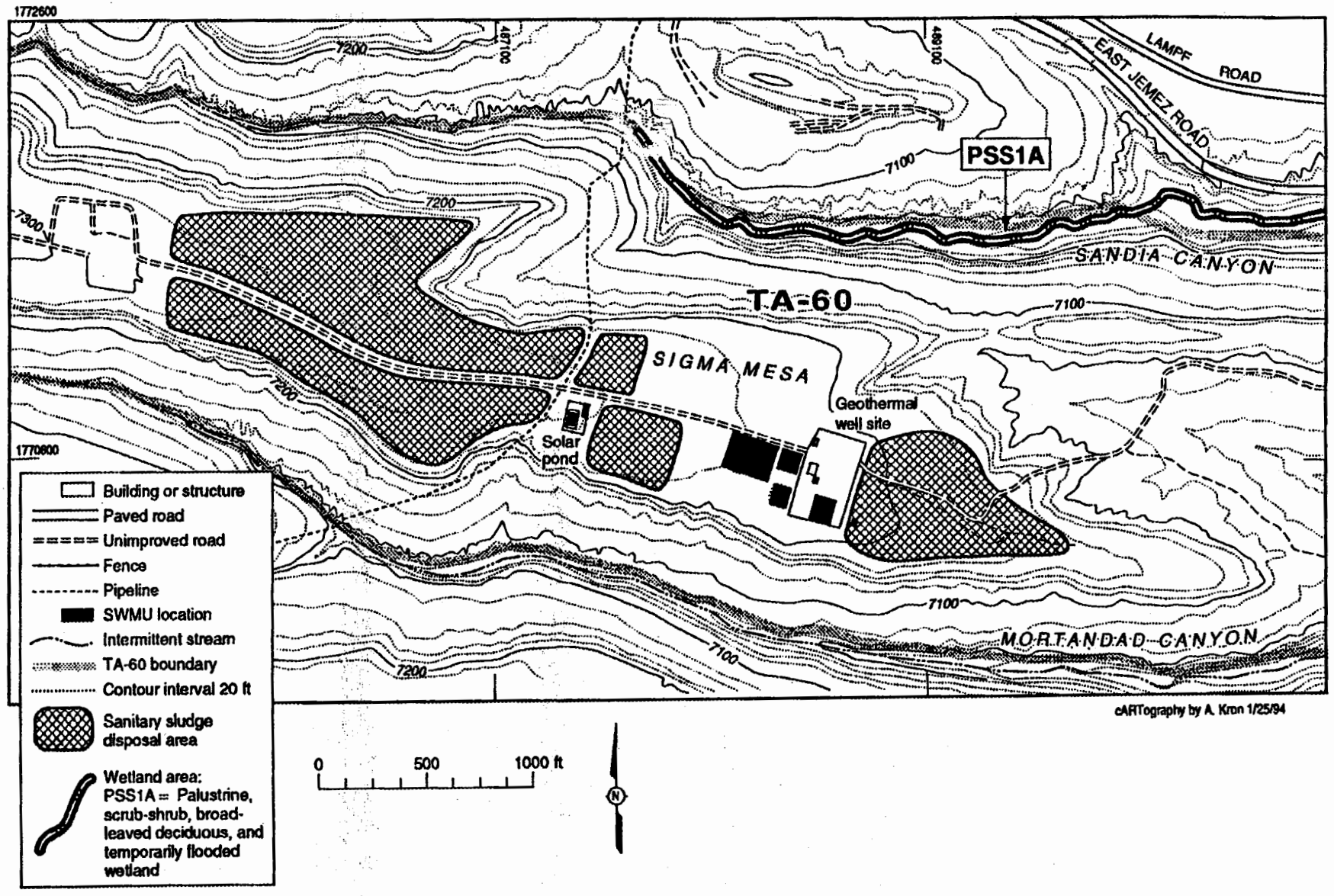

Fig. 3. Locations of the sanitary sludge disposal areas, wetlands, and SWMUs at TA-60.

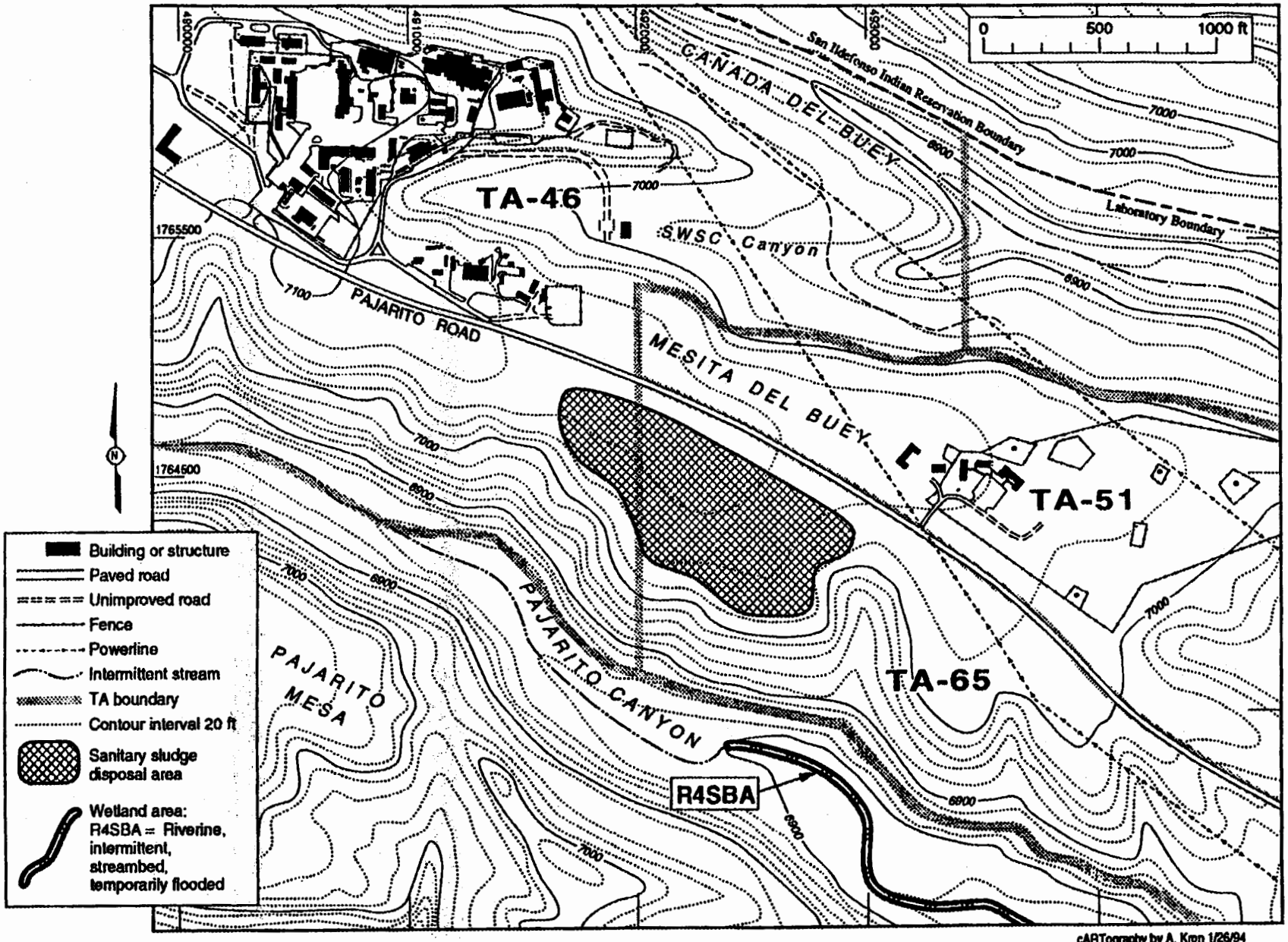

Fig. 4. Location of the sanitary sludge disposal area and wetland at TA-65.

The proposed site at TA-65, on Pajarito Mesa, is located at an average elevation of 2149m (7050 ft). The overstory habitat consists primarily of ponderosa pine, pifion pine, Gambel oak, wavy leaf oak (*Quercus undulata*), squawbush (*Rhus trilobata*), and rabbit bush (*Chrysothamnus nauseosus*). The south-facing slopes of the surrounding canyon is dominated by a pifion-juniper community, but includes narrow-leafed cottonwood (*Populus angustifoliar*) because of a nearby stream channel. Understory species includes blue grama grass, mock orange (*Philadelphus microphyllus*), big sagebrush (*Artemesia tridentata*), and bluegrass (*Poa fendleriana*).

A limited number of studies characterizing the fauna of the area have been conducted since 1975. The studies were concerned with vegetation and small mammals; also, there is some data on insects, reptiles, amphibians, birds, and fish (see Table 1 for a list of documents and surveys completed in the project area).

TABLE 1: A List of Documents and Surveys Previously Completed in or Adjacent to the SWDA Project Areas

PROJECT	DATE	TYPE	AUTHORS
Classification of wetlands and deep water habitats of the US	1979	W	Cowardin, et al.
Biological/floodplain assessment of OU 1114	1993	TES	Cross
Biological/floodplain assessment of OU 1093	unpubl.	TES	Foxx
Inventory survey of bats	unpubl.	M (bats)	BRET
The amphibians and reptiles of the Los Alamos National Research Park	1986	A, R	Bogart
Movements of mule deer on the Los Alamos National Environmental Research Park	1979	M	Eberhart and White
Potential use of NPDES outfalls for wildlife watering	1992	W, I, B, A, R, M	Edeskuty, Foxx and Raymer
Status of the flora of the Los Alamos Environmental Research Park	1980	V, TES plants	Foxx and Tierney
Status of the flora of the Los Alamos Environmental Research Park: a historical perspective	1984	V, TES plants	Foxx and Tierney
Vegetation/environmental survey of upper Sandia Canyon for the proposed location of selected rubble landfill	1986	W, FP	Foxx and Tierney
Biological survey report for the proposed extension of the sanitary landfill, Sandia Canyon, LANL	1988	V, TES, plants, SM, M	Foxx
Effects of fire on small mammals in Bandelier National Monument	1981	V, SM	Guthrie
Mammals of Bandelier National Monument, New Mexico	1980	M	Guthrie and Large
R-30 Peregrine falcon habitat management plan	1992	TES	Johnson
The nesting ecology of Cooper's hawks and northern goshawks in north central New Mexico	1987	TES	Kennedy
Small mammal survey	unpubl.	SM	Kent
Potential use of NPDES outfalls for wildlife watering	1992	all species	LANL/EM-8
The ants of Los Alamos County, New Mexico (Hymenoptera: Formicidae)	1986	I	MacKay et al.
Determination of 100-year floodplain elevations at Los Alamos National Laboratory	1992	F	McLin

Atlas of the breeding birds of Los Alamos County, New Mexico	1991	B	Travis
Survey for bats in the Los Alamos National Environmental Research Park, with special emphasis on the spotted bat	1992	SM	Tyrell and Brack
Inventory and mapping of LANL's floodplains and wetlands	1990	F, W	USFWS, NWI
Biotelemetry studies on elk	1981	M	White
Small mammal populations on Los Alamos National Laboratory land burned by the La Mesa fire	1981	SM	Wright

F=floodplain W=wetland V=vegetation I=insects B=birds
R=reptiles A=amphibians R=reptiles SM=small mammals
M=mammals TES=threatened, endangered, and sensitive species

2.3 Threatened, Endangered, and Sensitive Species

Initial surveys did not confirm the presence of threatened, endangered, or sensitive (TES) species in the project area; however, mitigation measures are required to ensure that impacts do not adversely affect species that may inhabit the area. Based on BRET's TES species database and OU reports, there is habitat that may be useful for several TES species in the project areas(see Table 2). Listed in Table 3 are all species that may inhabit the proposed sites based on the TES species database, the potential for habitation in the project areas, and either potential impacts from the project or reasons the species was dismissed from further consideration. There is a moderate to high potential for six species to occur in TA-60: wood lily (*Lilium philadelphicum* var. *andium*), checker lily (*Fritillaria atropurpurea*), northern goshawk (*Accipiter gentilis*), peregrine falcon (*Falco peregrinus*), spotted bat (*Euderma maculatum*), and Mexican spotted owl (*Strix occidentalis lucida*) (Cross 1993). In TA-65, there is a moderate to high potential for two species to occur: peregrine falcon and spotted bat (Foxx in preparation).

TABLE 2: Threatened, Endangered, and Sensitive (TES) Species That May Inhabit the Proposed Area

SCIENTIFIC NAME	COMMON NAME	STATUS*	HABITAT
Wildlife			
Accipiter gentilis	Northern goshawk	FCC2	Ponderosa pine/Gambel's oak, ponderosa pine/gray oak, mixed conifer
Euderma maculatum	Spotted bat	FCC2 SPG2	Ponderosa, piñon-juniper; cliffs and rock crevices
Falco peregrinus	Peregrine falcon	FE SPG1	Ponderosa-piñon; cliffs and rock outcrops on cliffs
Plegadis chihi	White-faced ibis	candidate	Generally restricted to Gulf Coast and SE states; migrates through NM; may breed in NM
Strix occidentalis lucida	Mexican spotted owl	FT	Mixed conifer mountains and canyons; uneven-aged, multi-storied forest with closed canopies
Lymnaea caperata	Say's pond snail	SPG1	Wetlands at Cerro la Jara in the Jemez Mountains
Zapus hudsonius	Meadow jumping mouse	FCC2 SPG2	Grassy areas in mesic habitats next to permanent streams and wet meadows

Plants			
Abronia bigelovii, Heimerl	Tufted sand verbena	SS	Piñon-juniper areas; restricted to todilto gypsum or the derivative thereof; 6000 ft
Aletes sessiliflorus, Theobald & Tseng	Sessile-flowered false carrot	SS	Piñon-juniper; rocky canyons or slopes, usually basaltic or sandstone areas; 6500-8100 ft
Astragalus cyaneus, Gray	Cyanic milk vetch	SS	Piñon-juniper; sandy or gravelly hillsides; 5500-6,00 ft
Astragalus feensis, M.E. Jones	Santa Fe milk vetch	SS	Piñon-juniper; dry slopes; 5000-6500 ft
Astragalus mollissimus, Torr. var. mathewsii (Wats)	Mathew's woolly milk vetch	SS	Open slopes and ridges in piñon pine forests; sometimes in canyons; 5000-6000 ft
Astragalus puniceus, Osterh. var. gertudis (Green)	Taos milk vetch	SS	Open, loose soil in piñon and juniper areas; 7000 ft
Fritillaria atropurpurea	Checker lily	SS	Mixed conifer
Heuchera pulchella	Sandia alumroot	SS	Mixed conifer cliffs; 8000-12,000 ft
Lilium philadelphicum var. *andium*	Wood lily	SE3	Ponderosa to mixed conifer; 6000-10,000 ft
Mammillaria wrightii, Engelm.	Wright fishhook cactus	SE2	Desert grassland to piñon-juniper; gravely or sandy hills or plains; 3000-7000 ft
Opunita viridiflora, Britt. and Rose.	Santa Fe cholla	FCC2	Piñon-juniper; 7200-8000 ft
Silene plankii	Plank's catchfly	SS	Mountains along Rio Grande in piñon-juniper
Silene plankii, Hitchc. and Maguire	Plank's catchfly	C3	Piñon-juniper; crevices and pockets in protected cliff faces of igneous rock; 5000-6000 ft
Tetradymia filifolia, Greene	Threadleaf horsebrush	SS	Piñon-juniper; limestone or highly gypseous soils, 6000-7000 ft
Toumeya papyracantha, (Engelm.) Britt., Rose.	Grama grass cactus	FCC2	Sandy soil in piñon-juniper; basalt outcrops, 5000-7300 ft
Phlox caryophylla	Pagosa phlox	SS	Ponderosa-piñon; 6500-7500 ft, open slopes in open woods

***CODES FOR LEGAL STATUS**

FE = Federally endangered
FT = Federally threatened
FPT = Federally proposed as threatened
FCC2 = Federal candidate as a C2
SE1 = State protected and listed as threatened or endangered under the Federal Endangered Species Act
SE2 = State protected, so rare across its entire range with limited distribution and population size that unregulated collection jeopardize its survival in New Mexico
SE3 = State protected, widespread in or adjacent to New Mexico, but its numbers are being significantly reduced to such a degree that its survival within New Mexico is jeopardized
SPG1 = State protected as a Group 1 species (endangered)
SPG2 = State protected as a Group 2 species (threatened)
SS = State sensitive

TABLE 3. Potential for Habitation by TES Species in SWDA Project Areas

Wildlife	Potential to Occur	Reason for Dismissal	Potential Impact
Northern goshawk	Moderate to high		Noise
Spotted bat	Moderate to high		Cliff destruction
Peregrine falcon	Moderate to high		Noise, cliff destruction
White-faced ibis	Low to none	Location, HNS, NI	
Mexican spotted owl	Moderate to high		Noise
Say's pond snail	Low to none	HNS, NI	
Meadow jumping mouse	Low to moderate	HNS, NI	
Plants			
Tufted sand verbena	Low to none	HNS, NI	
Sessile-flowered false carrot	Low to moderate	NI	
Cyanic milk vetch	Low to none	E, NI	
Santa Fe milk vetch	Low to none	E, NI	
Mathew's woolly milk vetch	Low to none	E, NI	
Taos milk vetch	Low to none	NI	
Checker lily	Moderate	NI	Destruction of vegetation
Sandia alumroot	Low to moderate	NI	Destruction of vegetation
Wood lily	Moderate	NI	Destruction of vegetation
Wright fishhook cactus	Low to none	HNS, NI	
Santa Fe cholla	Low to moderate	HNS, E, NI	Destruction of vegetation
Plank's catchfly	None	Location, HNS, NI	
Plank's catchfly, Hitchc. and Maguire	Low to none	E, HNS	
Threadleaf horsebrush	Low	HNS, NI	
Grama grass cactus	Low to none	HNS, NI	
Pagosa phlox	Low to moderate	HNS, NI	Destruction of vegetation

HNS = habitat not suitable for this species
NI = no impact is expected from the proposed project
E = elevation at which species grows is not compatible with the elevation at proposed site

The wood lily grows in moist, shaded areas within mixed conifer forests. The project area contains suitable habitat for the wood lily, although none have been found there to date.

The checker lily is known to occur in upper Pajarito Canyon in ponderosa and mixed conifer vegetation. The project area contains suitable habitat for the lily, although it is rare in Los Alamos County.

To date, raptor surveys in the project area have not revealed any nesting goshawks; however, foraging goshawks were encountered. The foraging area for this species is approximately 2185 ha (5,400 acres) located primarily in middle-aged, mature, and old coniferous forests. Sightings have been made near the boundaries of OU 1114, and it is likely that goshawks use the OU for foraging.

The peregrine falcon has little probability of occurring in either project area, except to utilize the areas for feeding during winter migrations. They occupy steep cliffs in wooded and forested areas. Surveys within Los Alamos Canyon, the canyon north of Sandia Canyon, to determine suitability for peregrine falcon breeding habitat found that nests usually occur in cliff faces within the transition zone from pifion-juniper woodland to ponderosa pine forest. Lower Los Alamos Canyon provides breeding habitat that would have

been designated as suitable, were it not for the presence of more attractive habitat in nearby Pueblo Canyon (Johnson 1992). He concluded that Los Alamos Canyon provides viable alternative nesting habitat. Bird surveys conducted in Sandia Canyon in 1986 and 1990 found no peregrines there. Peregrines have been observed in and near Pueblo Canyon and have been recorded as nesting along the cliffs of this canyon. The peregrine probably will not use Mesita del Buey or the adjacent canyons for nesting, but numerous cavities along primarily north-facing slopes of canyons could provide shelter (Johnson 1992). Also, the species could utilize areas in or near the project area as feeding grounds.

Suitable habitat exists for the spotted bat in canyon bottoms in near the project areas. Spotted bats require a source of water with standing pools for hunting, and they roost in caves and rock crevices in pifion-juniper, ponderosa pine, mixed conifer, and riparian areas. Potential roost sites exist in surrounding canyons, but water sources are limited to a cattail marsh and stream in Sandia Canyon and a narrow stream in Pajarito Canyon.

The Mexican spotted owl lives in forested mountains and canyons of the southwestern U.S. and Mexico. The species nests in mixed conifer habitat (*Abies concolor-Pseudotsuga menziesii-Pinus ponderosa*), preferring uneven-aged stands with a multi-storied, closed canopy. This habitat exists primarily in old-growth forests that have not been cut for timber. Spotted owls construct their nests in tree cavities or abandoned hawk nests. Preliminary surveys suggest there may be spotted owl habitat in upper Water Canyon adjacent to the project area, but none within the project area.

Cooper's hawk, red-tailed hawk, American kestrel, flammulated owl, and great horned owl are known to breed and forage in or adjacent to the project area. These species do not have threatened or endangered status, but they are protected from harassment and collection by the Migratory Bird Treaty Act.

2.4 Wetlands

In 1990, the US Fish and Wildlife Service (USFWS) mapped wetlands at LANL using the methodology outlined by Cowardin, et al., in accordance with the National Wetlands Inventory (NWI) standards. The method employs a hierarchical classification system based solely on aerial photography that may not detect small wetlands and those in deep canyons. The USFWS survey identified one wetland area near the project area in upper Sandia Canyon (see Figure 3). It is a palustrine wetland and floods temporarily. Also, a wetland area was found south of the project area in Pajarito Canyon (see Figure 4). It is an intermittent, riverine streambed that floods temporarily.

In addition to the USFWS-described wetlands, there are 15 NPDES outfalls within OU 1114. The largest amount of effluent empties into Sandia Canyon and maintains the wetlands areas there. Most of the effluent is once-through cooling water and treated cooling water and flows almost to East Jemez Road, then sinks into the alluvium.

2.5 Floodplains

Floodplains exist throughout the Laboratory. Figure 5 shows floodplains in relation to the proposed project areas. One-hundred-year floodplains are to the south of both TA-60 and TA-65.

3 POTENTIAL IMPACTS

There would be minimal impacts to plants and wildlife at the SWDAs. The vehicle that would be used to spread the sludge is a high flotation/low impact design, so minimal destruction to vegetation would occur. Grading of roads is not necessary, and a fence would probably be unnecessary in TA-65 because there are already "No Trespassing" signs posted. Impacts that may occur at the TA-65 site are discussed in the following sections. In addition, there would be some increased noise because of increased traffic on Pajarito Road, possible aesthetic impacts if the sludge will be visible from the road, and, if a fence is put up, migration of large mammals could be influenced.

3.1 Floodplains and Wetlands

The installation of the proposed SWDAs would not impact floodplains or wetlands because there would be no construction or earth-breaking activities. Also, the sites were chosen specifically to minimize any potential effluent impact as specified by siting criteria established in laws and regulations. The only potential for liquid effluent release from these areas is from stormwater runoff. However, the runoff would be nonhazardous and nonradioactive because of sampling and air-drying procedures prior to disposal. In addition, any runoff or ground infiltration would be monitored, according to the Stormwater Pollution Prevention Plan and the Groundwater Discharge Plan (DOE 1993).

The TA-65 site may require construction of a fence around the area. The following impacts to wetlands could result from this and other activities:

- Disturbances within drainages and on steep slopes could initiate or increase soil erosion, causing localized sedimentation in wetlands.
- Hazardous fuel spills or leaks from vehicles could degrade water quality in drainages, streams, and wetlands and could damage wetland vegetation.

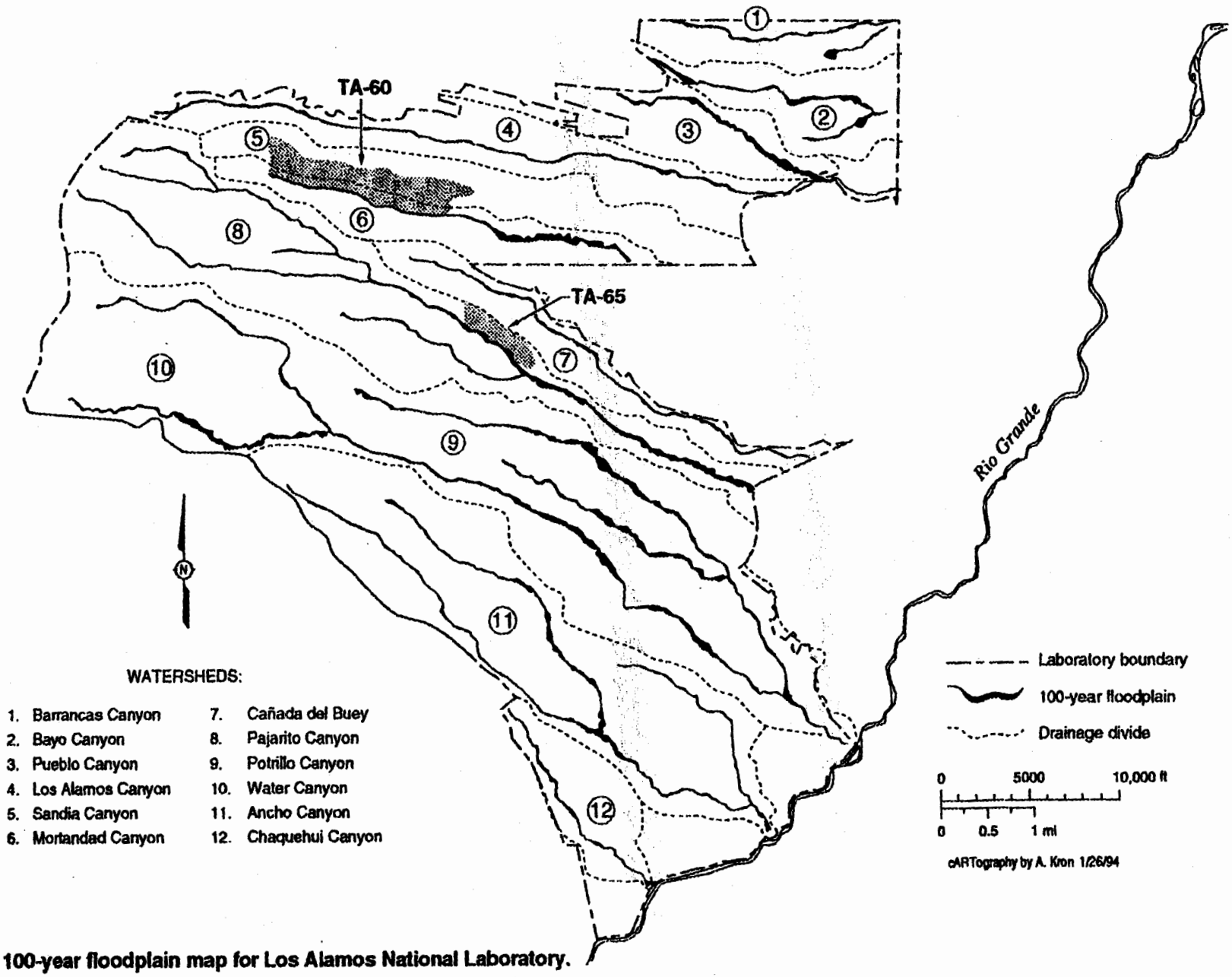

Fig. 5. 100-year floodplain map for Los Alamos National Laboratory.

3.2 Threatened, Endangered, and Sensitive Species

Twenty-three TES species were listed in the BRET database for pifion-juniper, ponderosa, mixed conifer, and wetland habitats that may exist in the project areas. Fourteen species were dismissed from consideration because the habitat is unsuitable for the species and/or because the project will have no effect on their habitat. Five species may inhabit or use the areas, but should not be affected by the project because the impacts are greatly minimized by the use of the high-flotation/low-impact vehicle. This leaves six species with a moderate to high potential of occurring that may be affected by the following:

- Vehicles driven off established roads may crush checker lilies and wood lilies.
- Alteration or disturbance of small caves, rock crevices, and water sources could disrupt spotted bat populations.
- Excessive activity or noise, especially near canyon rims, during mating and nesting periods (May through October), could disrupt the breeding activities of peregrine falcon, Mexican spotted owl, and goshawk populations.
- Cooper's hawk, red-tailed hawk, American kestrel, flammulated owl, and great horned owl, all of which are known to breed in and adjacent to the project area, could also be affected. While these species presently are not given threatened or endangered status, they are protected from harassment and collection.

3.3 Nonsensitive Species

3.3.1 Plants

Heavy machinery would disturb existing vegetative cover over a large area. Besides eliminating individual plants, this could initiate increased erosion and alter natural drainage patterns. However, impacts will be greatly minimized by the high-flotation/low-impact vehicle.

3.3.2 Wildlife

Both riparian and nonriparian areas provide nesting, foraging, perching, and cover habitats for a variety of birds, large mammals, and other wildlife. Habitat disturbance, especially during critical periods, could eliminate this habitat and could cause birds to abandon their nests.

4 MITIGATION

4.1 Floodplains and Wetlands

SWDAs will be located outside wetlands or floodplain areas. Project personnel must notify BRET prior to any new activities in or near wetlands so that BRET can review and assess potential impacts on biological resources.

Stormwater and groundwater monitoring will ensure that effluent does not adversely affect wetlands or floodplains. If it is found that there are impacts, applicable local, state, and federal regulations must be followed.

In addition, BRET should be allowed to monitor existing wetlands to ensure no adverse impacts arise due to any increase in nutrient loading. Monitoring would involve periodic surveys of flora and fauna and wetland boundaries. Besides being valuable to wetland management and compliance with wetland regulations, monitoring wetland biota could supplement conventional measurements of physical parameters used to monitor water quality.

4.2 Threatened, Endangered, and Sensitive Species

4.2.1 Plants

Checker and wood lilies: Avoid unnecessary disturbances (i.e., excessive parking areas or equipment storage areas, off-road travel) to vegetation on mesatops and on canyon slopes.

4.2.2 Wildlife

Northern goshawk and peregrine falcon: In order to protect potential goshawk and peregrine habitat, the following mitigation measures must be followed:

- Any activity, including sludge application, that utilizes machinery and occurs between March and October must be cleared through BRET.
- Avoid excessive noise, especially near canyon rims and between March and October.

Spotted bat: In order to avoid adverse impacts to spotted bat habitat, the following mitigation measures are required.

- Do not alter or destroy rock crevices on cliffs.

Mexican Spotted Owl: To avoid unnecessary impacts to the Mexican spotted owl, the following mitigation measures must be followed:

- Any activity that uses loud, heavy machinery, including sludge application, that occurrs between May and October must be cleared through BRET.

Sensitive Species

To prevent adverse impacts to Cooper's hawk, red-tailed hawk, American kestrel, flammulated owl, and great horned owl, activities along the edge of canyons should be done between September and March. The mitigation measures recommended for protecting northern goshawk and spotted owl habitat will also help protect these species.

4.3. Nonsensitive Species

4.3.1 Plants

Mitigation measures include the following:

- Avoid unnecessary disturbance (i.e., excessive parking areas or equipment storage areas and off-road travel), to vegetation on mesatops and along canyon slopes.
- Revegetate disturbed areas if the loss of vegetation initiates or increases erosion. BRET should be consulted to determine the mixture of native species most appropriate for revegetating specific sites.

4.3.2 Wildlife

The same mitigations for plants apply to wildlife to avoid destruction of habitat and food sources.

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