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DRAFT FINAL Programmatic Environmental Assessment

Grazing Activities at Office of Legacy Management Sites

November 2019

U.S. DEPARTMENT OF ENERGY | Legacy Management

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PROGRAMMATIC ENVIRONMENTAL ASSESSMENT GRAZING ACTIVITIES AT OFFICE OF LEGACY MANAGEMENT SITES

U.S. Department of Energy
Office of Legacy Management

Lead Agency: U.S. Department of Energy Office of Legacy Management
Proposed Action: Conduct Grazing Activities
Date: November 2019

ABSTRACT

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is committed to reusing its sites for beneficial purposes, one of which is livestock grazing. With good land stewardship practices, LM also manages its sites to protect remedies, natural resources, and human health and the environment. In 2018, LM convened a team to study the topic of grazing on its sites, whereby a grazing reuse could include either a traditional concept of grazing (livestock graze vegetation for the purposes of weight gain and meat production) or a nontraditional use (livestock are used to control unwanted vegetation).

This Environmental Assessment provides National Environmental Policy Act (NEPA) analyses and documentation for an LM proposal to conduct grazing activities at some of its sites. Proposed grazing activities would be conducted in accordance with LM policies and procedures and include a process for implementing or excluding grazing at specific sites.

The Proposed Action addressed in this document is programmatic in nature; therefore, this document is a Programmatic Environmental Assessment (PEA). Specifically, the PEA evaluates (1) the potential impacts from grazing activities at identified LM sites and (2) establishing grazing at other existing U.S. government-owned sites under a programmatic planning framework. The framework would provide a structure for LM to decide whether to graze a site, and it would be applied to all sites under consideration for grazing, for newly transitioned sites with habitat for livestock, and for grazed sites as licenses are being considered for renewal.

This PEA is prepared in accordance with NEPA; the Council on Environmental Quality *"Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act"*; the requirements of DOE Policy 451.1, *National Environmental Policy Act Compliance Program*; and Title 10 *Code of Federal Regulations* Section 1021, "National Environmental Policy Act Implementing Procedures" to evaluate the proposed grazing activities on the human and physical environment and provide an opportunity for the public to review and comment on the project. This PEA serves as notification to the public of the Proposed Action.

Written comments on this EA should be submitted within 30 days from the date published.
Please direct comments, via U.S. mail or email, to:

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Abbreviations

ACHP	Advisory Council on Historic Preservation
AEC	U.S. Atomic Energy Commission
APE	area of potential effect
AQCR	Air Quality Control Region
ARCO	Atlantic Richfield Company
AUM	animal unit month
BCC	Birds of Conservation Concern
BLM	U.S. Bureau of Land Management
C	carbon
CD	Controlled District
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CH_4	methane
CO_2	carbon dioxide
CWA	Clean Water Act
DOE	U.S. Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
ft	feet
GHG	greenhouse gas
IC	institutional control
kg	kilograms
LM	Office of Legacy Management
LTSP	Long-Term Surveillance Plan
m	meters
MLRA	Major Land Resource Area
MOA	Memorandum of Agreement

N	nitrogen
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMED	New Mexico Environment Department
N_2O	nitrous oxide
NPL	National Priorities List
NRC	U.S. Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O_3	ozone
P	phosphorus
PEA	Programmatic Environmental Assessment
PL	Public Law
PM	particulate matter
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
UMTRCA	Uranium Mill Tailings Radiation Control Act
USACE	U.S. Army Corps of Engineers
USC	*United States Code*
USFWS	U.S. Fish and Wildlife Service
WOTUS	Waters of the U.S.

Executive Summary

ES-1 Introduction

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is committed to reusing its sites for beneficial purposes, one of which is livestock grazing. With good land stewardship practices, LM also manages its sites to protect remedies, natural resources, and human health and the environment. In 2018, LM convened a team to study the topic of grazing, whereby a grazing reuse could include either a traditional concept of grazing (livestock graze vegetation for the purposes of weight gain and meat production) or a nontraditional use (livestock are used to control unwanted vegetation).

This Environmental Assessment provides National Environmental Policy Act (NEPA) analyses and documentation for the LM proposal to conduct grazing activities at some of its sites. Proposed grazing activities would be done in accordance with LM policies and procedures and include a process for implementing or excluding grazing at specific sites.

The Proposed Action addressed in this document is programmatic in nature; therefore, this document is a Programmatic Environmental Assessment (PEA). Specifically, this PEA evaluates (1) the potential impacts from grazing activities at identified LM sites and (2) establishing grazing at other existing LM-owned sites under a programmatic planning framework. The framework would provide a structure for LM to decide whether to graze a site, and it would be applied to all sites under consideration for grazing, for newly transitioned sites with habitat for livestock, and for grazed sites as licenses are being considered for renewal.

This PEA is prepared in accordance with NEPA; the Council on Environmental Quality "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act"; the requirements of DOE Policy 451.1, *National Environmental Policy Act Compliance Program*; and Title 10 *Code of Federal Regulations* Section 1021 (10 CFR 1021), "National Environmental Policy Act Implementing Procedures."

ES-2 Purpose and Need

There are multiple reasons to consider grazing on candidate LM sites. When used appropriately, grazing supports the LM mission goal to sustainably manage and optimize public use of land and properties.

Many of LM's current and future sites are in regions where traditional grazing is a common and beneficial land use. Livestock grazing at such sites could increase the public use of federal lands while ensuring, through the framework, that the rangeland is maintained in a healthy condition. Implementing traditional grazing leases could also enhance LM's long-term surveillance and maintenance capabilities at remote sites, as local ranchers could maintain site structures such as fences and alert LM to changing conditions (e.g., vandalism or wildfire). Other benefits of traditional grazing could include partnering opportunities that combine grazing with compatible reuses such as cultural resource protection or community outreach.

As a vegetation management tool, nontraditional grazing could optimize land management strategies, reduce costs, and lessen environmental impacts. For example, grazing animals may

reduce the use of chemical herbicides to control noxious weeds, or they may efficiently remove unwanted vegetation in hard to reach places such as fence lines. Grazing animals, when used appropriately, could also support beneficial changes in vegetation that could lessen the long-term need to control noxious weeds and other early successional plants in an area.

ES-3 Alternatives Considered

ES-3.1 No Action Alternative (Alternative 1)

Under the No Action Alternative, LM would continue to manage grazing as it currently does. LM would allow traditional grazing only on sites where grazing activities now occur. Grazing would not be established on other sites even for vegetation management purposes, although site activities such as haying, mowing, or weed control would continue. LM would continue to allow grazing at its five sites with licenses in place and would authorize grazing only on those transitioning sites that have active grazing agreements in place. LM would continue to manage grazing under licenses with private entities and, as needed, continue to conduct rangeland health assessments to monitor site conditions and perform baseline ecological characterizations for incoming sites. Grazing licenses would be revised and renewed as needed.

This alternative is included in the environmental analysis as required under NEPA (40 CFR 1502.14[d]), and it provides the baseline against which the potential environmental impacts of Alternative 2 can be compared. Although the No Action Alternative would not include impacts associated with Alternative 2, it would not satisfy the purpose and need for this project.

ES-3.2 Preferred Alternative (Alternative 2)

Under Alternative 2, LM would allow grazing reuse at its sites for purposes of traditional and nontraditional livestock grazing. Grazing would continue at sites with current grazing licenses in place. Alternative 2 would also establish grazing at other existing and transitioning LM sites under a programmatic planning framework. The framework would provide a structure for LM to decide whether to graze a site, and it would be applied to (1) all sites under consideration for grazing, (2) transitioning sites with habitat for livestock, and (3) grazed sites as licenses are being considered for renewal.

The framework would apply primarily to traditionally grazed sites but would be adapted to sites where nontraditional grazing is being considered to manage vegetation. Although this alternative could apply to any site being considered under the programmatic planning framework, impacts can only be assessed at this time for the seven sites identified as candidates for grazing as most sites are not suitable candidates or a site has not transitioned to LM. In the latter case, final site conditions and boundaries have not been established, preventing a full analysis of impacts. After transition occurs, the framework, including an environmental review, would be applied to sites with livestock habitat not evaluated in this PEA.

The scope of the framework is larger than the scope of this PEA. The PEA evaluates the potential environmental effects of implementing a programmatic planning approach to grazing at LM sites; however, it does not evaluate the framework in its entirety. The framework includes

environmental considerations but may also recommend that a site not be grazed for other reasons (e.g., when no ranchers in the area are interested in a grazing license).

The framework is designed to evaluate applicable land restrictions, land use considerations, rangeland health (the ability of a site to support sustainable livestock grazing), and environmental compliance. LM would monitor site vegetation through periodic site-specific rangeland health assessments, make land management decisions, and apply the framework to decisions about whether to graze a site. As needed, LM would continue to perform baseline ecological characterizations or rangeland health assessments, especially during the formal transition process for Uranium Mill Tailings Radiation Control Act Title II sites and for sites under consideration for grazing.

ES-3.3 Selection of Preferred Alternative

After comparing each alternative against the project's purpose and need, LM selected Alternative 2 as its Preferred Alternative.

ES-4 Environmental Consequences

This PEA evaluates potential impacts of implementing Alternative 2 and the No Action Alternative. Impacts of the alternatives on relevant resource areas are evaluated individually for each site, and cumulative impacts are also included.

ES-5 Conclusions

Implementing the No Action Alternative (Alternative 1) or the Preferred Alternative (Alternative 2) would result in negligible to minor impacts to the physical environment at LM sites. The conclusion, a Finding of No Significant Impact (FONSI), is predicated upon implementing best management practices and mitigation measures during and immediately following proposed activities. Collectively, best management practices and mitigation measures to be implemented have been identified and are summarized in Table ES-1.

Based on the analyses presented in this PEA and information provided by all consulted personnel, the proposed activities would not have significant impacts on the resources considered. Therefore, preparing an Environmental Impact Statement is not warranted at this time. This decision is documented through a FONSI.

Table ES-1. Summary of Best Management Practices and Mitigation Measures

Resource Area	Proposed Best Management Practices and Mitigation Measures under Alternative 2
Overall site conditions	• Implement the planning framework to guide decision-making about implementing grazing at a site based on ecological health and regulatory constraints. • Use fencing to exclude livestock from sensitive site resources such as scientific measurement devices, telemetry equipment, and other potentially fragile structures.
Biological resources and soils	• Establish baseline vegetation and soils data at sites for which no data have been collected. Collect rangeland health monitoring data periodically to compare to baseline conditions. Use this information to inform land management decisions and ensure that proper stocking rates and grazing practices are being implemented by licensees. • Use fencing to exclude livestock as needed from sensitive plant communities, riparian areas, wetlands, and other sensitive portions of a site. • Establish erosion control measures to the extent practicable. • Avoid areas of designated critical habitat.
Water resources, wetlands, and floodplains	• Use fencing to exclude livestock if necessary from sensitive wetland or riparian environments to maintain water quality and preserve wetland vegetation.
Air quality	No mitigation measures.
Cultural resources	No mitigation measures.
Land use and recreation	No mitigation measures.

1.0 Purpose and Need

1.1 Introduction

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is committed to reusing its sites for beneficial purposes, one of which is livestock grazing. With good land stewardship practices, LM also manages its sites to protect remedies, natural resources, and human health and the environment. In 2018, LM convened a team to study the topic of grazing, whereby a grazing reuse could include either a traditional concept of grazing (livestock graze vegetation for the purposes of weight gain and meat production) or a nontraditional use, (livestock are used to control unwanted vegetation) (DOE 2019a). Traditional grazing typically occurs once a year for several months and continues for numerous years, whereas nontraditional grazing for vegetation management typically occurs once or twice a year for relatively short periods (for a few days or weeks) and may be repeated for several years. The goal of traditional grazing is to feed livestock while not "overgrazing." In contrast, the goal of grazing for vegetation management is to target undesirable plants and "overgraze" them, thereby weakening them and allowing desirable species to eventually take their place.

This Environmental Assessment (EA) provides the National Environmental Policy Act (NEPA) (Title 42 *United States Code* Section 4321 et seq. [42 USC 4321 et seq.]) analyses and documentation for the LM proposal to conduct both traditional and nontraditional grazing activities at some of its sites. Proposed grazing activities would be done in accordance with LM policies and procedures and include a process for implementing or excluding grazing at specific sites.

The proposed action addressed in this document is programmatic in nature; therefore, this document is a Programmatic Environmental Assessment (PEA). Specifically, this PEA evaluates (1) the potential impacts from grazing activities at identified LM sites and (2) establishing grazing at other existing LM-owned sites under a programmatic planning framework. The framework would provide a structure for LM to decide whether to graze a site, and it would be applied to all sites under consideration for grazing, for newly transitioned sites with habitat for livestock, and for grazed sites as licenses are being considered for renewal.

This PEA is prepared in accordance with NEPA; the Council on Environmental Quality (CEQ) "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act" (Title 40 *Code of Federal Regulations* Sections 1500–1508 [40 CFR 1500–1508]); the requirements of the *National Environmental Policy Act Compliance Program* (DOE Policy 451.1) and "National Environmental Policy Act Implementing Procedures" (10 CFR 1021).

1.2 Project Purpose and Need

There are multiple reasons to consider grazing on candidate LM sites. When used appropriately, grazing supports the LM mission goal to sustainably manage and optimize public use of land and properties.

Many of LM's current and future sites are in regions where traditional grazing is a common and beneficial land use. Livestock grazing at such sites could increase the public use of federal lands

while ensuring, through the framework, that the rangeland is maintained in a healthy condition. Implementing traditional grazing leases could also enhance LM's long-term surveillance and maintenance capabilities at remote sites, as local ranchers could maintain site structures such as fences and alert LM to changing conditions (e.g., vandalism or wildfire). Other benefits of traditional grazing could include partnering opportunities that combine grazing with compatible reuses such as cultural resource protection or community outreach.

As a vegetation management tool, nontraditional grazing could optimize land management strategies, reduce costs, and lessen environmental impacts. For example, grazing animals may reduce the use of chemical herbicides to control noxious weeds, or they may efficiently remove unwanted vegetation in hard to reach places such as fence lines. Grazing animals, when used appropriately, could also support beneficial changes in vegetation that could lessen the long-term need to control noxious weeds and other early successional plants in an area.

1.3 Background

LM currently manages 100 sites; of these, 80 are excluded from consideration for grazing. Forty of these 80 sites have been remediated and released for unrestricted use, and LM activities are limited to records management and responding to public inquiries. The remaining 40 of these 80 sites were not considered for several reasons.[1] Many have little or no habitat to support livestock because they are in urban environments or consist mainly of rock-covered disposal cells. The surface of other sites may be owned or managed by state, county, tribal, private, or federal entities other than DOE. At some sites, grazing may not be allowed for regulatory reasons, such as at the Fernald Preserve, Ohio, Site, where an environmental covenant restricts agricultural use, including grazing.

Thus, 20 remaining sites possess the potential for grazing: 5 LM-owned sites are currently being grazed under a license; 7 candidate sites are being evaluated for grazing in this PEA (Figure 1); 8 sites not owned by DOE contain withdrawn lands (4 of these are being grazed by other federal agencies under licenses or leases, and 4 could potentially be grazed in the future). Table 1 identifies these 20 sites, along with 12 reasonably foreseeable transitioning sites with habitat that has the potential to support livestock.

[1] If conditions change in the future, allowing LM to consider grazing at sites previously excluded from consideration, LM's framework to determine whether a site should be included or excluded, as outlined in this PEA, could be applied.

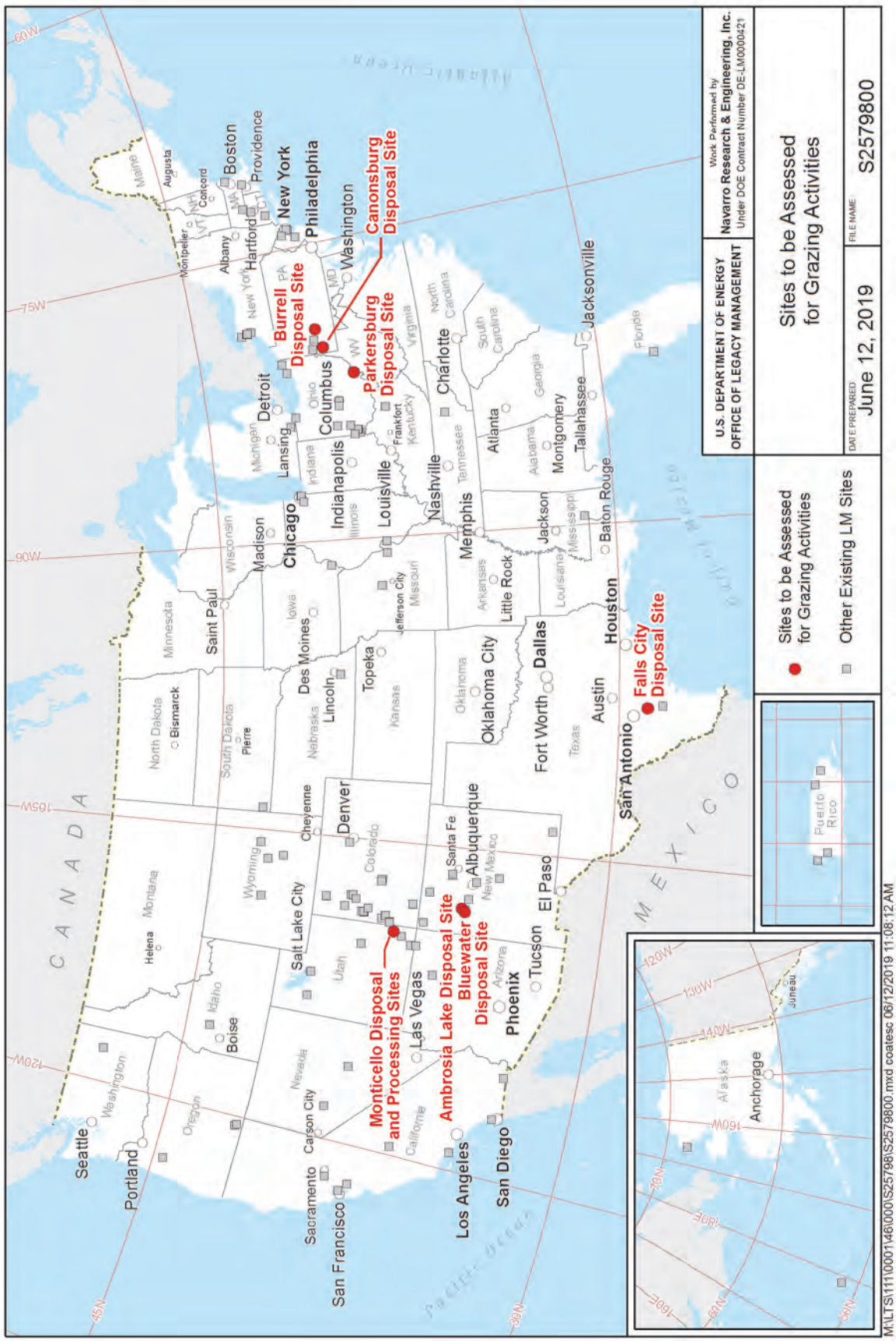

Figure 1. LM Sites to Be Assessed for Grazing Activities

628 *Table 1. Status of LM Sites and Transitioning Sites with Grazing Potential*
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Sites on Which Grazing Is Currently Authorized and Managed by LM			
Site Name	**Authorizing Document**	**Notes**	**License Expiration**
Bear Creek, Wyoming, Disposal Site[a]	License for Non-Federal Use of Real Property	No-cost license; grazing is for sheep	1/31/2022
Edgemont, South Dakota, Disposal Site	License for Non-Federal Use of Real Property	No-cost license; grazing is for livestock	5/1/2022
L-Bar, New Mexico, Disposal Site	Grazing License	For grazing activities only; no improvements that disturb soils or the surface are allowed	Perpetual
Shirley Basin South, Wyoming, Disposal Site	License for Non-Federal Use of Real Property	No-cost license; grazing is for livestock	12/31/2021
Spook, Wyoming, Disposal Site	License for Non-Federal Use of Real Property	No-cost license; grazing is for livestock	3/29/2022

LM-Owned Sites That Are Candidates for Grazing[b]			
Site Name	**Site Regulatory Authority**	**Site Acreage**	**Notes**
Ambrosia Lake, New Mexico, Disposal Site	UMTRCA Title I	288	Fenced with four-strand barbed wire only on south side of site. Considered for traditional grazing. Two adjacent ranchers requested to graze the site; LM previously denied grazing due to site conditions.
Bluewater, New Mexico, Disposal Site	UMTRCA Title II	3305	Site enclosed by four-strand barbed-wire fence. Fencing also along utility rights-of-way. LM retains local subcontractor to maintain fence. A 640-acre area in the eastern portion of the site may be candidate for grazing; traditional use.
Burrell, Pennsylvania, Disposal Site	UMTRCA Title I	72	A chainlink fence encloses most of the site. LM subcontracts a licensed pesticide applicator to keep fence clear of vegetation and control invasive weeds. Considered for grazing; nontraditional use.
Canonsburg, Pennsylvania, Disposal Site	UMTRCA Title I	37	A chainlink fence encloses most of the site. LM contracts personnel to mow and spray herbicides. Considered for grazing; nontraditional use.
Falls City, Texas, Disposal Site	UMTRCA Title I	231	A five-strand barbed-wire fence encircles the site. Haying operations are conducted onsite, but grazing is being considered to manage vegetation on the perimeter. Considered for grazing; nontraditional use.
Monticello, Utah, Disposal Site	CERCLA	506	A four-strand barbed-wire fence encloses the site. A mesh wildlife fence with openings for wildlife access surrounds the disposal cell. Considered for grazing; traditional use.
Parkersburg, West Virginia, Disposal Site	Nuclear Waste Policy Act	15	A chainlink fence encloses most of the site. LM contracts personnel to mow and spray herbicides. Considered for grazing; nontraditional use.

Table 1. Status of LM Sites and Transitioning Sites with Grazing Potential (continued)

LM Sites with Surfaces Managed by Other Agencies, Currently Grazed, or Considered for Grazing			
Site Name	**Site Regulatory Authority**	**Land Agency**	**Notes**
Central Nevada Test Area, Nevada	Nevada Offsites	BLM	Currently grazed by livestock; 2560 acres withdrawn from BLM, which retains authority to administer existing rights on the land.
Gasbuggy, New Mexico, Site	Nevada Offsites	USFS	Currently grazed by livestock; 640 acres withdrawn. USFS administers the grazing agreement.
Gnome-Coach, New Mexico, Site	Nevada Offsites	BLM	Currently grazed by livestock; 680 acres withdrawn. BLM administers grazing agreement. LM has partnered with BLM and claims agricultural reuse at the site.
Maybell, Colorado, Disposal Site	UMTRCA Title I	BLM	Not grazed; 110 acres withdrawn. BLM retains authority to administer existing rights, claims, and interests in the land.
Maybell West, Colorado, Disposal Site	UMTRCA Title II	BLM	Not grazed; 180 acres withdrawn. BLM retains authority to administer existing rights, claims, and interests in the land.
Rifle, Colorado, Disposal Site	UMTRCA Title I	BLM	Not grazed; 205 acres withdrawn. BLM retains authority to administer existing rights, claims, and interests in the land.
Rio Blanco, Colorado, Site	Nevada Offsites	BLM	Not grazed; 200 acres withdrawn. BLM maintains jurisdiction over surface management.
Shoal, Nevada, Site	Nevada Offsites	BLM	Currently grazed by livestock; 2560 acres withdrawn from BLM, which manages the grazing permits. The site is managed by the U.S. Navy.
Transitioning LM Sites with Potential for Grazing[c]			
Site Name	**Site Regulatory Authority**	**Projected Acreage**	**Notes**
Ambrosia Lake West, New Mexico, Disposal Site	UMTRCA Title II	2500–3000	Contains barbed-wire fence, but exact locations unknown. Planned transition in FY 2025. Currently grazed for livestock under licensee oversight.
Conquista, Texas, Disposal Site	UMTRCA Title II	614	Planned transition in FY 2025.
Durita, Colorado, Disposal Site	UMTRCA Title II	160	Planned transition in FY 2022.
Gas Hills East, Wyoming, Disposal Site	UMTRCA Title II	1750–2000	Barbed-wire fence encloses most of the site but does not align with the proposed site boundary. Several interior fences present. Planned transition in FY 2022.
Gas Hills North, Wyoming, Disposal Site	UMTRCA Title II	1200–1500	Barbed-wire fence encloses most of the site but does not exactly align with the proposed site boundary. Planned transition in FY 2022.

Table 1. Status of LM Sites and Transitioning Sites with Grazing Potential (continued)

Transitioning LM Sites with Potential for Grazing[c]			
Site Name	**Site Regulatory Authority**	**Projected Acreage**	**Notes**
Gas Hills West, Wyoming, Disposal Site	UMTRCA Title II	550	Planned transition in FY 2025.
Lisbon Valley, Utah, Disposal Site	UMTRCA Title II	2000–2250	Contains barbed-wire fence, but exact locations unknown. Planned transition in FY 2024.
Panna Maria, Texas, Disposal Site	UMTRCA Title II	360	A chainlink fence surrounds the site. Anticipated reuse (haying) and site features would not align with grazing activities. Planned transition in FY 2022.
Ray Point, Texas, Disposal Site	UMTRCA Title II	75–100	Chainlink and barbed-wire fences surround most of the site but do not align with the proposed site boundary. Planned transition in FY 2022. Currently proposed reuse (conservation reuse for sensitive species) would not align with grazing.
Sequoyah County, Oklahoma, Disposal Site	UMTRCA Title II	600	Planned transition in FY 2025.
Split Rock, Wyoming, Disposal Site	UMTRCA Title II	5250–5750	Barbed-wire fence surrounds disposal areas. Other fencing is present within the proposed boundary. Portions of the site containing cultural resources would be excluded from grazing activities. Planned transition in FY 2022.
Uravan, Colorado, Disposal Site	UMTRCA Title II	750–900	Contains some barbed-wire fence, but exact locations unknown. Planned transition in FY 2025.

Notes:

[a] The Bear Creek site is not fully transitioned to LM, but LM currently manages the surface.

[b] The traditional concept of grazing is where livestock graze vegetation for the purposes of weight gain and meat production; nontraditional use is where livestock are used to control unwanted vegetation.

[c] Transitioning sites are those that will transfer to LM. The planned dates of transition are as published in the May 2019 U.S. Department of Energy Office of Legacy Management *Site Management Guide* (DOE 2019b). The list of transitioning sites and dates of transition will change over time; so will the above projected acreages as the boundaries change once groundwater remedies have been approved.

Abbreviations:

BLM = U.S. Bureau of Land Management
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
FY = fiscal year
UMTRCA = Uranium Mill Tailings Radiation Control Act
USFS = U.S. Forest Service

LM Site Regulatory Authority

Uranium Mill Tailings Radiation Control Act (UMTRCA) Sites

Congress passed UMTRCA in 1978 (PL 95-604), enabling DOE to remediate 22 inactive uranium-ore-processing sites in accordance with standards promulgated by the U.S. Environmental Protection Agency (EPA) in 40 CFR 192. The radioactive materials were encapsulated in U.S. Nuclear Regulatory Commission (NRC)–approved disposal cells. The NRC general license for UMTRCA Title I sites is established in 10 CFR 40.27. The Burrell, Pennsylvania, Disposal Site was included under the NRC general license for UMTRCA Title I sites in 1994; the Canonsburg, Pennsylvania, Disposal Site in 1996; the Falls City, Texas, Disposal Site in 1997; and the Ambrosia Lake, New Mexico, Disposal Site in 1998. The Bluewater, New Mexico, Disposal Site was included under the NRC general license for UMTRCA Title II sites (10 CFR 40.28) and transferred to DOE for long-term custody in 1997.

Radioactive materials at UMTRCA sites are managed in accordance with the NRC general license and site-specific Long-Term Surveillance Plans (LTSPs) accepted by NRC under the general license. Radioactive materials at UMTRCA sites are managed in accordance with the NRC general license.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sites

Under EPA authority, the Monticello, Utah, Disposal and Processing Sites qualified for placement on the National Priorities List (NPL) in accordance with CERCLA (also known as Superfund) and the Superfund Amendments and Reauthorization Act. Two sites, Monticello Vicinity Properties and Monticello Mill Tailings Site, were placed on the NPL in June 1986 and November 1989, respectively. LM manages both NPL sites as one site.

CERCLA requires that remedial actions resulting in hazardous substances, pollutants, or contaminants remaining at a site—above levels that allow for unlimited use and unrestricted exposure—be reviewed every 5 years to ensure protection of human health and the environment. This requirement applies to the Monticello site because of contamination that remains in the disposal cell, on supplemental standards properties, and in surface water and groundwater. The cycle of Five-Year Reviews for the Monticello site began in 1997. The fifth and most recent review, completed in June 2017, concluded that remedies remain protective of human health and the environment.

Nevada Offsites

The U.S. government conducted underground nuclear testing for various purposes outside of the Nevada National Security Site. At these sites, LM assumed responsibility for all activities associated with subsurface completion and long-term surveillance and maintenance in 2006. In Colorado, regulatory oversight involves collaboration with the Colorado Department of Public Health and Environment and the Colorado Oil and Gas Conservation Commission. The New Mexico sites are overseen by the New Mexico Environment Department (NMED) under the New Mexico Voluntary Remediation Program. The Nevada sites are under the regulatory authority of a Federal Facility Agreement Consent Order administered by the Nevada Division of Environmental Protection.

Nuclear Waste Policy Act Sites

The Parkersburg, West Virginia, Disposal Site was remediated and transferred to DOE under the Nuclear Waste Policy Act of 1982. Subtitle D Section 151(c) of 42 USC 101719 contains provisions for transferring privately owned disposal sites to the federal government if the site activities were conducted for the government's benefit. Remediation standards are set forth in 10 CFR 20, "Standards for Protection Against Radiation." Radon emission standards are specified in 40 CFR 61 Subpart Q, "National Emission Standards for Radon Emissions from Department of Energy Facilities." At the Parkersburg site, groundwater quality must comply with standards of the Safe Drinking Water Act (42 USC 300f et seq.) and the State of West Virginia. The site is managed in accordance with an NRC license.

Current Grazing at LM Sites

Grazing is currently authorized and managed at five LM sites identified in Table 1. Grazing is authorized through licenses rather than leases, although either instrument could be used in the future, and the use of either instrument would not affect the NEPA analysis. Therefore, the term "grazing agreement" will be used for the remainder of this document, and the private party leasing the property will be referred to as "licensee." None of the grazing agreements were originally negotiated or crafted by LM, as they existed before the sites were transitioned. LM has revised several agreements to accommodate rangeland improvements, and most agreements have been renewed at least once. The mixed histories of these grazing agreements have resulted in variable language among them.

Current grazing agreements are offered at no cost to the licensee because grazing benefits LM and enhances long-term site management while reducing costs. A local presence at the site maintains fences, manages vegetation, monitors for trespassing, and alerts LM of noteworthy occurrences (e.g., flash floods, range fires, vandalism). LM avoids the costs of site maintenance and surveillance activities through the activities of grazing licensees. This is especially valuable at remote sites.

Some of LM's sites contain land withdrawn from another agency, and that agency manages the land surface. Although LM cannot initiate grazing reuse at sites containing primarily withdrawn lands, LM may support another agency's land use activities.

1.4 Regulatory Framework

Table 2 lists statutes, regulations, Executive Orders (EOs), and DOE and LM regulations, policies, and procedures that are applicable to the scope of this PEA. Although this list is not all-inclusive, the proposed alternatives must comply with all applicable regulatory requirements.

1.5 Scope and Organization of Programmatic EA

LM has prepared this PEA to assess the potential consequences of the proposed action in accordance with 40 CFR 1500−1508, which implements NEPA, and 10 CFR 1021, which delineates DOE's implementing procedures under NEPA. If this PEA does not identify significant impacts associated with the proposed action, LM may issue a Finding of No Significant Impact (FONSI) and proceed with the action. If impacts are identified as potentially significant, an Environmental Impact Statement (EIS) would be prepared.

The geographic scope of this PEA covers sites located across the entire continental U.S., including site-specific evaluation of the seven sites identified in Section 1. A planning framework described in Section 2 would be applied to other LM transition sites to be determined nationwide, and that framework is intended to provide the basis for site-specific NEPA documentation (e.g., tiered EAs) that would occur before any proposed grazing activities at these sites. Tiering is a procedure for completing the NEPA process in two separate stages, known as tiers. The first tier involves the preparation of a programmatic NEPA document that examines a broad set of issues, like grazing. The second tier generally involves the preparation of several separate NEPA documents to address site-specific issues in greater detail.

Table 2. Summary of Applicable Regulatory Requirements

Regulatory Requirements
Statutes
National Environmental Policy Act of 1969 (42 USC 4321 et seq.)
National Historic Preservation Act of 1966 (PL 89-665, 54 USC 300101 et seq.), referred to here as "Section 106"
Clean Air Act of 1970 as amended (42 USC 7401 et seq.)
Clean Water Act of 1977 as amended (33 USC 1251 et seq.), including Section 401 ("State Certification of Water Quality"), Section 402 ("National Pollutant Discharge Elimination System"), and Section 404, which includes dredge and fill requirements in Waters of the United States
Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 USC 9601 et seq.)
Endangered Species Act of 1973 (16 USC 1531 et seq.)
Resource Conservation and Recovery Act (42 USC 6901 et seq.)
Regulations
Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR 1500–1508)
Protection of Historic Properties (36 CFR 800)
Protection of Archaeological Resources: Uniform Regulations (32 CFR 229)
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings (40 CFR 192)
The Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act (48 FR 44716–44742)
Executive Orders
Protection and Enhancement of the Cultural Environment (EO 11593)
Floodplain Management (EO 11988)
Protection of Wetlands (EO 11990)
Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EO 12898)
DOE Procedural Requirements, Policy Directives, and Policy Guidance
U.S. Department of Energy, National Environmental Policy Act Implementing Procedures (10 CFR 1021)
DOE Policy 451.1, *National Environmental Policy Act Compliance Program*
LM Procedure 451.1C, *National Environmental Policy Act (NEPA) Planning and Compliance Procedure*

This PEA (1) describes the existing environment within the region of influence relevant to potential impacts of the alternatives, (2) analyzes potential environmental impacts that could result from the alternatives, and (3) identifies and characterizes cumulative impacts that could result from allowing grazing activities in relation to other ongoing or proposed activities within the surrounding area.

Certain aspects of the proposed action have a greater potential for creating adverse environmental impacts than others. For this reason, CEQ regulations (40 CFR 1502.1 and 1502.2) recommend a "sliding-scale" approach so actions with greater potential effect can be discussed in greater detail in NEPA documents than those that have little potential for impact.

The resource categories determined relevant to this PEA include biological resources (vegetation, wildlife, and sensitive species), soils, water resources (surface water, groundwater), wetlands and floodplains, air quality, cultural resources, and land use and recreation. The organization of this PEA is as follows:

- **Section 1** provides background information and history relevant to the proposed action and discusses its purpose and need.
- **Section 2** presents the No Action Alternative (Alternative 1), the Preferred Alternative (Alternative 2), and the alternatives eliminated from detailed consideration, as well as a summary of the environmental consequences associated with each alternative.
- **Section 3** outlines and justifies resources evaluated or dismissed from in-depth analysis in this PEA and describes baseline conditions or "affected environment" (i.e., the conditions against which the potential impacts of the Proposed Action or alternatives are measured) for each of the resource areas.
- **Section 4** provides a description of the potential environmental impacts or consequences of the No Action Alternative and Preferred Alternative and includes any proposed mitigation and monitoring required to reduce or eliminate the potential adverse impacts of the proposed action. This analysis is organized by site and then by resource.
- **Section 5** includes an analysis of potential cumulative effects. Cumulative effects include evaluation of the Preferred Alternative in relation to past, present, and future foreseeable actions in the affected environment.
- **Section 6** lists people and agencies contacted and the document distribution list.
- **Section 7** contains references cited in preparation of this PEA, including correspondence.
- **Section 8** provides a list of PEA preparers.

Appendixes are included to provide supporting technical documentation.

2.0 Alternatives

This section describes LM's alternatives for establishing and managing livestock grazing at its sites. This PEA analyzes two alternatives in detail: The No Action Alternative (Alternative 1) and one action alternative (Alternative 2) that was developed to meet the purpose and need for the proposed action. Alternative 2 proposes implementing grazing at LM sites under a programmatic planning framework. Both alternatives would be implemented under LM's existing regulatory framework with the approval of regulating agencies, including requirements for cost-benefit analysis and awarding licenses through a competitive process. No alternatives were considered and dismissed from detailed evaluation. This section also provides a comparison of environmental impacts for Alternatives 1 and 2.

2.1 Alternative 1: No Action Alternative

Under the No Action Alternative, LM would continue to manage grazing as it currently does. LM would allow traditional grazing only on sites where grazing activities currently occur. Grazing would not be established on other sites even for vegetation management purposes, although site activities such as haying, mowing, or weed control would continue. LM would continue to allow grazing at its five sites that have licenses in place and would authorize grazing only on those transitioning sites that have active grazing agreements in place. LM would continue to manage grazing under licenses with private entities (e.g., ranchers) and, as needed, continue to conduct rangeland health assessments to monitor site conditions and perform baseline ecological characterizations for incoming sites. Grazing licenses would be revised and renewed as needed on an individual basis.

Alternative 1 does not satisfy the purpose and need for this project; however, it is included in the environmental analysis as required under NEPA (40 CFR 1502.14[d]), and it provides the baseline against which potential environmental impacts of Alternative 2 can be compared.

2.2 Alternative 2 (Preferred Alternative): Implement Grazing at LM Sites Under a Programmatic Planning Framework

Under Alternative 2, LM would allow grazing reuse at its sites for purposes of traditional and nontraditional livestock grazing. LM would continue to allow traditional grazing at U.S. government-owned sites with current grazing licenses in place. Alternative 2 would also establish grazing at other existing U.S. government-owned sites under a programmatic planning framework. The framework would provide a structure for LM to decide whether to graze a site, and it would be applied to (1) all sites under consideration for grazing, (2) transitioning sites with habitat for livestock, and (3) grazed sites as licenses are being considered for renewal.

The framework would apply primarily to traditionally grazed sites but would be adapted to sites where nontraditional grazing is being considered to manage vegetation. Although this alternative could apply to any site being considered under the programmatic planning framework, impacts can only be assessed at this time for the seven sites identified in Table 1 as candidates for grazing because most sites are not suitable candidates at this time (see Section 1.3) or a site has not transitioned to LM. In the latter case, final site conditions and boundaries have not been established, preventing a full analysis of impacts. After transition occurs, the framework,

including an environmental review, would be applied to sites with livestock habitat not evaluated in this PEA.

The framework employed under Alternative 2 is summarized in Figure 2. The scope of the framework is larger than the scope of this PEA; the PEA evaluates whether implementing additional grazing at LM sites can move forward from an environmental perspective. The framework includes environmental considerations but may also recommend that a site not be grazed for other reasons (e.g., when no ranchers in the area are interested in a grazing agreement).

The framework is designed to evaluate applicable land restrictions, land use considerations, rangeland health (the ability of a site to support sustainable livestock grazing), and environmental compliance. LM would monitor site vegetation through periodic site-specific rangeland health assessments, make land management decisions, and apply the framework to decisions about whether to graze a site. As needed, LM would continue to perform baseline ecological characterizations or rangeland health assessments, especially during the formal transition process for UMTRCA Title II sites and for sites under consideration for grazing.

The decision points identified in Figure 2 are described below in a step-by-step approach.

Step 1 Determine if Grazing Is Legally Permissible at the Site

LM would determine whether environmental regulations, private restrictions, governmental restrictions (such as institutional controls [ICs] and environmental covenants), zoning laws, or regulatory requirements allow a site to be grazed. During this step, restrictions would also be identified that would need to be addressed before grazing could become legally permissible (e.g., consultations with other agencies for threatened or endangered species or cultural resources).

Step 2 Determine if Grazing Is the Best Use of the Land or if Grazing Is Important Enough to Change Restrictions

[2a] If grazing is determined to be legally permissible, LM would conduct a highest and best use analysis to determine if it is also physically possible, financially feasible, and, for sites under consideration for traditional grazing licenses, maximally productive. Grazing is physically possible if the site's size, shape, area, topography, general vegetation, and accessibility make grazing a logical and reasonable use. The presence of fences, water, and scientific or sensitive monitoring equipment that could be damaged by livestock would also be considered. LM also would compare grazing reuse to other potential reuses to determine which might produce the greatest return and which might result in the greatest benefits to LM. All uses that are expected to produce a positive return would be considered financially feasible. Uses resulting in benefits would be considered maximally productive.

[2b] If grazing is not legally permissible, or if restrictions are in place, LM would determine if grazing is important enough to change or resolve the restrictions and make grazing legally permissible.

Step 3 Determine if Grazing Is Occurring Adjacent to or Within a Few Miles of the Site; Determine if a Partnering Opportunity Exists with Another Agency or Nonprofit Organization

LM would determine ownership and uses of adjacent and vicinity lands. It is preferable that a potential grazing licensee own or manage base property adjacent to or near the LM site, as a primary advantage of a grazing reuse is having "local eyes" on the property. Also, transporting sheep, goats, or cattle long distances to a site may not be energy efficient, greenhouse gas (GHG)-reducing, or practical. There would be a benefit to having the livestock come from a nearby farm or ranch. LM would also determine if partnering opportunities exist, as LM could derive benefits by combining a grazing reuse with another compatible reuse, such as conservation, energy development (e.g., wind farm, solar panels), cultural resource protection, or community outreach. Potential partners might include other federal or state agencies, nonprofit organizations, or conservation groups.

Step 4 Determine if Potential Grazing Candidates Are Conducting Rangeland Health Best Management Practices

LM can visit the site, and ecologists can conduct visual inspections of the grazing candidates' rangelands. LM can also speak with local ranchers, range conservationists from the Natural Resources Conservation Service (NRCS) and U.S. Bureau of Land Management (BLM), and other members of the public to collect information about potential candidates. If the LM site manager is not confident that a potential candidate would sustainably care for the land, there is no requirement to offer that candidate a grazing license. For sites where nontraditional grazing is being considered, LM may review the livestock owner's plans, equipment, and record of success.

Step 5 Determine if One or More Candidate Ranchers Are Willing to Establish a Grazing Agreement with LM

LM would contact potential candidates and discuss grazing license requirements and restrictions. If no ranchers are interested in a grazing agreement with DOE, grazing may not be considered for a site. This step would not necessarily apply to sites at which nontraditional grazing would be used for vegetation management.

Step 6 Perform Cost Analysis for Conducting Initial and Follow-Up Rangeland Health Assessments and an Environmental (Including NEPA) Review of Grazing

LM must decide if the cost of conducting rangeland health assessments, an environmental review, and NEPA review are worth the benefits that could be gained by allowing the land to be grazed and managed by a local licensee or vegetation management subcontractor. Under proper management, traditional grazing can be a sustainable activity that could occur for many years. Both traditional and nontraditional grazing potentially could occur in conjunction with other reuses.

Step 7 Conduct Initial Rangeland Health Assessment

If the site manager makes the decision to go forward with a traditional grazing reuse, LM would conduct an initial baseline rangeland health assessment. Results of the assessment would allow LM to assess the ecological feasibility of grazing at the site. This step would not apply to nontraditional grazing reuse, although a general vegetation assessment would likely be conducted.

Step 8 Conduct Environmental Review; Prepare EA or EIS

If an appropriate environmental review has not been done for a site, LM would conduct an environmental review of the proposed grazing activities and determine the appropriate form of NEPA documentation. The outcome of the environmental review would determine whether or not to graze a site.

Step 9 Prepare Grazing Agreement and Implement Grazing

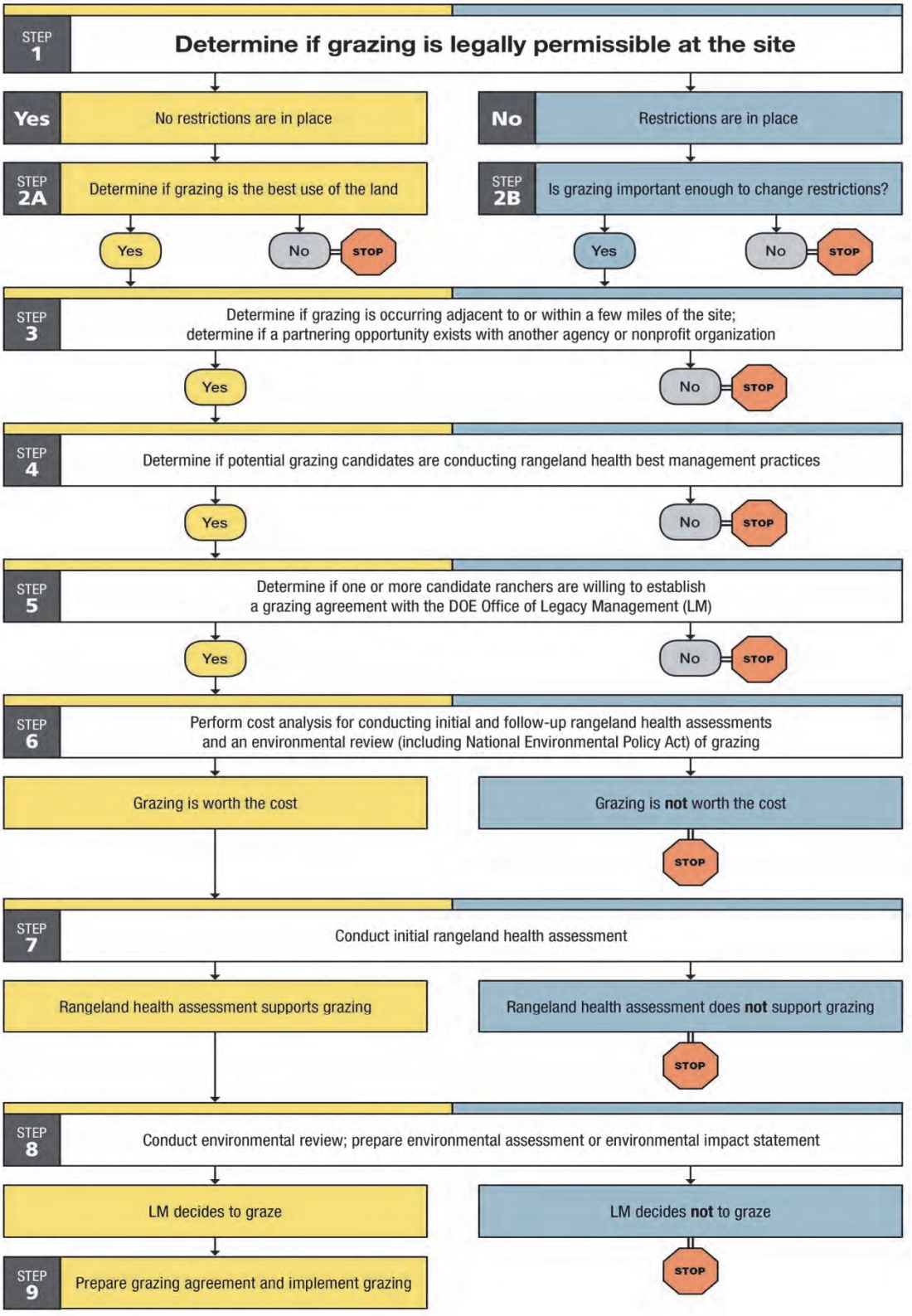
For traditionally grazed sites, LM would prepare a grazing agreement that contains standard and site-specific requirements and restrictions. Additionally, the grazing agreement would contain licensee actions (such as maintaining fences, removing trespassing livestock, conducting sustainable grazing practices, and notifying LM of noteworthy events) that provide the cost avoidance benefit to LM. The agreement, a legally binding contract, would be reviewed and signed by LM and the licensee. For nontraditional grazing, LM would likely not prepare a grazing agreement but would approve contracting actions to procure a vegetation management subcontractor.

Once grazing activities are approved and implemented under Alternative 2, other actions necessary to conduct grazing operations could follow. Not all actions would be required at all sites, but the following list includes most of the possibilities:

- Install and maintain new fences to exclude specific site resources (e.g., sensitive plant communities) or features (e.g., scientific monitoring equipment) from access by livestock or to divide a site into pastures that can be grazed separately
- Improve or maintain existing fences and gates
- Install temporary fences to intensively graze areas for vegetation control
- Install and maintain temporary corrals, shelters, or other structures to control or protect livestock or to store necessary equipment
- Install and maintain temporary water stations (this may include tanks, permitted wells completed in uncontaminated aquifers, wind pumps, pumps, energy supplies such as solar panels or utility connections, and the use of water trucks to import water to the site)
- Use vehicles to maintain structures, move and manage livestock onsite, or transport livestock between the LM site and offsite grazing areas

Along with impacts of the grazing activity itself, impacts of these actions are analyzed in Section 4.0 of this PEA.

Alternative 2 is the Preferred Alternative because it would best meet the purpose and need for action. The No Action Alternative fails to meet the objectives since no action would be taken to allow for grazing additional LM sites, which is the basis of the purpose of and need for this proposed action.



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965 *Figure 2. Flowchart of Decision Points for Authorizing New Grazing at Legacy Management Sites*

2.3 Alternatives Considered but Dismissed from Detailed Evaluation

As part of the NEPA process, all potential alternatives must be evaluated. For alternatives to be considered reasonable, they must be affordable and implementable and meet the purpose and need for grazing as stated in Section 1. There are no other alternatives beyond grazing or not grazing LM sites. Therefore, no other alternatives were identified.

2.4 Comparison of Environmental Impacts

This section includes a summary of potential environmental impacts associated with the No Action Alternative (Alternative 1) and Preferred Alternative (Alternative 2) that were evaluated in this PEA (Table 3).

Under the No Action Alternative, new grazing activities would not occur. LM would continue to allow grazing at its five sites that have licenses in place, would continue to manage grazing under licenses with private entities (e.g., ranchers), and, as needed, continue to conduct rangeland health assessments to monitor site conditions and perform baseline ecological characterizations for incoming sites. Grazing licenses would be revised and renewed as needed on an individual basis. The No Action Alternative would have impacts on environmental resources only through ecological changes resulting from the absence of grazing activities on vegetation; otherwise, there are no short- or long-term impacts on environmental resources.

Implementing the Preferred Alternative would result in short- and long-term impacts to vegetation, wildlife, special status species, soils, surface water, groundwater, wetlands and floodplains, air quality, cultural resources, and land use at some LM sites. Many of these impacts would be negligible. Direct impacts associated with the Preferred Alternative would include changes in composition, biomass, diversity, and productivity of vegetation; spread or curtailment of invasive plants; changes in soils from trampling and vegetation removal; changes in surface water quality from trampling, manure, and reduced mowing and herbicide use; and air emissions associated with livestock transport, enteric fermentation, and manure. Indirect impacts would include changes in wildlife habitat (including habitat for special status species), wetland quality, and groundwater infiltration rates resulting from changes to vegetation and soils.

Table 3. Comparison of Potential Environmental Impacts

Resource	Alternative 1 (No Action Alternative)	Alternative 2 (Preferred Alternative)
Biological Resources		
Vegetation	**Short term:** Ambrosia Lake, Bluewater: Minor beneficial impacts through weed reduction and allowing for ecological succession. Burrell, Canonsburg, Falls City: minor adverse impacts from continued herbicide use. Monticello, Parkersburg: no impact.	**Short term and Long term:** Ambrosia Lake, Bluewater, Falls City, Monticello: Moderate adverse impacts from negative changes in vegetation, livestock trails, trampling, erosion, and weed spread. Impacts at Ambrosia Lake and Bluewater would be mitigated by using the framework, which would not allow grazing until ecosystems were mature. Impacts at Monticello would be avoided by using the framework, which would not allow grazing because the site is within designated critical habitat. Ambrosia Lake, Bluewater, Falls City, Monticello: Minor beneficial impacts from increased productivity, positive changes in vegetation, and onsite presence to help monitor and manage rangeland health.

Table 3. Comparison of Potential Environmental Impacts (continued)

Resource	Alternative 1 (No Action Alternative)	Alternative 2 (Preferred Alternative)
	Long term: Ambrosia Lake, Bluewater: minor adverse impacts from continuing to exclude grazing animals from mature rangelands. Burrell, Canonsburg, Falls City: minor adverse impacts from continued herbicide use. Monticello and Parkersburg: no impact.	Burrell, Canonsburg, Falls City, Parkersburg: Moderate beneficial impacts from enhanced control of invasive weeds and reduced herbicide use.
Wildlife	**Short term:** No impact. **Long term:** No impact.	**Short term:** No impact. **Long term:** Ambrosia Lake, Bluewater, Monticello: Minor impacts that are neither beneficial nor adverse resulting from changes in vegetation and soil components of wildlife habitat. Burrell, Canonsburg: Moderate beneficial impacts to wildlife habitat from controlling Japanese knotweed in forested areas. Falls City, Parkersburg: No impact.
Special status species	**Short term:** No impact. **Long term:** No impact.	**Short term:** Monticello: Moderate adverse impacts to designated critical habitat for Gunnison sage-grouse and other special status species; these impacts would be avoided by using the framework, which would not allow grazing at the Monticello site. Ambrosia Lake, Bluewater: Negligible impact. Burrell, Canonsburg, Falls City, Parkersburg: No impact. **Long term:** Burrell, Canonsburg: Minor beneficial impacts on habitat. Ambrosia Lake, Bluewater: Negligible beneficial or adverse impacts on species and habitat. Falls City, Parkersburg: No impact. Monticello: Moderate adverse impacts to designated critical habitat for Gunnison sage-grouse and minor beneficial or adverse impacts to other special status species; impacts would be avoided by using the framework, which would prohibit grazing at the site.
Soils	**Short term:** No impact. **Long term:** No impact.	**Short term:** Burrell, Canonsburg, Falls City, Parkersburg: Minor adverse impacts from soil compaction and vegetation removal. Ambrosia Lake, Bluewater, Falls City, Monticello: Same as long-term impacts, summarized below. **Long term:** Ambrosia Lake, Bluewater, Falls City, Monticello: Moderate adverse impacts from increases in amount of bare soil, soil compaction, and destruction of soil crusts. Minor beneficial impacts from increased soil organic matter. Burrell, Canonsburg, Parkersburg: No impact.

Table 3. Comparison of Potential Environmental Impacts (continued)

Resource	Alternative 1 (No Action Alternative)	Alternative 2 (Preferred Alternative)
Water Resources		
Surface water	**Short term:** No impact. **Long term:** No impact.	**Short term:** All sites: Negligible to minor adverse impacts through nitrogen, phosphorus, and sediment inputs onsite or in downstream areas. Burrell, Canonsburg, Falls City, Parkersburg: Negligible beneficial impacts by reducing inputs from mowing, herbicides, or prescribed burns and by increased quality of riparian areas. **Long term:** Ambrosia Lake, Monticello: Negligible impact. Bluewater, Falls City: Negligible to minor adverse impacts through nitrogen, phosphorus, and sediment inputs onsite, especially in wetlands, or in downstream areas. Burrell, Canonsburg, Parkersburg: Negligible beneficial impacts by reducing inputs from mowing, herbicides, or prescribed burns and by increased quality of riparian areas.
Groundwater	**Short term:** No impact. **Long term:** No impact.	**Short term and Long term:** Ambrosia Lake, Bluewater, Falls City: Negligible impact. Burrell, Canonsburg, Monticello, Parkersburg: No impact.
Wetlands and Floodplains		
Wetlands and Floodplains	**Short term:** No impact. **Long term:** No impact.	**Short term:** Ambrosia Lake, Canonsburg, Falls City, Monticello, Parkersburg: no impact. Bluewater: moderate adverse impacts to wetlands from trampling and grazing. Burrell: minor adverse impacts to wetlands from trampling and grazing. **Long term:** Ambrosia Lake, Canonsburg, Falls City, Monticello, Parkersburg: no impact. Bluewater: moderate adverse impacts to wetlands from trampling and grazing. Burrell: minor beneficial impacts to wetlands from weed control and positive ecological changes.
Air quality	**Short term:** No impact. **Long term:** No impact.	**Short term and Long term:** Negligible impact on air pollutants. Minor adverse impacts at regional and local scale from GHG emissions related to livestock enteric fermentation and manure.
Cultural resources	**Short term:** No impact. **Long term:** No impact.	**Short term:** No impact. **Long term:** No impact.
Land Use and Recreation		
Land use	**Short term:** No impact. **Long term:** No impact.	**Short term:** No offsite impacts because no changes to land use would occur outside LM sites. Negligible onsite impacts because of grazing activities. **Long term:** No impact. Grazing may be permissible following the procedures set forth in Section 2.2; however, some modifications to restrictions may be needed to allow this use.
Recreation	**Short term:** No impact. **Long term:** No impact.	**Short term:** No impact. **Long term:** No impact.

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3.0 Affected Environment

This section describes the existing condition of resources that could be affected by implementing the alternatives analyzed in detail. The affected environment serves as the baseline for predicting changes that could occur if either of the alternatives under consideration are implemented. The affected environment is separate and distinct from the No Action Alternative, which describes current management that would continue into the future rather than the existing state of affected resources.

A broad range of environmental resources were considered during the NEPA planning process. Resources that clearly do not have the potential to be impacted by either the No Action Alternative or the Preferred Alternative are presented in Section 3.1 and eliminated from further analysis. Resources that may be present and could be affected by either the No Action Alternative (Alternative 1) or the Preferred Alternative (Alternative 2) are presented in Sections 3.2 through 3.7 and include biological resources, soils, water resources, wetlands and floodplains, air quality, cultural resources, and land use and recreation. The level of detail in the description of each resource and the effects from implementing the alternatives are described in proportion to their importance.

3.1 Resources Eliminated

CEQ regulations (40 CFR 1501.7[a][3]) indicate that the lead agency should identify and eliminate from detailed study the issues that are not important or that have been covered by prior environmental review, narrowing the discussion of these issues in the document to a brief presentation of why they would not have a significant effect on the human or natural environment. The following resources were eliminated from detailed analysis in this PEA:

Coastal barriers: This standard resource category is not applicable, because no coastal areas are present on or near LM sites under consideration for grazing. This resource area was eliminated from further analysis.

Coastal zone management: This standard resource category is not applicable, because no coastal zones are present on or near LM sites under consideration for grazing. This resource area was eliminated from further analysis.

Energy supplies, energy resources, and sustainable design: The proposed grazing activities would not result in any changes to energy supplies, energy resources, or sustainable design. The Proposed Action would also not change LM energy or sustainability goals, so this resource area was eliminated from further analysis.

Prime and unique farmland: The LM sites under consideration for grazing do not meet the definition of prime and unique farmland, as defined by the Farmland Protection Policy Act of 1981. None of the LM sites are currently being farmed. The Proposed Action would not require the conversion of farmland to nonfarm uses; therefore, a *Federal Farmland Conversion Impact Rating* form (AD-1006) (USDA 1983) was not completed, and this resource area was eliminated from further analysis.

Noise: Implementing the Proposed Action would not increase ambient noise levels on or adjacent to LM sites because grazing is not associated with increased ambient noise. The potential for increased noise levels associated with installing infrastructure related to grazing (e.g., fencing, watering tanks) would be minor, temporary, and localized, so this resource area was eliminated from further analysis.

Wild and Scenic Rivers: Because none of the LM sites being considered for grazing contain or are located near Wild and Scenic Rivers, this resource area was eliminated from further analysis.

Socioeconomics: The Proposed Action would neither change local and regional land use nor appreciably impact any local businesses or other agencies. Any increase in work force and revenue would be temporary and negligible. Because the impacts to the socioeconomic environment would be negligible, this resource area was eliminated from further analysis.

Environmental justice: *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (EO 12898) requires all federal agencies to incorporate environmental justice into their missions. They do this by identifying and addressing the disproportionately high or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities.

While the areas surrounding LM sites contain both minority and low-income populations, environmental justice was dismissed as an impact topic for the following reasons:

- Implementing any of the alternatives would not result in any identifiable adverse human health effects; therefore, there would be no direct or indirect adverse effects on any minority or low-income population.
- Implementing any alternatives would not result in any identified environmental effects that would be specific to any minority or low-income community.
- The economic impacts from implementing any of the alternatives may be adverse, but they would not disproportionately affect minority or low-income populations. In addition, LM does not anticipate that the impacts on the socioeconomic environment would alter the physical and social structure of nearby communities.

Based on this rationale, environmental justice was dismissed and is not carried forward for analysis in this PEA.

Indian trust resources (including sacred sites): LM disposal sites analyzed in this PEA were extensively disturbed during construction and are not located on tribal lands. Therefore, LM decided to consult only with the relevant SHPOs on proposed grazing activities, or undertakings. The impact topic of Indian trust resources was dismissed and is not carried forward for analysis in this PEA.

Traffic and transportation: No high traffic public roadways would be substantially impacted by livestock transport or equipment associated with grazing operations traveling to and from the sites. Therefore, this resource area was eliminated from further analysis.

Geology: Implementing the Proposed Action would not affect local or regional geology, nor would there be any adverse impacts to natural hazards or effects on any site's preexisting seismic conditions. Therefore, this resource area was eliminated from further analysis.

Human health risk: No elevated human health risk is associated with consuming meat or milk from livestock grazed at LM sites. At all the sites, contaminated materials are inaccessible because they are contained in engineered disposal cells. LM regularly inspects the cells to ensure their continued protectiveness. Livestock also do not have access to contaminants in groundwater, as ICs and locked structures prevent access to the water except for monitoring purposes.

Hazardous materials: Records and previous use indicate no known hazardous materials are in the project area. Hazardous materials are encapsulated in disposal cells, and access to contaminated groundwater is restricted. Therefore, hazardous materials were dismissed as an impact topic.

3.2 Definitions of Resources

This section defines resources presented, in the order in which they appear in Sections 3.3–3.9.

Biological resource: Living components of ecosystems including vegetation (plants and fungi) and wildlife (vertebrate and invertebrate animals) and the habitats in which they occur. Special status species are also included as biological resources. A sensitive biological resource can be a rare plant association or community, rookery, breeding site, or another area important to conservation as recognized by an agency (e.g., a state government).

Special status species: Plant and animal species listed as threatened or endangered, or proposed as such, by the U.S. Fish and Wildlife Service (USFWS) or by a state agency. Special status species also include USFWS-designated Birds of Conservation Concern (BCC) and other species designated as sensitive by BLM, the U.S. Forest Service, or other federal agencies, states, tribes, or municipalities. Species of Greatest Conservation Need (SGCN) is a formal classification given to a species by an agency (e.g., a state government) that gives protection to a species, usually with the goal of preventing the need to list the species as federally threatened or endangered.

Soils: Soils are composed of minerals and organic matter formed from the weathering of bedrock and other parent materials, as well as decaying plant matter. Soil properties, which include color, texture, particle size, moisture, and chemistry, affect the fertility and erodibility of soil.

Surface water: For the purposes of this PEA, surface water refers to rivers, perennial and intermittent streams, canals, lakes, reservoirs, and impoundments. Surface water includes all Waters of the U.S. (WOTUS) as defined by Section 404 of the Clean Water Act (CWA) and nonjurisdictional surface waters that provide water for drinking and other public uses, irrigation, and industry. The CWA utilizes water quality standards, permitting requirements, and monitoring to protect water quality. EPA sets the standards for water pollution abatement for all WOTUS under the CWA programs but, in most cases, gives qualified states and tribes the authority to issue and enforce water quality certification permits.

Groundwater: Groundwater is water that flows underground and is stored in natural geologic formations called aquifers.

Floodplains: Floodplains are low, relatively flat areas adjoining inland and coastal waters. *Floodplain Management* (EO 11988) sets forth the responsibilities of federal agencies for reducing the risk of flood loss or damage to personal property, minimizing the impacts of flood loss, and restoring the natural and beneficial functions of floodplains. Floodplains are typically described as areas likely to be inundated by a particular flood event. The 100-year floodplain is an area that has a 1% chance of being flooded in any given year and includes Zones A and AE, described below. Three floodplain classifications are used in this PEA:

- Zone A designates areas inundated by 1% annual chance of flooding for which no base flood elevations have been determined.
- Zone AE designates areas inundated by 1% annual chance of flooding for which base flood elevations have been determined. Also called the regulatory floodway or base floodplain.
- Zone B designates areas inundated by 0.2% annual chance of flooding, also called areas of 500-year flood.

Wetlands: The U.S. Army Corps of Engineers (USACE) defines wetlands as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Section 404 of the CWA protects regulated wetlands, other special aquatic sites, and other WOTUS. USACE, under EPA authority, is the primary regulating agency for these areas. To be regulated under Section 404, a wetland must meet specific criteria for vegetation, soils, and hydrology. *Protection of Wetlands* (EO 11990) also applies to federal actions. Riparian areas are typically associated with rivers, creeks, and drainage ways and may include regulated wetlands. Riparian areas are often sensitive biological resources, especially in arid regions.

Air quality: Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The levels of pollutants are generally expressed in terms of concentration, either in units of parts per million or micrograms per cubic meter (m). Based on measured ambient air pollutant concentrations, EPA designates whether areas of the U.S. meet National Ambient Air Quality Standards (NAAQS). Those areas demonstrating compliance with NAAQS are considered attainment areas, while those that are not are nonattainment areas.

EPA monitors and controls regional air pollution with defined Air Quality Control Regions (AQCRs) based on climate, meteorology, topography, vegetation, land use patterns, population characteristics, and growth projections. Ozone (O_3) and particulate matter (PM) pose a risk to human health, and areas are ranked according to the air quality index for these pollutants. Areas rated as "good" (air quality index of 0–50) pose little or no risk from air pollution. "Moderate" areas (51–100) are acceptable, but some pollutants may present a moderate health concern for a very small number of people. In areas "unhealthy for sensitive groups" (101–150), most people are not likely to be affected, but people with heart or lung disease, older adults, and children are at greater risk from O_3 or PM. At "unhealthy" levels (151–200), everyone may begin to experience health effects, and effects may be more serious for sensitive groups. "Very

unhealthy" (201–300) levels constitute a health alert, and anyone may experience serious health effects. "Hazardous" indexes (301–500) warn of emergency conditions.

GHGs trap heat in the atmosphere and include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Emissions of these gases are calculated separately and converted to CO_2 equivalents on the basis of their global warming potential.

Cultural resources: The National Park Service defines cultural resources as "physical evidence or place of past human activity: site, object, landscape, structure; or a site, structure, landscape, object or natural feature of significance to a group of people traditionally associated with it (https://www.nps.gov/acad/learn/management/rm_culturalresources.htm). As a commonly used term, cultural resource does not have a consistent or legal definition (https://www.achp.gov/Section_106_Archaeology_Guidance/Terms%20Defined).

Cultural resources typically encountered include:

- Archeological resources: The remains of past human activity on or below the ground surface. The term is used regardless of whether or not an archaeological site is determined to be a historical property.
- Buildings and structures: Material assemblies that extend the limits of human capability. Buildings (house, barn, factory, etc.) provide space for human activity; structures (bridges, towers, roads, disposal cells, etc.) do not typically contain space for human activity.
- Cultural landscapes: Settings that have been created by humans in the natural world (e.g., farmed fields).
- Ethnographic resources: Sites, structures, landscapes, objects or natural features that have significance to a group of traditionally associated people.
- Museum objects: Artifacts or other physical manifestations of human behavior.

Cultural resources that meet specific criteria regarding their historic context and integrity can be determined to be "historic property." Historic property, which is subject to the provisions of the National Historic Preservation Act (NHPA) of 1966, is defined in 54 USC 300308 as any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places [NRHP], including artifacts, records, and material remains related to such a property or resource." While the Section 106 process can be applied to nearly any cultural resource that has been determined to merit consideration, the process is typically applied to historic property found within a proposed project's area of potential effect (APE).

The importance of a property (often termed "significance" in cultural resources literature) refers to its ability to meet one of the four National Register criteria (A–D). According to *National Register Bulletin* No. 15, "How to Apply the National Register Criteria for Evaluation, "[t]he quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association" that meet one or more of the four criteria (A–D). Integrity is the ability of the property to convey this significance through physical features and context. Historic properties are important because they meet these criteria

and retain the necessary integrity to convey their historic character. Pursuant to Section 101(d)(6)(A) of the NHPA, properties of traditional religious and cultural significance may also be deemed eligible for listing on the National Register.

All federal agencies under the executive branch of the U.S. government are subject to the requirements of the Section 106 process. Because complying with Section 106 is a federal agency responsibility, LM is responsible for all cultural resource findings and determinations. Section 106 requires federal agencies to consider the effects of their "undertakings" (i.e., projects they carry out, assist, permit, license, or approve) on historic properties (https://www.achp.gov/digital-library-section-106-landing/section-106-applicant-toolkit).

The proposed use of controlled grazing to manage vegetation is an undertaking as defined at 36 CFR 800.16(y). This undertaking is the type with potential to have an effect on historic properties; therefore, the Section 106 consultation process was initiated with the State Historic Preservation Officer (SHPO) for each state with a site where grazing is proposed.

The Section 106 process defined at 36 CFR 800, *Protection of Historic Properties*, is followed to evaluate a proposed project for potential impacts to historic property or other cultural resources. The first step in this process is to define the APE for the undertaking, which in this Proposed Action would be the area proposed for grazing at each location. The APE is then evaluated to determine whether or not historic property or important cultural resources are present within it.

If LM makes the finding that no historic property is present within the APE, then the determination of "no historic property subject to effect" would be communicated to the relevant SHPO. LM would provide the SHPO with the necessary documentation for this determination and offer the SHPO a 30-day window to review and comment on the LM determination. If the SHPO agreed (concurred), the Section 106 process would be complete. If the SHPO disagreed in writing or asked for more information, the Section 106 process would continue.

If historic property is present within the APE, LM would determine whether or not the Proposed Action would have an adverse effect upon it. If LM determined that the Proposed Action would not have an adverse effect on the historic property within the APE, its determination of "no adverse effect" would be communicated to the relevant SHPO. LM would provide the SHPO with the necessary documents for this determination and offer the SHPO a 30-day window to review and comment on this determination. If SHPO agrees, the Section 106 process would be complete. If SHPO does not agree, the Section 106 process would continue.

If LM determines that the Proposed Action would have an adverse effect on historic property within the APE, then its determination of "adverse effect" would be communicated to the relevant SHPO. LM would provide the SHPO with the necessary documents for this determination and offer the SHPO a 30-day window to review and comment on this determination. If SHPO agrees, then a Memorandum of Agreement (MOA) would be drafted between the SHPO and LM that would document the measures to be taken to address the adverse effect to historic property. The Advisory Council on Historic Preservation (ACHP) would also be notified of this adverse effect and invited to participate in MOA development. Once the MOA was completed and signed, the Section 106 process would be complete. If SHPO does not agree, additional consultation, which includes ACHP participation, may be required.

Land use: Land use comprises the natural conditions or human-modified activities occurring at a particular location. Human-modified land use categories may include residential, commercial, industrial, transportation, communications and utilities, agricultural, institutional, recreational, and other developed uses. Management plans and zoning regulations determine the type and extent of land use allowable in specific areas and are often intended to protect specially designated or environmentally sensitive areas.

Recreation: Recreation includes outdoor activities that have the potential to occur on LM land. Recreation consists of a variety of features of the man-made and natural environment. Recreational uses include a variety of active and passive pursuits for personal enjoyment: Active recreational uses include hunting, hiking, biking, backpacking, horseback riding, and fishing, while passive activities consist of bird and wildlife watching, photography, camping, and picnicking.

3.3 Ambrosia Lake

The Ambrosia Lake site is a former uranium-ore-processing facility in McKinley County, approximately 25 miles north of Grants, New Mexico. The site is in the Ambrosia Lake Valley, a broad, elongated valley with basalt-capped mesas to the north. The site is within the Ambrosia Lake Mining District, near the center of the Grants Mineral Belt. The area surrounding the site is sparsely populated (Figure 3 and Figure 4).

DOE remediated the site and local contaminated vicinity properties between 1987 and 1995 under UMTRCA Title I. LM manages the site according to a site-specific LTSP to ensure that the disposal cell continues to prevent release of contaminants to the environment. Under provisions of this plan, LM maintains the site and conducts annual inspections to evaluate the condition of surface features. LM also monitors groundwater quality as a best management practice. In accordance with 40 CFR 192.02(a), the disposal cell was designed to be effective over the long term. The NRC general license has no expiration date, and LM's responsibility for the safety and integrity of the site will last indefinitely.

3.3.1 Biological Resources

3.3.1.1 Vegetation

The Ambrosia Lake site is in the Semiarid Tablelands Level IV Ecoregion within the Arizona/New Mexico Plateau (EPA 2019a). The Arizona/New Mexico Plateau is a large transitional region between the drier shrublands and wooded, higher-relief tablelands of the Colorado Plateau to the north; the lower, hotter, less vegetated Mojave Basin and Range to the west; and the forested mountain ecoregions to the northeast and south. The Semiarid Tablelands ecoregion is characterized by mesas, plateaus, cliffs, canyons, and valleys. The land is covered in shrubland, woodland, and some grassland composed of scattered juniper and pinyon-juniper communities, with alkali sacaton (*Sporobolus airoides*), shadscale saltbush (*Atriplex confertifolia*), fourwing saltbush (*Atriplex canescens*), mixed gramas (*Bouteloua* spp.), western wheatgrass (*Pascopyrum smithii*), and some winterfat (*Krascheninnikovia lanata*).

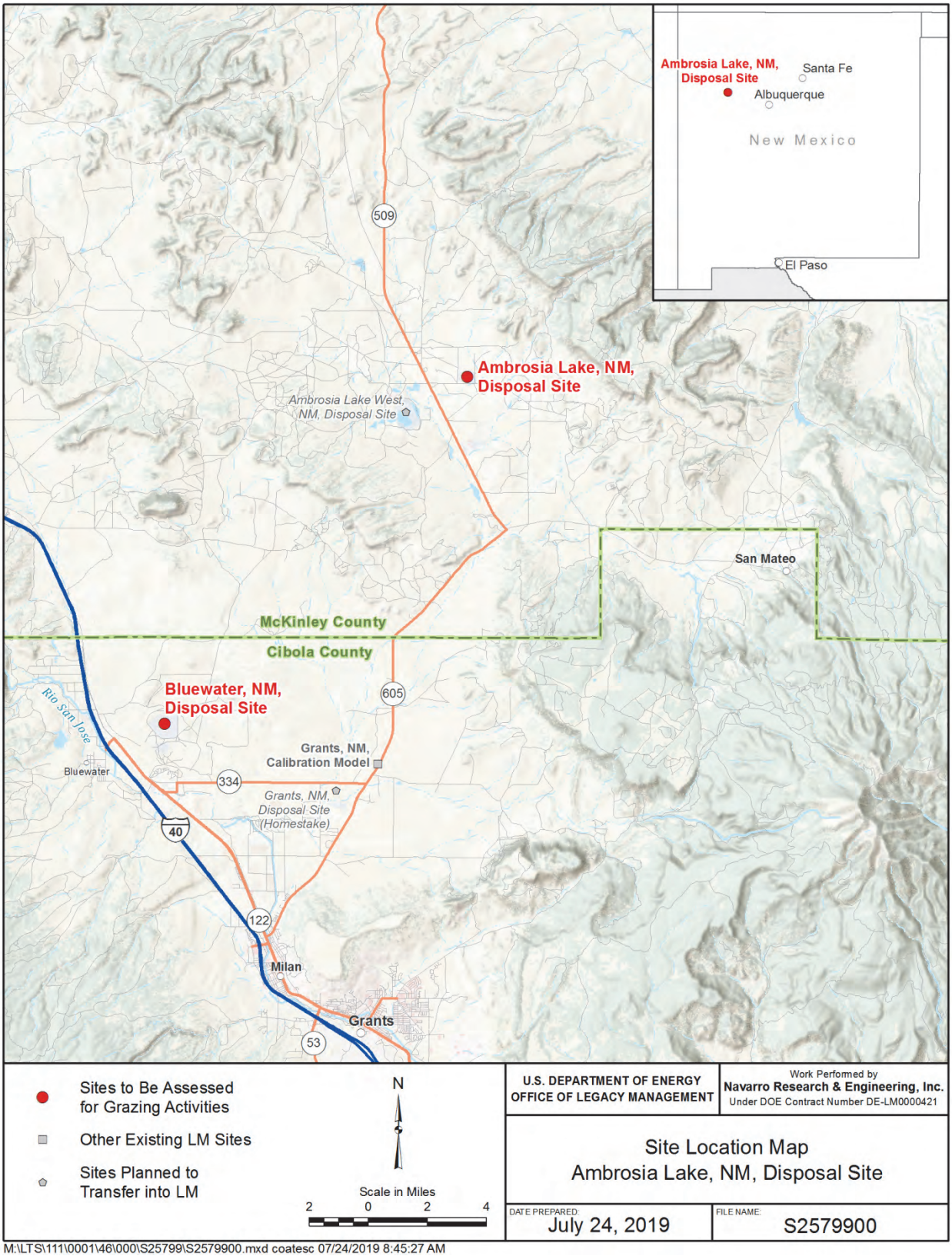

Figure 3. Location Map for Ambrosia Lake, NM, Disposal Site

Figure 4. Site Map for Ambrosia Lake, NM, Disposal Site

NRCS describes the majority of the Ambrosia Lake site as uranium mined lands, which are not associated with an ecological site description (NRCS 2019). Areas surrounding the site are within the Colorado Plateau Major Land Resource Area (MLRA) and Colorado Plateau Mixed Grass Plains, a region dominated by fourwing saltbush, winterfat, blue grama (*Bouteloua gracilis*), and western wheatgrass. MLRAs are geographic units defined by NRCS and characterized by particular physiography, geology, soils, climate, water, biological resources, and land uses.

LM characterized vegetation at the site in August 2013 (DOE 2014) and identified 34 plant species and four soil-vegetation map units: the disposal cell cover, reclaimed area, exposed bedrock areas, and mesic area (see Figure 5). The approximately 86-acre disposal cell cover supports sparse vegetation. Herbicides are routinely used to control woody shrubs, so herbaceous flowering plants like gypsum phacelia (*Phacelia integridolia*) and Adonis blazingstar (*Mentzelia multiflora*) are dominant on the cover.

The reclaimed area map unit surrounding the cell comprises approximately 197 acres of the site. It was historically disturbed by milling and surface reclamation activities. In the mid-1990s, it was seeded with native species, and by 2013, it contained western wheatgrass, alkali sacaton, fourwing saltbush, sand dropseed (*Sporobolus cryptandrus*), blue grama, rubber rabbitbrush (*Ericameria nauseosa*), broom snakeweed (*Gutierrezia sarothrae*), and giant dropseed (*Sporobolus giganteus*).

Several weed-dominated patches were identified as well, the largest approximately 2.5 acres in size. These patches contained burningbush (*Bassia scoparia*), crossflower (*Chorispora tenella*), and prickly Russian thistle (*Salsola tragus*). A patch of horsetail milkweed (*Asclepias subverticillata*) was identified within the reclaimed area in 2018. Milkweed is an important habitat plant for monarch butterflies (*Danaus plexippus*) (see Section 3.3.1.3).

The exposed bedrock areas, all north of the cell, total approximately 3 acres and have little or no topsoil. They support small pockets of sparse vegetation similar in composition to the reclaimed area map unit.

Approximately 2 acres of the site at the southern base of the disposal cell were identified as a mesic area because it receives seasonal surface water runoff from the cell. At the time of the 2013 characterization, it was dominated by invasive ambrosia leaf bur ragweed (*Ambrosia artemisiifolia*) and foxtail barley (*Hordeum jubatum*) as well as native bush muhly (*Muhlenbergia porteri*) and scarlet globemallow (*Sphaeralcea coccinea*). Perennial pepperweed (*Lepidium latifolium*) and saltcedar (*Tamarix ramosissima*), state-listed noxious weeds, were found in 2013 but have now been nearly eliminated.

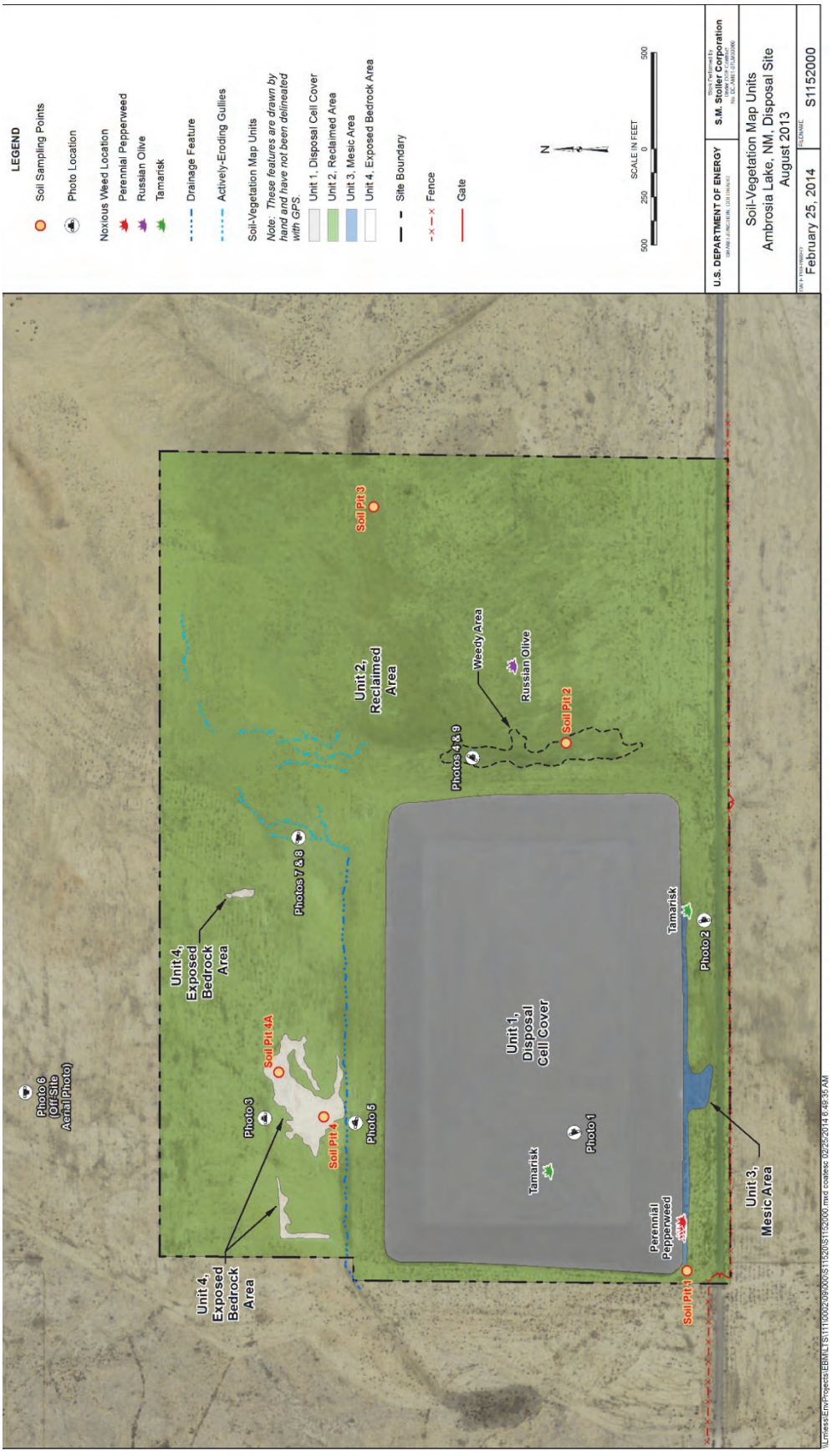

Figure 5. Soil-Vegetation Map Units at the Ambrosia Lake, NM, Disposal Site

3.3.1.2 Wildlife

Wildlife at the Ambrosia Lake site is associated with shortgrass and desert shrub habitat. Big game species like elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), and pronghorn (*Antelocapra americana*) are rare in this area (BLM 2003). Smaller mammals common to the region (NPS 2019) and potentially present at the site include coyotes (*Canis latrans*) and burrowing rodents like deermice (*Peromyscus* spp.), white-throated woodrats (*Neotoma albigula*), Botta's pocket gophers (*Thomomys bottae*), Ord's kangaroo rats (*Dipodomys ordii*), silky pocket mice (*Perognathus flavus*), and Gunnison's prairie dogs (*Cynomys gunnisoni*). Gunnison prairie dogs are a keystone species; their burrows provide habitat for other animals such as burrowing owls (*Athene cunicularia*) and a variety of snakes (EPA 2019a).

Common birds that may use the site (NPS 2019) include mourning doves (*Zenaida macroura*), raptors such as red-tailed hawks (*Buteo jamaicensis*), turkey vultures (*Cathartes aura*), horned larks (*Eremophila alpestris*), western scrub jays (*Aphelocoma californica*), songbirds such as vesper sparrows (*Pooecetes gramineus*), and common ravens (*Corvus corax*). Dominant reptiles in the region (NPS 2019) are small lizards such as the plateau striped whiptail (*Cnemidophorus velox*), rattlesnakes (*Crotalus* spp.) and bullsnakes (*Pituophis catenifer*).

3.3.1.3 Special Status Species

The Ambrosia Lake site is within range of the federally listed Mexican spotted owl (*Strix occidentalis lucida*), southwestern willow flycatcher (*Empidonax extimus*), yellow-billed cuckoo (*Coccyzus americanus*), Zuni bluehead sucker (*Catostomus discobolus yarrowi*), and Zuni fleabane (*Erigeron rhizomatus*). The site does not contain any designated critical habitat for these species. Many state-listed species are found in McKinley County, and some have potential habitat at the site. Other special status species are not protected by legal statute but are conserved and managed by other agencies. At the Ambrosia Lake site, these include USFWS BCC, BLM sensitive species, and state SGCN.

Table 4 summarizes special status species that could potentially be found at the Ambrosia Lake site. If a species is not listed in Table 4, no potential habitat for that species exists on or near the site. A patch of milkweed was identified at the Ambrosia Lake site. Milkweeds are larval hosts for the monarch butterfly, a species that has been petitioned for protection under the Endangered Species Act (ESA). Though monarchs are often observed in New Mexico, very little is known about their migratory behavior through the state because the state lies between the understood boundaries of the eastern and western monarch migratory routes.

Table 4. Special Status Species Potentially Occurring at the Ambrosia Lake Site

Common Name	Scientific Name	Status	Potential Presence
Bendire's thrasher	*Toxostoma bendirei*	BLM sensitive	Unlikely; prefers other habitats but can be associated with short grass desert and scrub.
Burrowing owl	*Athene cunicularia*	BLM sensitive	Possibly present if prairie dogs are present.
Cassin's sparrow	*Peucaea cassinii*	State SGCN	Possibly present; grasslands with sparse shrubs onsite.
Common nighthawk	*Chordeiles minor*	State SGCN	Possibly present; arid grasslands onsite.
Ferruginous hawk	*Buteo regalis*	BLM sensitive	Unlikely; if present, foraging only.
Grasshopper sparrow	*Ammodramus savannarum*	BLM sensitive	Possibly present; short grass desert habitat onsite.
Gunnison's prairie dog	*Cymomys gunnisoni*	BLM sensitive	Possibly present; habitat may be present onsite.
Loggerhead shrike	*Lanius ludovicianus*	BLM sensitive	Possibly present; short grass desert habitat onsite.
Mexican spotted owl	*Strix occidentalis lucida*	Federal threatened	Unlikely; if present, foraging only.
Monarch butterfly	*Danaus plexippus*	Federal petitioned	Possibly present; milkweed is present at the site, and monarchs are often observed in New Mexico. Very little is known about their migratory behavior through the state because the state lies between the understood boundaries of the eastern and western monarch migratory routes.
Painted bunting	*Passerina ciris pallidior*	BLM sensitive	Unlikely; scrub habitat onsite is marginal but present.
Vesper sparrow	*Pooecetes gramineus*	State SGCN	Possibly present; arid grasslands onsite.

3.3.2 Soils

Before remediation, soils of the Las Lucas-Litle-Persayo association surrounded the disposal cell (DOE 1987) and currently underlie the cell and existing disturbed surface soils. These soils were composed of alluvium underlain by weathered Mancos Shale (DOE 1996). NRCS currently describes most of the site as uranium mined lands (NRCS 2019) and does not provide soil descriptions.

LM characterized soils at the site in 2013 (DOE 2014) and identified four soil-vegetation map units (Figure 4). The disposal cell cover map unit is covered by rock riprap and does not contain "soil." However, windblown sediment has built up in the rock interstices since the cell was completed in 1994 and is expected to continue to accumulate.

Soils within the reclaimed area and mesic area map units vary in classification from coarse-loamy to fine to very fine, mixed, calcareous, mesic Ustic Torriorthents, which means soils are young, undeveloped, have relatively high concentrations of calcium carbonate, and have varying surface and subsurface textures. Surface soil textures vary widely between sandy loam, sandy clay loam, clay loam, silty clay loam, and clay. Subsurface textures are clayey in the north and east portions of the site and sandy (sandy loam) in the southwest portion of the site. Slopes range from 1% to 8%. Soils within the exposed bedrock area are nonexistent or extremely

shallow (<5 inches), and slopes range from 1% to 8%. Where soil is present, textures are sandy loam.

LM documented several areas of active erosion during the 2013 characterization. Numerous gullies that were actively downcutting through the reclaimed area map unit were north and northeast of the disposal cell. Some gullies were up to 6 feet (ft) deep. The current status of these gullies is not known.

3.3.3 Water Resources

3.3.3.1 Surface Water

The Ambrosia Lake site lies within the drainage basin of the Arroyo del Puerto, an intermittent stream about 1 mile southwest of the site. The Arroyo del Puerto flows into San Mateo Creek about 5 miles south of the site. These waterways are within the larger drainage basin of the Rio Grande. There are no perennial streams nearby. Several small ephemeral streams and channels originating in canyons northeast of the site direct surface runoff in the immediate area to the southwest.

During remediation, the site was contoured to direct runoff away from the disposal cell. The disposal cell cover was designed with a layer of compacted earth to inhibit water infiltration. A 2-acre portion of the site (described as a mesic area in Section 3.3.1.1) receives runoff from the disposal cell and seasonally retains surface water. The National Wetlands Inventory (NWI) shows several wetlands and water bodies on the site, but this information does not reflect current site conditions. These features were associated with past milling operations and are no longer present onsite.

3.3.3.2 Groundwater

The uppermost groundwater aquifer beneath the site consists of alluvium (river deposits), sandstone, and weathered shale. This uppermost aquifer is not a current or potential source of drinking water because of low yield. Before the site was remediated, uranium mill tailings (the solid waste byproduct of the processed ore, often containing potentially hazardous radiologic and nonradiologic constituents) contaminated this aquifer through wastewater disposal and seepage. The tailings are now encapsulated in the disposal cell, and these sources have been removed. Groundwater recharge is limited and may occur only near surface depressions that collect surface runoff. Because the groundwater is low yield and is not a present or potential resource, no monitoring is required at the site. However, as a best management practice, LM monitors groundwater in the uppermost aquifer at the request of NMED. Deeper aquifers are isolated from the uppermost aquifer by impermeable layers of rock.

Wells access these deeper aquifers in areas surrounding the cell to supply water for domestic and livestock use, but no wells are completed in any of the shallower zones within at least 5 miles of the site. The nearest public water supply is operated by the town of San Mateo, 10 miles southeast of the site. Water for San Mateo is derived from an aquifer that is stratigraphically higher than, and not connected with, any of the geologic units at the site.

3.3.4 Wetlands and Floodplains

3.3.4.1 Wetlands

No potential wetlands are at the Ambrosia Lake site. Information in the NWI (USFWS 2019) is out of date and shows features at the site before remediation. Stock ponds and ephemeral streams are near the site, but none of these features are associated with potential wetlands. Runoff water collects at an onsite mesic area; although vegetation is denser in this area, it does not have wetland characteristics.

3.3.4.2 Floodplains

All portions of the Ambrosia Lake site are outside of 1% and 0.2% annual chance floodplains (FEMA 2019).

3.3.5 Air Quality

The Ambrosia Lake site is entirely within attainment areas for all criteria pollutants (EPA 2019b). EPA's Air Quality Index Report (EPA 2019b) does not report for McKinley County, but air quality in the nearby, primarily rural Sandoval County reported no "unhealthy" days in 2018 (EPA 2019c). In 2018, 12 days were "unhealthy for sensitive groups," 118 days were in the "moderate" category, and 224 were categorized as "good."

The site is within the Southwestern Mountains-Augustine Plains Intrastate AQCR. NMED lists six facilities in McKinley County with reportable emissions in 2018 (NMED 2019). These include three compressor stations, two refineries, and one generating station. In 2018, these facilities together emitted 392 tons of CO, 3036 tons of NO_2, 933 tons of sulfur dioxide, 360 tons of volatile organic compounds, 40 tons of PM, and 65 tons of hazardous air pollutants. EPA data from 2017 show that the three largest of these facilities emitted 1,403,153 metric tons of CO_2 equivalent in GHG (EPA 2019d). Most of these emissions came from a generating station near the Ambrosia Lake site.

3.3.6 Cultural Resources

The entire disposal site was surveyed in 1985 before construction; no archaeological sites were identified within the location where the disposal cell was later built (Hammack 1985). LM made a determination, in accordance with Section 106 of the NHPA and the operating regulations in 36 CFR 800, that the proposed project is defined as an undertaking (36 CFR 800.16(y)). This undertaking is the type with potential to affect historic properties. LM initiated the NHPA Section 106 consultation process with the New Mexico SHPO. The APE for this undertaking is the entire 290-acre disposal site.

In accordance with 36 CFR 800.4(d)(1), LM determined there is no historic property present within the APE of the proposed project because of the extensive disturbance that occurred during disposal cell construction and remediation of the surrounding area. All ore-processing buildings and structures once found at this location were demolished during remediation; their remains are entombed in the disposal cell. Additionally, this disposal site was extensively disturbed during construction and is not located on tribal land. Therefore, LM decided to consult only with the relevant SHPO on this undertaking.

3.3.7 Land Use and Recreation

3.3.7.1 Land Use

The site is situated in McKinley county in the Ambrosia Lake Valley, a broad, elongated valley dominated by desert grassland plant communities and basalt-capped mesas to the north. The site is within the Ambrosia Lake Mining District, near the center of the Grants Mineral Belt. The area surrounding the site is sparsely populated. The site is owned by the U.S. through a September 17, 1998, Quitclaim Deed between the Property Control Division of the New Mexico General Services Department and the U.S. and Public Land Order 6828 of March 12, 1991.

The former mill processed more than 3 million tons of uranium ore between 1958 and 1963 and provided uranium for U.S. government national defense programs. Phillips Petroleum Company built the original mill at the site in 1957 to process ore from nearby mines. United Nuclear Corporation purchased and briefly operated the mill in 1963, then ceased milling operations but retained ownership of the site. In the late 1970s to early 1980s, United Nuclear Corporation operated an ion exchange system, extracting uranium from mine water. All mill operations ceased in 1982. The site was remediated between 1987 and 1995. Current use of the site is for a disposal cell and associated features; it is fenced on the south side.

Current access to the site is through a gate and access road that are privately owned by Rio Algom Mining LLC through a Restrictive Easement and Agreement between Rio Algom Mining LLC and New Mexico General Services Department, with DOE and NRC as third-party beneficiaries to this agreement. There is also a permanent restrictive easement between Rio Algom Mining LLC and DOE that allows DOE access to Tract B2-E, which consists of 68.3 acres in the site. Current use on vicinity properties appears to permit livestock grazing.

3.3.7.2 Recreation

The site has no current recreational uses. El Malpais National Monument is south of the site and has recreational activities that include hiking, sightseeing, bird-watching, caving, scenic driving, nature viewing, and volcanic geology. The unique habitats it preserves include pygmy pine forests growing on the vast Grants Lava Flow fields (https://www.nps.gov/elma/index.htm). Cibola National Forest, south of the site, has recreational activities that include hiking, fishing, camping, sightseeing, bird-watching, scenic driving, nature viewing, and exploring archeological sites (https://forestcamping.com/dow/southwst/cibinfo.htm).

3.4 Bluewater

The Bluewater disposal site is in Cibola County, approximately 9 miles northwest of Grants, New Mexico (Figure 6 and Figure 7). Anaconda Copper Company constructed the original carbonate-leach mill at the site in 1953 to process limestone uranium ore mined nearby. The site comprises 3300 acres, about one-third of which (the southern and western parts) is covered by basalt flows. The region around the disposal site is sparsely populated, and the main land use near the site is grazing. A barbed-wire perimeter fence encloses the entire site.

Atlantic Richfield Company (ARCO) began decommissioning the mill in 1989 under UMTRCA Title II and began site reclamation in 1991. By 1995, all mill tailings, contaminated soils, demolished mill structures, and contaminated vicinity property materials were encapsulated in onsite disposal areas. These areas are the main tailings disposal cell, the carbonate tailings disposal cell, an asbestos disposal area, a disposal area that also contains a polychlorinated biphenyl disposal cell, and two small former dumps. More than 90% of the tailings material is encapsulated in the main tailings disposal cell.

LM manages the disposal site according to a site-specific LTSP to continue to prevent release of contaminants into the environment. Under provisions of this plan, LM conducts annual inspections of the site, performs site maintenance as necessary, and monitors groundwater quality. In accordance with UMTRCA Title II regulations, the disposal cells were designed to be effective over the long term. The NRC general license has no expiration date, and LM's responsibility for the safety and integrity of the site will last indefinitely.

3.4.1 Biological Resources

3.4.1.1 Vegetation

The Bluewater site is in the same EPA Ecoregion and NRCS MLRA as the Ambrosia Lake site described in Section 3.3.1.1. LM characterized vegetation at the site in 2014 (DOE 2015) and identified 88 plant species within nine soil-vegetation map units: the lava complex, reclaimed lava complex, Chinle alluvial fan, reclaimed alluvial complex, limestone hill, Moenkopi clay, native red clay, rock cover, and wetlands/potential wetlands (see Figure 8). Wetlands/potential wetlands are described in Section 3.4.4.1.

The lava complex map unit, approximately 873 acres in size, is characterized by rough, rocky terrain and dominated by blue grama. Secondary species include James' galleta (*Pleuraphis jamesii*) and fourwing saltbush. Grasses are dominant in this area, but it also contains a diversity of forbs and woody plants.

The reclaimed lava complex map unit (approximately 215 acres) includes lava complex areas that were disturbed by uranium milling and reclamation activities. Blue grama, sand dropseed, and fourwing saltbush dominate this area. Secondary species include broom snakeweed, hairy false goldenaster (*Heterotheca villosa*), and scarlet globemallow. Like the lava complex, the reclaimed lava complex supports a diversity of native grasses, forbs, and shrubs.

The Chinle alluvial fan map unit in the far eastern and northeastern portions of the site is approximately 737 acres in size. Blue grama is the most common species along with fourwing saltbush, winterfat, and a large diversity of forbs. The reclaimed alluvial complex, about 628 acres, is an area disturbed by milling and reclamation activities that contains both barren and vegetated areas. It is dominated by Texas blueweed (*Helianthus ciliaris*) and prickly Russian thistle, both weedy forbs.

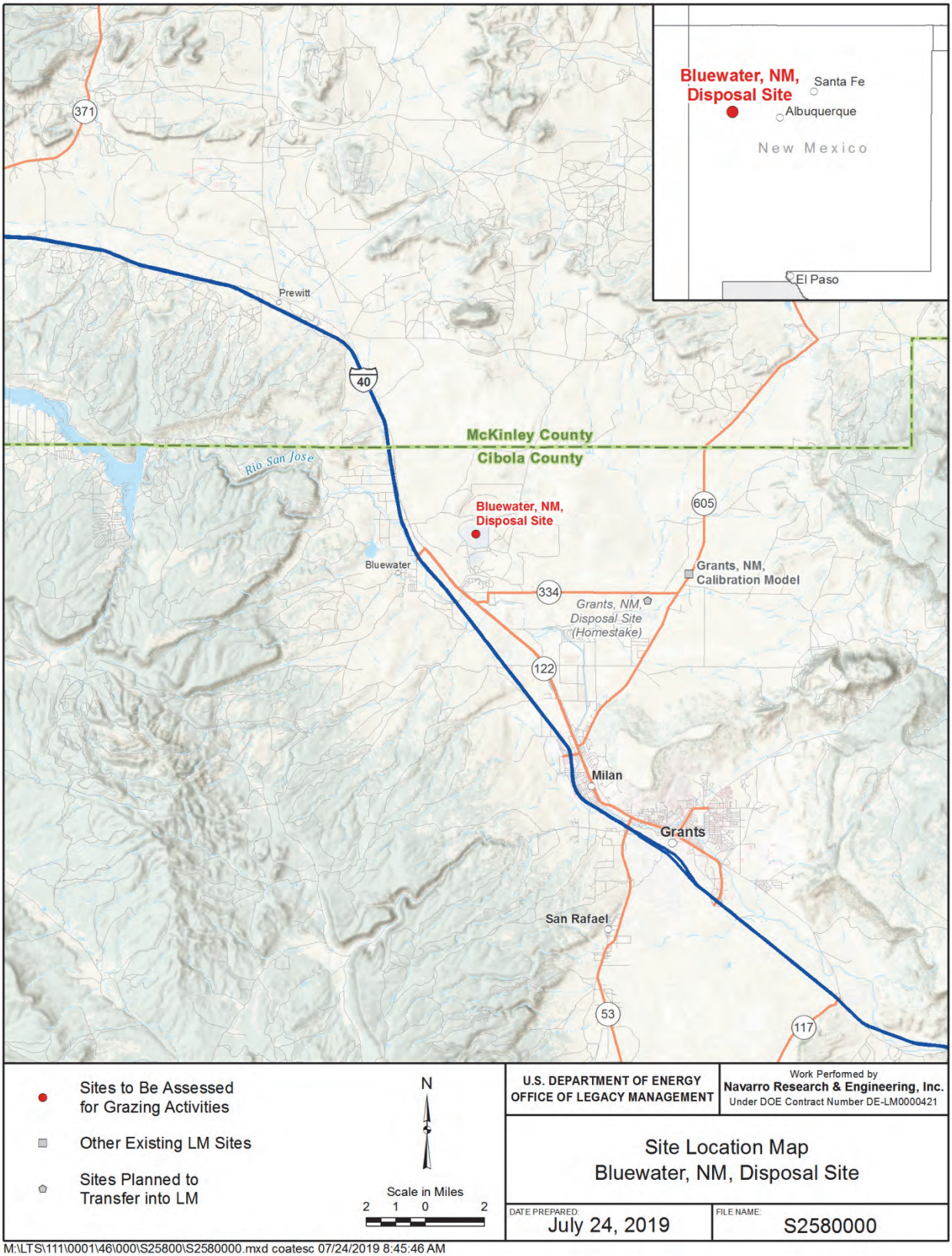

Figure 6. Location Map for Bluewater, NM, Disposal Site

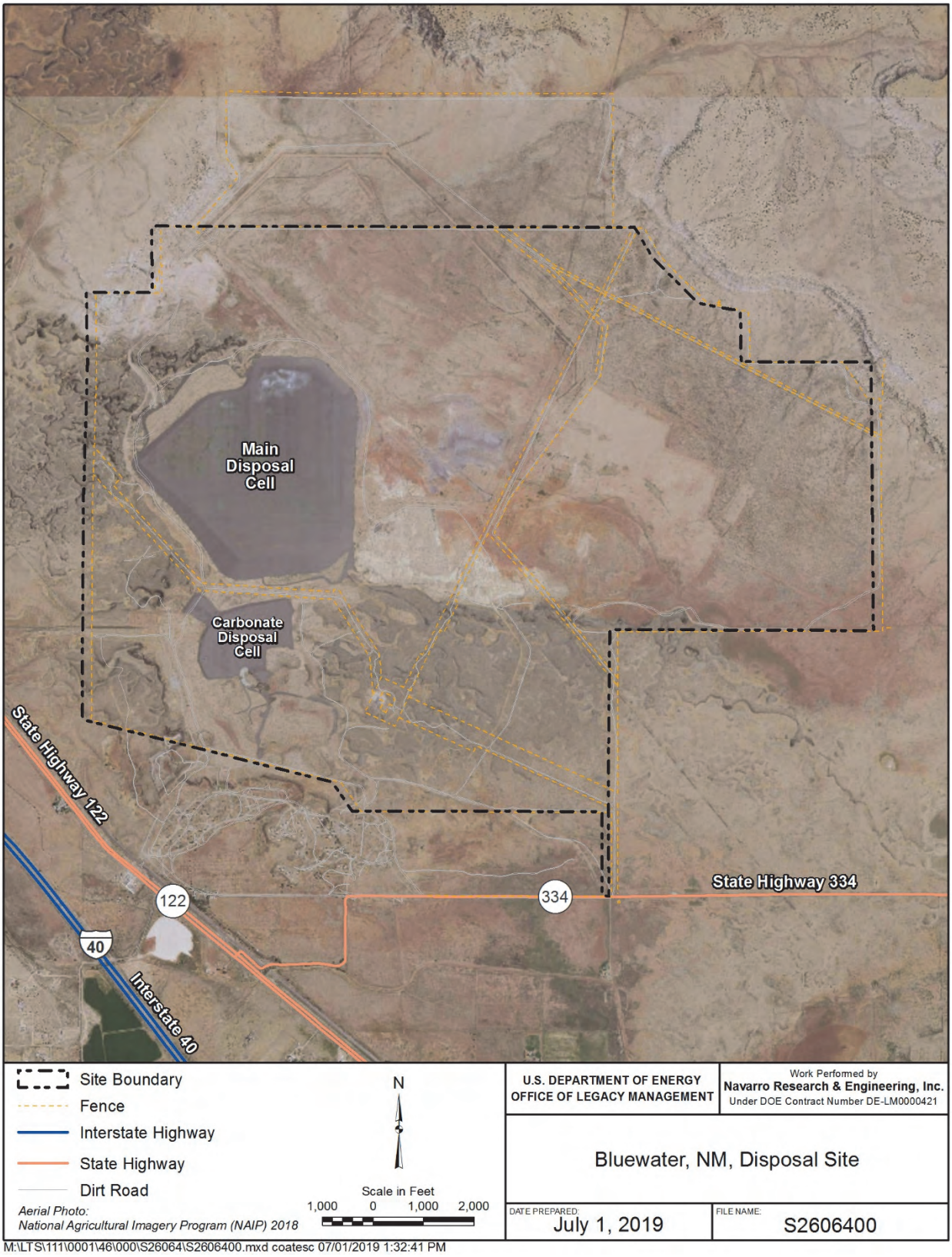

Figure 7. Site Map for Bluewater, NM, Disposal Site

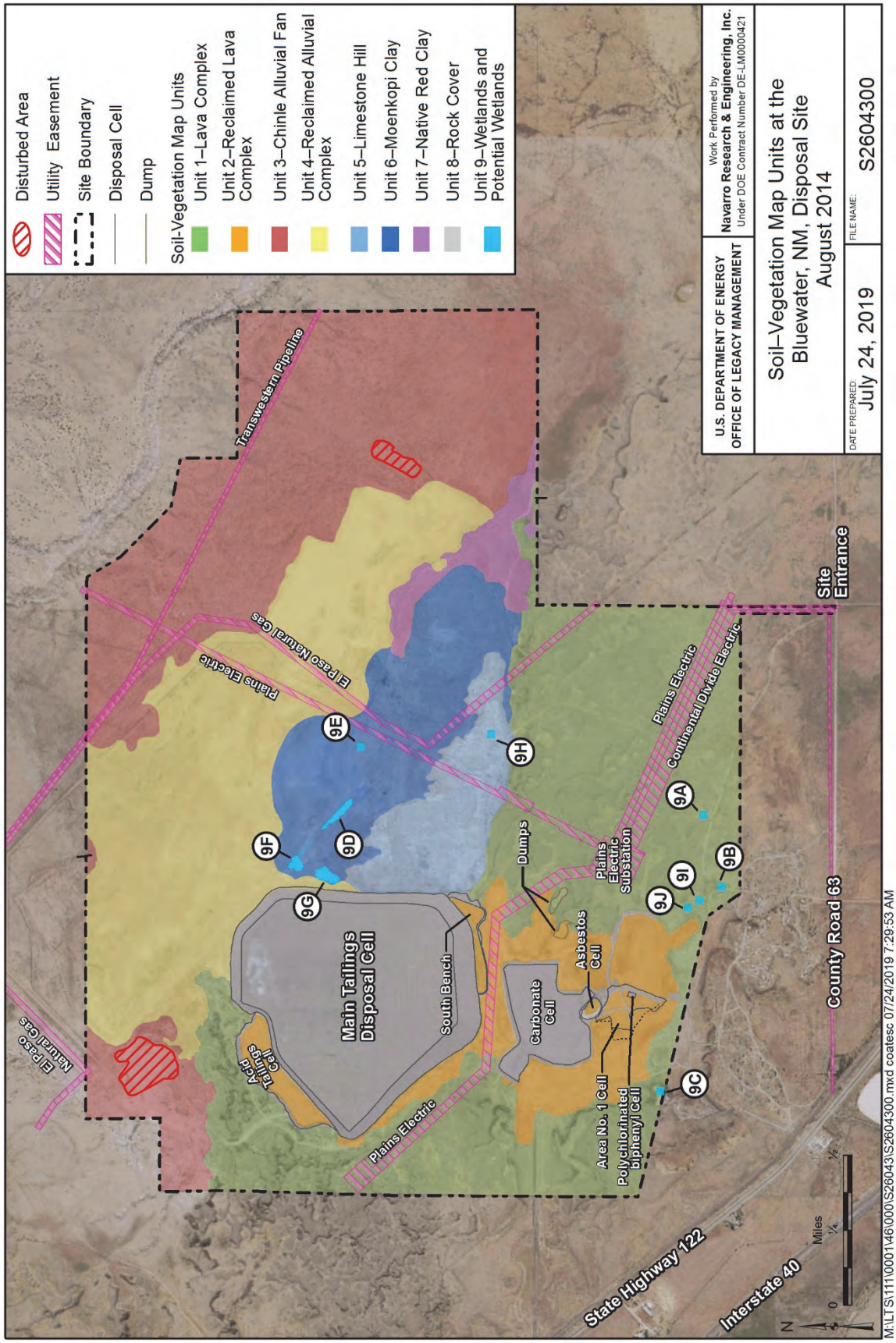

Figure 8. Soil–Vegetation Map for Bluewater, NM, Disposal Site

The limestone hill (131 acres), Moenkopi clay (251 acres), and native red clay (58 acres) map units are characterized by distinct soil types. The limestone hill map unit is relatively undisturbed and dominated by black sagebrush (*Artemisia nova*), blue grama, and giant dropseed with a diversity of native species and few weeds. Topsoil was historically scraped from the Moenkopi clay map unit. It is dominated by giant dropseed and also includes fourwing saltbush, two species of sandmat (*Chamaesyce* spp.), and a higher proportion of weeds than other areas of the site. The native red clay map unit is relatively undisturbed but lower in both species richness and vegetative cover. It is dominated by Texas blueweed, James' galleta, and pale wolfberry (*Lycium pallidum*).

The rock cover is 395 acres in size. It comprises the site's main tailings disposal cell and the carbonate disposal cell. It is covered in rock riprap; windblown sediments support some vegetation. Purple three-awn (*Aristida purpurea*), Russian thistle, burningbush, blue grama, bottlebrush squirreltail, needle and thread (*Hesperostipa comata*), horsetail milkweed, and prickly lettuce (*Lactuca serriola*) are common on the rock cover. Horsetail milkweed is a habitat plant for monarch butterflies (a species petitioned for protection under the ESA, Table 4) but is not itself a special status species.

3.4.1.2 Wildlife

Common wildlife species potentially present at the Bluewater site are similar to those at the Ambrosia Lake site (see Section 3.3.1.2).

3.4.1.3 Special Status Species

The Bluewater site is similar to the Ambrosia Lake site in terms of special status species that may be present (see Section 3.2.1.3). In 2019, monarch butterflies were confirmed to be present at the Bluewater site. Many locations at the site also contained possible Gunnison's prairie dog habitat. Gunnison's prairie dog is a BLM-sensitive species that can also create habitat for other special status species like the burrowing owl.

3.4.2 Soils

Soils in the site area are generally classified as two types: Viuda-Penistaja and Penistaja-San Mateo-Sparank (NRCS 2019). Viuda-Penistaja soils are developed on basalt. Viuda soil is shallow, well-drained, and on hills and ridges. Penistaja soil is on alluvial material developed over sandstone and siltstone bedrock; these soils are deep, well-drained, and moderately susceptible to wind erosion.

LM characterized soils on the site in 2014 (DOE 2015) and identified nine soil-vegetation map units (Figure 6). The lava complex map unit covers approximately 873 acres in the southern and western portions of the site and includes a variety of soil types that are dependent upon landscape position. Soils on the tops and side slopes of the lava flows are loamy, mixed, mesic, shallow Ustic Petrocalcids and contain a cemented calcium carbonate horizon at a depth of 3 to 20 inches. Soil surface texture is extremely gravelly sandy clay loam, and soil pH is mildly alkaline.

Soils in the depressions between flows are loamy, mixed, mesic Ustic Haplargids and Lithic Ustic Haplargids and range in depth from 6 inches to greater than 20 inches. Surface textures range from silty clay loam to extremely stony silt loam, and soil pH ranges from neutral to moderately alkaline. Slopes on the tops and in the depressions are 1% to 8%, and slopes on the side slopes vary from 25% to 45%.

Soils within the reclaimed lava complex map unit are classified as fine, mixed, calcareous, mesic Ustic Torriorthents, which are young, undeveloped, finely textured soils. Surface textures are reddish-brown sandy clay loam and sandy clay, and pH is moderately to strongly alkaline. Slopes range from 0% to 7%.

The Chinle alluvial fan map unit is in the east and northeast portions of the site and contains relatively undisturbed, deep soils derived from the Chinle Formation. These soils are fine-loamy, mixed, mesic Ustic Haplocalcids and fine, mixed, mesic Ustic Calciargids. The surface is typically red sandy clay loam, mildly to strongly alkaline, and high in calcium carbonates.

The 628-acre reclaimed alluvial complex map unit encompasses areas formerly covered by evaporation ponds and used for borrow areas. It was backfilled in some places, and soil was "scraped off" in others during remediation. Because of the historical disturbance, this unit is considered a complex of soils and vegetation types that are too intermixed to map separately. The unit is composed of native and alluvial materials deposited by Quaternary fluvial and lacustrine events; it also includes historical and recent aeolian deposits. The surface exhibits many erosional features: small dunes from windblown depositions, cracks and hummocks from wetting and drying cycles, rills, and sediment "deltas." Soils are classified as very fine, smectitic, calcareous, mesic Ustic Torriorthents. Given the "heavy" textures, soils are moderately well drained but very slowly permeable. They are moderately alkaline and contain high concentrations of calcium carbonate.

Another distinct map unit, Limestone hill, surrounds an outcrop of San Andres limestone, the oldest formation exposed at the site. The associated soils are undeveloped and clayey, and they overlie limestone bedrock at a depth of 1 to 6 inches. The surface horizon is pink, very gravelly clay that is moderately alkaline and contains disseminated lime.

Approximately 255 acres of the site comprise the Moenkopi clay map unit. Soils are very fine, smectitic, mesic Ustic Haplocalcids. They are not highly developed, except for the formation of a shallow calcic horizon. Although the soils are well drained, they are slowly permeable due to their high clay content. Soils within the adjacent native red clay map unit are similar to those within the Moenkopi clay map unit. The rock cover map unit is covered by rock riprap and does not yet contain "soil." However, windblown sediment has built up in the rock interstices since the cell was completed and is expected to continue to accumulate.

Small portions of the site are mapped as wetlands and potential wetlands, but most of these were not characterized for soils. Soils were observed only in Unit 9C, and they were classified as fine, mixed, calcareous, mesic Typic Endoaquepts. They are considered hydric, as defined by USACE.

Several areas of active erosion have been identified at the site. These include gullies forming and increasing in size and depth in the northwest portion of the site in the Chinle Alluvial Fan and

Reclaimed Alluvial Complex. Gully formation has threatened site features such as secondary roads and the perimeter fence.

3.4.3 Water Resources

3.4.3.1 Surface Water

The Bluewater site is in the broad northwest-trending Grants–Bluewater Valley, which contains the southeasterly flowing Rio San Jose, a tributary to the Rio Puerco within the Rio Grande basin. Surface drainage in portions of the site outside of the main tailings area is poorly defined because of irregular topography, mainly from the presence of basalt flows. Drainage from the main tailings disposal cell is northward from the crest of the cell. The Rio San Jose is intermittent to perennial in this area, and it runs south of the site. The National Wetlands Inventory (USFWS 2019) shows an intermittent channel, a tributary to the Rio San Jose, running through the northwest portion of the site, but this information is incorrect.

3.4.3.2 Groundwater

Principal aquifers on and near the Bluewater site are the San Andres-Glorieta and alluvial. The San Andres-Glorieta aquifer is the principal aquifer in the area and consists mainly of sandstone and limestone. It is generally a high-yield, confined aquifer, and flow at the site is generally eastward to southeastward. The alluvial aquiver consists of alluvial sediments along the ancestral course of the Rio San Jose and the overlying Bluewater Basalt, which has flowed into the low area along the ancestral river valley and covered the alluvial material. Most of the alluvium is confined or semiconfined by the overlying basalt, which recharges the aquifer by infiltration of precipitation. Both the San Andres-Glorieta and alluvial aquifers contain contaminants from historical uranium milling.

LM monitors groundwater quality on and near the site through a network of groundwater wells. There are no wells permitted for domestic or municipal use near the site that have concentrations above the applicable regulatory limits.

3.4.4 Wetlands and Floodplains

3.4.4.1 Wetlands

Ten potential wetland areas between 0.5 and 19.5 acres were observed during a 2014 soil and vegetation baseline survey (DOE 2015). These potential wetlands varied widely in plant and animal composition, but many were of poor quality and dominated by invasive species such as ambrosia leaf bur ragweed, field bindweed (*Convolvulus arvensis*), and saltcedar. Although information in the NWI (USFWS 2019) is out of date and probably shows features at the site before remediation, five of the ponded areas found in 2014 correspond with areas identified by NWI as permanent or semi-permanent freshwater ponds. More potential wetlands may be present at the site.

3.4.4.2 Floodplains

All portions of the site are outside of 1% and 0.2% annual chance floodplains (FEMA 2019).

3.4.5 Air Quality

The Bluewater site is entirely within attainment areas for all criteria pollutants (EPA 2019b). EPA's Air Quality Index Report (EPA 2019b) does not report for Cibola County, but air quality in the nearby, primarily rural Sandoval County reported no "unhealthy" days in 2018 (EPA 2019c). In 2018, 12 days were "unhealthy for sensitive groups," 118 days were in the "moderate" category, and 224 were categorized as "good." The site is within the Southwestern Mountains-Augustine Plains Intrastate AQCR. NMED and EPA list no large facilities with reportable emissions in 2017 or 2018 for Cibola County (EPA 2019d; NMED 2019).

3.4.6 Cultural Resources

LM determined, in accordance with Section 106 of the NHPA and 36 CFR 800, that the proposed grazing activities are defined as an undertaking (36 CFR 800.16[y]). This undertaking has the potential to have an effect on historic properties; therefore, the Section 106 consultation process was initiated with the New Mexico SHPO. The APE for this undertaking is the entire 3300-acre disposal site.

LM has concluded that there are no buildings or structures at this disposal site. Archaeological sites are present; however, their current status is unknown. They might merit protection as historic property. This disposal site was extensively disturbed during its construction and is not located on tribal land. LM has decided to consult with the New Mexico SHPO on this undertaking to determine whether or not the archaeological sites present merit protection as historic property. Tribal consultation would likely follow, depending on the results of the SHPO consultation.

3.4.7 Land Use and Recreation

3.4.7.1 Land Use

Anaconda Copper Company constructed the original carbonate-leach mill at the site in 1953 to process limestone uranium ore mined near the site. The mill had a production capacity of 300 tons of ore per day. An acid-leach mill was constructed in 1957 to process sandstone uranium ore from the Jackpile-Paguate mine, the largest open-pit uranium mine in North America, north of Laguna Pueblo. The carbonate leach mill closed in 1959, and production in the acid-leach mill was reduced for economic reasons. The acid-leach mill resumed full operations in 1967, and the capacity of the mill had increased to 6000 tons of ore per day by 1978. Milling operations at the site ended on February 14, 1982. In 1977, the Anaconda Copper Company became a subsidiary of ARCO.

The site was transferred by Corporate Warranty Deed by ARCO Environmental Remediation LLC to the U.S. on September 19, 1997, with some reservations for existing patents. Current land use for the Bluewater site is to support the disposal cells and associated features. The current zoning listed for the site with Cibola County is nonresidential.

Adjacent owners include Elkins (north and south); BLM (west and north of the site); Homestake Mining Company (southeast); and the State of New Mexico (east). With the exception of BLM, the adjacent land uses are primarily ranching. There are also some small businesses and residential areas along Interstate 40 and in the village of Bluewater.

3.4.7.2 Recreation

The site has no current recreational uses. El Malpais National Monument is located to the south of the site and has recreational activities that include hiking, sight-seeing, bird watching, caving, scenic driving, nature viewing, volcanic geology and the unique habitats it preserves such as the pygmy pine forests growing on the vast lava fields of the Grants Lava Flow. (https://www.nps.gov/elma/index.htm)

Cibola National Forest is located to the east of the site and has recreational activities that include hiking, fishing, camping, sightseeing, bird watching, scenic driving, nature viewing, and exploring archeological sites. (https://forestcamping.com/dow/southwst/cibinfo.htm)

3.5 Burrell

The Burrell disposal site is about 1 mile east of the Borough of Blairsville, Indiana County, in southwestern Pennsylvania. The site is bordered on the south by the Conemaugh River and on the north by Norfolk Southern railroad tracks. The surrounding land is sparsely populated (Figure 9 and Figure 10).

LM manages the disposal site according to a site-specific LTSP to continue to prevent release of contaminants to the environment. Under provisions of this plan, LM conducts annual inspections of the site, performs site maintenance as necessary, maintains a native tall grass prairie as a pollinator reuse initiative, and monitors groundwater quality.

In accordance with 40 CFR 192.02(a), the disposal cell is designed to be effective over the long term. The NRC general license has no expiration date, and LM's responsibility for the integrity of the Burrell disposal site will last indefinitely.

3.5.1 Biological Resources

3.5.1.1 Vegetation

The Burrell site is in the Pittsburgh Low Plateau Level IV Ecoregion within the Western Allegheny Plateau (EPA 2019a). The Western Allegheny Plateau is a mostly unglaciated, dissected flat area. The Pittsburgh Low Plateau ecoregion has rounded hills, narrow valleys, fluvial terraces, entrenched rivers, general farming, landslides, and bituminous coal mining. The potential natural vegetation is mostly Appalachian Oak Forest dominated by white and red oaks, with farmland more common than woodland.

NRCS places the site in the Central Allegheny Plateau MLRA, an area characterized by deciduous forest vegetation; white oak (*Quercus alba*), red oak (*Quercus rubra*), black oak (*Quercus velutina*), hickory (*Carya* spp.), and associated upland hardwoods are the major species (NRCS 2006). Scarlet oak (*Quercus coccinea*), chestnut oak (*Quercus prinus*), and hickory along with scattered Virginia pine (*Pinus virginiana*), shortleaf pine (*Pinus echinata*), and white pine (*Pinus strobus*) grow on dry ridges and in areas with shallower soils. Yellow-poplar (*Liriodendron tulipifera*), black walnut (*Juglans nigra*), red oak, red maple (*Acer rubrum*), and other species grow in areas with higher moisture.

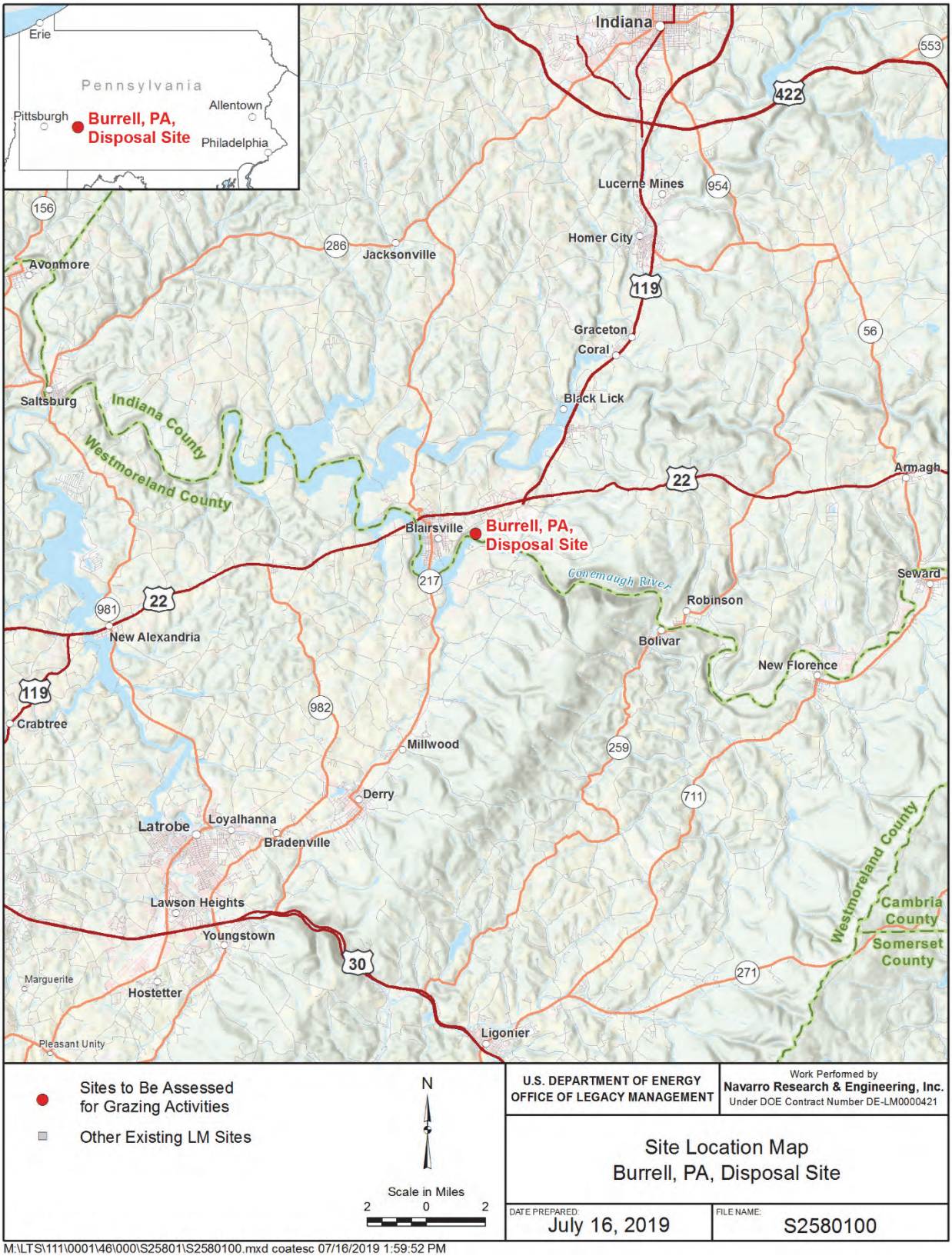

Figure 9. Location Map for Burrell, PA, Disposal Site

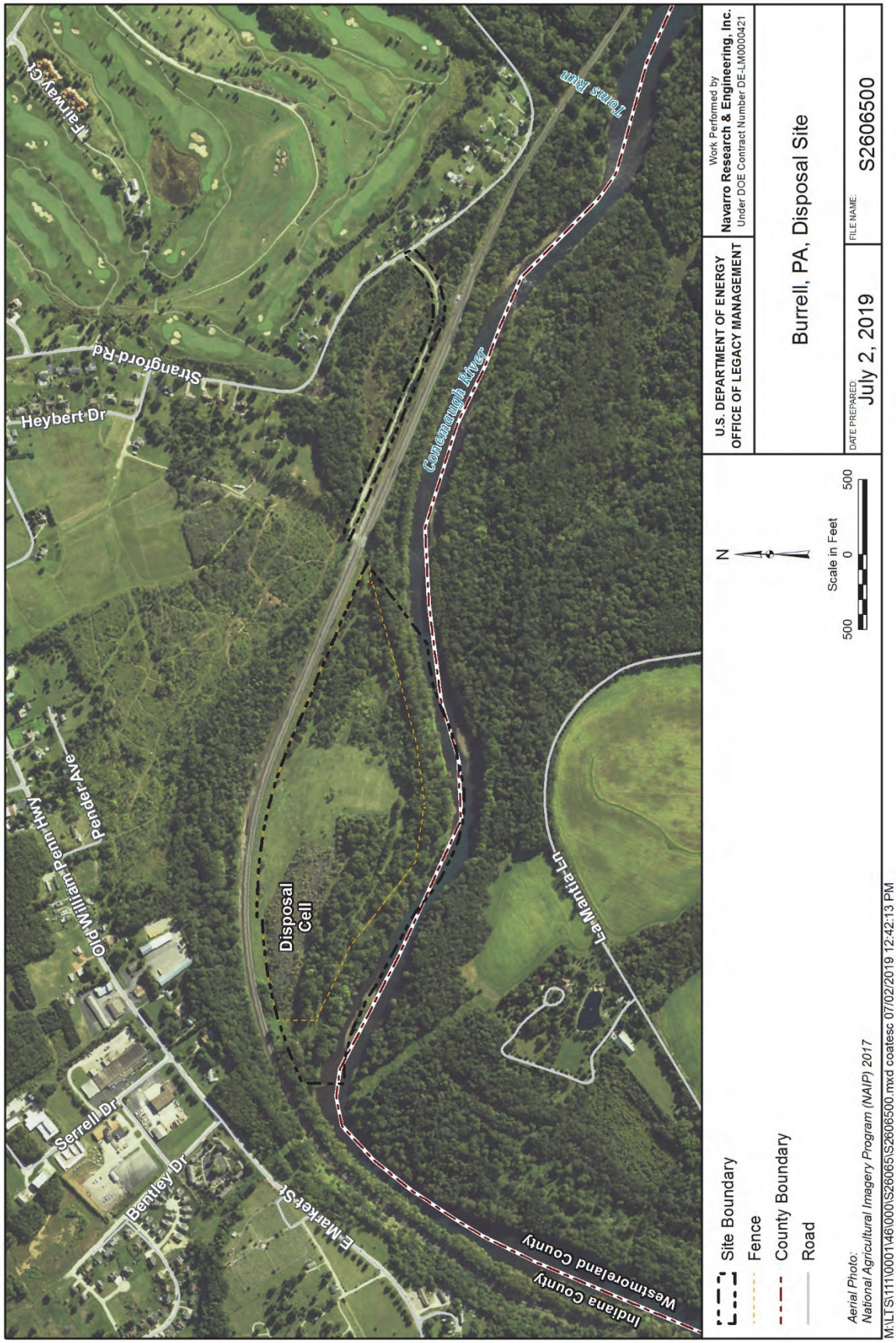

Figure 10. Site Map for Burrell, PA, Disposal Site

The northern part of the Burrell site surrounding the disposal cell is covered primarily by grassy areas, and the southern part is primarily hardwood forest. A two-acre plot was seeded in October 2018 as part of a conservation reuse initiative to promote pollinator habitat at LM sites. The grassy areas are maintained by mowing and contain crown vetch (*Securigera varia,* syn. *Coronilla varia*), fescues (*Festuca* spp.), Canada goldenrod (*Solidago canadensis*), and invasive weeds. The forested areas contain young hardwood trees with an understory composed primarily of Japanese knotweed (*Polygonum cuspidatum*, syn. *Fallopia japonica*).

The disposal cell comprises approximately 4 of the site's 72 site acres. A variety of woody species have established on the cover including sycamore (*Platanus occidentalis*), cottonwood (*Populus* sp.), tree of heaven (*Ailanthus altissima*), sumac (*Rhus* sp.), box elder (*Acer negundo*), black cherry (*Prunus serotina*), dogwood (*Cornus* sp.), and multiflora rose (*Rosa multiflora*). Herbaceous plants growing on the disposal cell include crown vetch, Japanese knotweed, and a variety of vines including Virginia creeper (*Parthenocissus quinquefolia*), virgin's bower (*Clematis* sp.), and wild grape (*Vitis* sp.).

A vegetation management plan is in place for the site (DOE 2008a), and it has been partially effective in controlling invasive weeds. State-listed noxious weeds found at the site are purple loosestrife (*Lythrum salicaria*), multiflora rose, poison hemlock (*Conium maculatum*), and Canada thistle (*Cirsium arvense*); other invasive weeds are common reed (*Phragmites australis*), spotted knapweed (*Centaurea stoebe*), teasel (*Dipsacus* sp.), Japanese knotweed, and bouncing bet (*Saponaria officinalis*).

3.5.1.2 Wildlife

Major wildlife species in the Central Allegheny Plateau MLRA are white-tailed deer (*Odocoileus virginianus*), black bear (*Ursus americanus*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), cottontail rabbit (*Sylvilagus* spp.), muskrat (*Ondatra zibethicus*), gray squirrel (*Sciurus carolinensis*), pheasant (*Phasianus colchicus*), grouse (*Bonasa, Lyrurus,* and other genera), and migratory songbirds (NRCS 2006). All these common species are likely to use the Burrell site, as it is on the edge of large tracts of hardwood forest and a waterway. However, the site's proximity to developed areas would be expected to decrease the numbers and diversity of wildlife that use the site and the amount of time animals would spend there. A perimeter chainlink fence also alters animal movement.

3.5.1.3 Special Status Species

The Burrell site is within the range of two federally listed species: the endangered Indiana bat (*Myotis sodalis*) and the threatened northern long-eared bat (*Myotis septentrionalis*). Both species hibernate in caves and abandoned mines but spend summers in wooded areas. Although either species could be found in the summer in wooded areas of the site, it is unlikely they would be found there because the site is bordered by developed and disturbed areas.

Table 5 summarizes special status species that could potentially be found at the Burrell site. If a species is not listed in Table 5, no potential habitat for that species exists on or near the site. The Commonwealth of Pennsylvania protects SGCN (Pennsylvania Game Commission 2015). Some SGCN species are possibly present in or on the Conemaugh River near the site. These include the American black duck (*Anas rubripes*), horned grebe (*Podiceps auritus*), red-necked grebe

(*Podiceps grisegena*), eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*), Fowler's toad (*Anaxyrus fowleri*), Ohio lamprey (*Ichthyomyzon bdellium*), bowfin (*Amia calva*), white catfish (*Ameiurus catus*), and longhead darter (*Percina macrocephala*). Although it is not a special status species, there is a mature American elm (*Ulmus americana*) tree on the site. This specimen tree has escaped impact from Dutch elm disease and is of interest to state regulators.

Table 5. Special Status Species Potentially Occurring at the Burrell Site

Common Name	Scientific Name	Status	Potential Presence
American kestrel	*Falco sparverius*	State SGCN	Likely to be present; habitat includes large grassy areas
Big brown bat	*Eptesicus fuscus*	State SGCN	Possibly seasonally present in forests
Black-and-white warbler	*Mniotilta varia*	State SGCN	Possibly present; habitat includes early successional forest
Blackburnian warbler	*Setophaga fusca*	State SGCN	Likely present during migration where woody vegetation is present
Black-capped chickadee	*Poecile atricapillus practicus*	USFWS BCC	Possibly present; habitat includes hardwood forest
Blue-winged warbler	*Vermivora cyanoptera*	State SGCN	Possibly present; habitat includes early to mid-successional forests with thickets and openings
Eastern box turtle	*Terrapene carolina*	State SGCN	Possibly present in forested areas onsite
Eastern hellbender	*Cryptobranchus alleganiensis*	State SGCN	Possibly present in the Conemaugh River
Fowler's toad	*Anaxyrus fowleri*	State SGCN	Possibly present in the Conemaugh River
Gray catbird	*Dumetella carolinensis*	State SGCN	Likely in places with denser vegetation; lives near developed areas
Hooded warbler	*Setophaga citrina*	State SGCN	Possibly present; habitat includes early successional deciduous forest
Indiana bat	*Myotis sodalis*	Federal endangered; State SGCN	Unlikely but possible; summer habitat includes forests
Kentucky warbler	*Geothlypis formosa,* syn. *Oporornis formosus*	USFWS BCC, State SGCN	Possibly present; habitat includes hardwood forest
Kirtland's snake	*Clonophis kirtlandii*	State SGCN	Likely present in forested or grassy areas; habitat includes urban/suburban areas
Little brown bat	*Myotis lucifugus*	State SGCN	Possibly seasonally present in forests
Long-eared owl	*Asio otus*	State SGCN	Unlikely but possible; habitat includes forest-grassland mosaics
Monarch butterfly	*Danaus plexippus*	Federal petitioned	Possibly present; site is within the eastern migration area for this species
Northern long-eared bat	*Myotis septentrionalis*	Federal threatened; State SGCN	Unlikely but possible; summer habitat includes forests
Northern saw-whet owl	*Aegolius acadicus*	State SGCN	Unlikely but possible; habitat includes forests
Osprey	*Pandion haliaetus*	State SGCN	Possibly present; habitat includes forests near water

Table 5. Special Status Species Potentially Occurring at the Burrell Site (continued)

Common Name	Scientific Name	Status	Potential Presence
Prairie deer mouse	*Peromyscus maniculatus bairdii*	State SGCN	Possibly present; known to inhabit grasslands and fallow fields
Ruffed grouse	*Bonasa umbellus*	State SGCN	Possibly present; habitat includes hardwood forest
Scarlet tanager	*Piranga olivacea*	State SGCN	Likely present; habitat includes a variety of deciduous forest types
Tricolored bat	*Perimyotis subflavus*	State SGCN	Possibly seasonally present in forests
Wood thrush	*Hylocichla mustelina*	State SGCN	Possibly present; habitat includes hardwood forest

3.5.2 Soils

NRCS classifies the site soils as Itmann extremely channery loam, 8% to 25% slopes (NRCS 2019). Parent material is loamy coal extraction mine spoil derived from shale and siltstone. The drainage class is "somewhat excessively drained."

3.5.3 Water Resources

3.5.3.1 Surface Water

The site borders the Conemaugh River, a major perennial waterway and tributary to the Kiskiminetas River. The site lies within the Allegheny River Basin. During remediation, the Burrell site was contoured to direct runoff water away from the disposal cell. Several swales and French drains direct water away from the disposal cell to a slough that contains emergent wetland vegetation but no permanent surface water. No waterways are present on the site itself.

3.5.3.2 Groundwater

The site is situated on unconsolidated alluvium that is as much as 50 ft thick. Groundwater in the alluvium is unconfined; depth to the water table is more than 30 ft below land surface. Confined groundwater lies beneath 30 to 40 ft of impermeable claystone and shale of the Casselman Formation. Groundwater has been monitored at the Burrell site since 1987 and continues on a 5-year basis as a best management practice to evaluate cell performance. Groundwater has never been contaminated by legacy materials at this site.

3.5.4 Wetlands and Floodplains

3.5.4.1 Wetlands

The Conemaugh River with associated wetlands is adjacent to the site on the south. The NWI (USFWS 2019) classifies the wetlands as lacustrine, limnetic, unconsolidated bottom, permanently flooded, diked, and impounded. The wetlands are within a dammed river channel, and they are less than 30% vegetated. They have little or no vegetation because they are deepwater habitats, greater than 8.2 ft (2.5 m) below low water. Several swales are present on the Burrell site, along with French drains that direct water away from the disposal cell. The drainages lead to a wetland slough that contains emergent woody vegetation. Common reed, an

invasive grass, and purple loosestrife, a listed noxious weed, are also found in these wetland areas.

3.5.4.2 Floodplains

The western portion of the Burrell site is designated as Zone A within the floodplain of the Conemaugh River (FEMA 2019). These floodplain areas are primarily forested except for the southern toe of the disposal cell, which is covered in rock riprap and supports a variety of woody and herbaceous plants.

3.5.5 Air Quality

The Burrell site is in Westmoreland County, which was a marginal nonattainment area for the 8-hour O_3 standard in 2008 (EPA 2019b). The EPA's Air Quality Index Report (EPA 2019b) reports no "unhealthy" days in 2018 for this county (EPA 2019c). In 2018, 2 days were "unhealthy for sensitive groups," 41 days were in the "moderate" category, and 321 were categorized as "good." The site is within the Southwest Pennsylvania Intrastate AQCR (EPA 1972). EPA lists eight facilities in Westmoreland County with reportable emissions in 2018. These include three landfills, two natural gas facilities, two iron and steel production plants, and one manufacturer. In 2017, these facilities together emitted 375,905 metric tons of CO_2 equivalent in GHGs (EPA 2019d).

3.5.6 Cultural Resources

LM determined, in accordance with Section 106 of the NHPA and the operating regulations in 36 CFR 800, that the proposed project is defined as an undertaking in accordance with the definition found at 36 CFR 800.16(y). This undertaking is the type with potential to influence historic property, so LM initiated the Section 106 consultation process with the Pennsylvania SHPO. The APE for this undertaking is the entire surface area within the disposal boundary fence.

In accordance with 36 CFR 800.4(d)(1), LM determined there is no historic property present within the APE of the proposed project. Additionally, this disposal site was extensively disturbed during construction and is not located on tribal land. Therefore, LM decided to consult only with the relevant SHPO on this undertaking.

3.5.7 Land Use and Recreation

3.5.7.1 Land Use

The Burrell disposal site is a former railroad landfill in southwestern Pennsylvania in the Burrell Township in Indiana County. The site was operated as a railroad landfill from the late 1940s through the late 1960s. In the late 1940s, the Pennsylvania Railroad constructed a berm along the bank of the Conemaugh River and began landfill operations. The landfill is believed to have been used for typical railroad wastes, such as railroad ties, cinders, and excess coal. In 1956 and 1957, 11,600 tons of radioactive mill tailings, a predominantly sandy material, were removed from the former uranium-ore-processing site at Canonsburg, Pennsylvania, and transported approximately 50 miles to the Burrell site for use as fill.

The U.S. acquired the Burrell site through condemnation proceedings in 1986. The site was identified as a "vicinity property" to the Canonsburg processing site. Because of the large volume of tailings and the distance to the Canonsburg site, DOE consolidated and encapsulated the contaminated material at the Burrell site. DOE completed surface remediation of the uranium mill tailings and other radioactively contaminated surface material in 1987, and the disposal cell was closed.

The current use of the site is to support the disposal cell and associated features, including a chainlink fence and drainage features. Adjacent land uses include the Conemaugh River south of the site, the Norfolk Southern Rail Corporation to the north, and residential uses to the east and west. Access to the site is gained by crossing over Norfolk Southern–owned railroad tracks. DOE on August 16, 1986, secured a Perpetual License Agreement for Private Grade Crossing with Consolidated Rail Corporation (which merged with Norfolk Southern in 1997).

3.5.7.2 Recreation

There are no public recreation uses on the Burrell site; however, local residents historically have used the area along the DOE right-of-way for unpermitted hunting, target practice, and riding all-terrain vehicles.

The Conemaugh River runs along the southern boundary of the site. This river runs from Johnstown to where it meets the Allegheny River near Freeport. This stretch is interrupted by the Conemaugh Reservoir (west–northwest of the site approximately 6 miles). The river is suitable for canoeing and kayaking, but no sections provide challenging water. Fishing is also a recreational pursuit on this river and provides anglers primarily with bass and panfish (bluegill and crappie).

3.6 Canonsburg

The Canonsburg disposal site is a former uranium-ore-processing site in the Borough of Canonsburg, Washington County, in southwestern Pennsylvania, approximately 20 miles southwest of downtown Pittsburgh. The site lies between Chartiers Creek and the Pittsburgh and Ohio Central Railroad tracks. The surrounding land is primarily residential and commercial (Figure 11 and Figure 12).

LM manages the disposal site according to a site-specific LTSP to ensure that the disposal cell systems continue to prevent release of contaminants to the environment. Under provisions of this plan, LM conducts annual inspections of the site, performs site maintenance as necessary, and monitors surface water and groundwater to verify the continued integrity of the disposal cell and protection of public health and the environment.

In accordance with 40 CFR 192.02(a), the disposal cell is designed to be effective over the long term. The NRC general license has no expiration date, and LM's responsibility for the safety and integrity of the Canonsburg disposal site will last indefinitely.

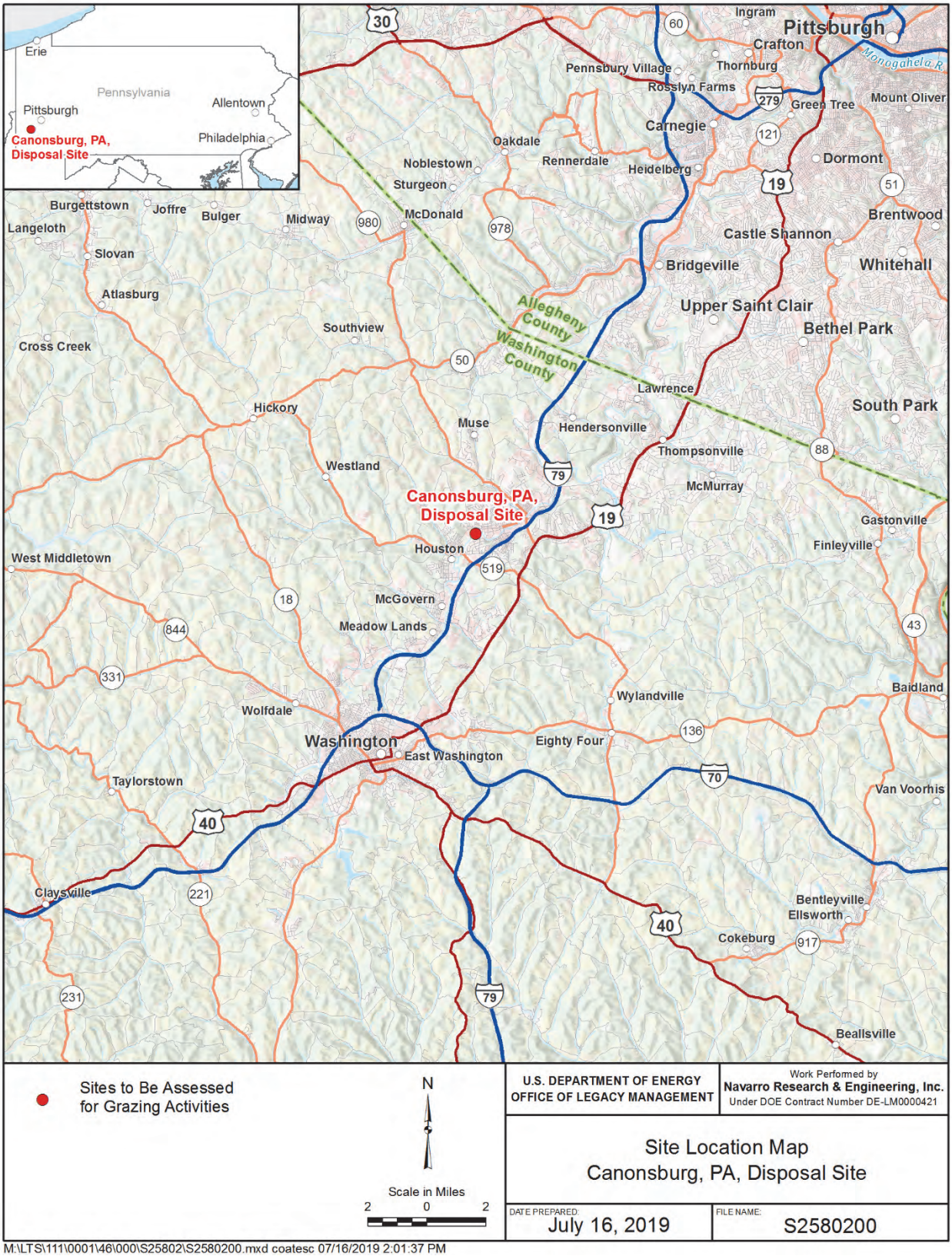

Figure 11. Location Map for Canonsburg, PA, Disposal Site

Figure 12. Site Map for Canonsburg, PA, Disposal Site

3.6.1 Biological Resources

3.6.1.1 Vegetation

The Canonsburg site is in the Monongahela Transition Zone Level IV Ecoregion within the Western Allegheny Plateau (EPA 2019a). The Western Allegheny Plateau is a mostly unglaciated, dissected plateau. The Monongahela Transition Zone ecoregion has hills, knobs, and ridges with entrenched rivers. Bituminous coal mining is common in this area, and there is also some farming. The potential natural vegetation is mostly Mixed Mesophytic Forest dominated by beech, yellow poplar, American basswood, sugar maple, yellow buckeye, red oak, and white oak. The site is in the Central Allegheny Plateau MLRA, which is described in Section 3.5.1.1 for the Burrell site.

Vegetation at the Canonsburg site consists primarily of mowed grasses on the disposal cell and surrounding area with woody trees and shrubs along Chartiers Creek, a tributary to the Ohio River that borders the site on three sides. Along with sycamore, oaks, maples, hackberry (*Celtis occidentalis*), black cherry, and black walnut, black locust (*Robinia pseudoacacia*) is present in the streamside areas. Several large pines are also on the property.

A vegetation management plan is in place (DOE 2008b), and it has been effective in controlling invasive weeds across most of the Canonsburg site. State-listed noxious weeds at the site are poison hemlock and Canada thistle; Japanese knotweed, an invasive plant, is also found. Crown vetch, historically seeded at the site, is invasive in areas of the site that are not regularly mowed.

3.6.1.2 Wildlife

Common wildlife species in the Central Allegheny Plateau are described in Section 3.5.1.2 for the Burrell site. Fewer of these species are expected to use the Canonsburg site than the Burrell site, because it is surrounded by developed areas.

3.6.1.3 Special Status Species

The Canonsburg site is within the range of two federally listed species: the endangered Indiana bat (*Myotis sodalis*) and the threatened northern long-eared bat (*Myotis septentrionalis*). Neither species could be found at the site because there is no appropriate forest habitat. The Commonwealth of Pennsylvania protects SGCN (Pennsylvania Game Commission 2015). Table 6 summarizes special status species that could potentially be found at the Canonsburg site. If a species is not listed in Table 6, no potential habitat for that species exists on or near the site.

3.6.2 Soils

NRCS describes three soil map units at the Canonsburg site (NRCS 2019). The majority of the site, including the disposal cell, is zoned as Urban Land, described as pavement, buildings, and other artificially covered areas. The western part of the site is Glenford silt loam, 3% to 8% slopes, derived from silty lacustrine deposits, are moderately well drained, and have a very high water-storage capacity. The north part of the site is described as Newark silt loam, 0% to 3% slopes, and frequently flooded. These soils are derived from fine-silty alluvium derived from sedimentary rock. They are somewhat poorly drained, with high water storage.

Table 6. Special Status Species Potentially Occurring at the Canonsburg Site

Common Name	Scientific Name	Status	Potential Presence
American black duck	*Anas rubripes*	State SGCN	Possibly present at times along Chartiers Creek
American kestrel	*Falco sparverius*	State SGCN	Likely to be present; habitat includes large grassy areas
Bald eagle	*Haliaeetus leucocephalus*	USFWS BCC; State SGCN	May forage at or near the site
Monarch butterfly	*Danaus plexippus*	Federal petitioned	Possibly present; site is within the eastern migration area for this species
Prairie deer mouse	*Peromyscus maniculatus bairdii*	State SGCN	Possibly present; known to inhabit grasslands and fallow fields
Short-eared owl	*Asio flammeus*	State SGCN	Possibly present; habitat includes large fields

Abbreviations:
SGCN = Species of Greatest Conservation Need
USFWS = U.S. Fish and Wildlife Service

3.6.3 Water Resources

3.6.3.1 Surface Water

Chartiers Creek, a perennial waterway, runs near the west, north, and east edges of the Canonsburg site. Chartiers Creek is within the Ohio River Basin and drains into the Ohio River approximately 17 miles east of the site. No natural surface water channels are present onsite. The disposal cell cover was designed to minimize infiltration of storm water and is graded to promote drainage. A rock-lined diversion ditch surrounds the disposal cell and conveys runoff water to Chartiers Creek via two outflow channels. Another engineered rock-lined channel, the perimeter drainage ditch, protects the railroad grade on the south and Strabane Avenue to the east from runoff and erosion. Although groundwater at the Canonsburg site flows into Chartiers Creek, which borders the site on the west, north, and east, no milling-related constituents have been detected in samples of creek water.

3.6.3.2 Groundwater

The site is underlain by as much as 30 ft of unconsolidated fill and alluvium that overlie claystones and shales of the Pennsylvanian-age Casselman Formation. Groundwater beneath the Canonsburg site is unconfined in the unconsolidated materials and semiconfined in the underlying bedrock. The water table is 3 to 14 ft below land surface. Groundwater in the unconsolidated materials is recharged by direct infiltration of precipitation and from northward groundwater flow beneath the site.

Processing of radioactive materials at the Canonsburg site since the early 1900s resulted in contamination of groundwater in the uppermost aquifer beneath the main site and beneath a 3-acre area known as Area C east of the main site. No wells that supply water for domestic or livestock use are completed in this aquifer. LM monitors the groundwater to ensure the continued protection of human health and the environment.

3.6.4 Wetlands and Floodplains

3.6.4.1 Wetlands

The site is bordered by Chartiers Creek, a tributary of the Ohio River, on the west, north, and east. Wetlands are associated with the creek. The NWI (USFWS 2019) classifies them as R2UBH: riverine, lower perennial, unconsolidated bottom, permanently flooded. Located entirely within the channel of the creek, water flows all year except in times of extreme drought. Vegetative cover is less than 30%.

3.6.4.2 Floodplains

Portions of the site are within the floodplain of Chartiers Creek (FEMA 2019). The east, north, and west edges of the site, including the far north tip of the disposal cell, are within Zone AE. Additional site acreage is within Zone A, including the northeast edge of the disposal cell. A small portion of the site, including a strip of the disposal cell southwest of Zone A, is within Zone B. Most of the floodplain areas onsite are covered in grass, but areas immediately adjacent to the creek are forested with hardwood trees. LM plans to expand the forested riparian buffer following repairs to the riprap bank in 2019.

3.6.5 Air Quality

The Canonsburg site is in Washington County, which was a marginal nonattainment area for the 8-hour O_3 standard in 2008 (EPA 2019b). EPA's Air Quality Index Report (EPA 2019b) reports no "unhealthy" days in 2018 for this county (EPA 2019c). In 2018, 2 days were "unhealthy for sensitive groups," 130 days were in the "moderate" category, and 233 were categorized as "good." The site is within the Southwest Pennsylvania Intrastate AQCR (EPA 1972). EPA lists seven facilities in Washington County with reportable emissions in 2018. These include one wholesaler or retailer, two manufacturers, one mine, two power companies, and one landfill. In 2017, these facilities together emitted 2,711,028 metric tons of CO_2 equivalent in GHGs (EPA 2019d).

3.6.6 Cultural Resources

LM determined, in accordance with Section 106 of the NHPA and the operating regulations in 36 CFR 800, that the proposed project is defined as an undertaking in accordance with the definition found at 36 CFR 800.16(y). This undertaking is the type with potential to influence historic property, so LM initiated the Section 106 consultation process with the Pennsylvania SHPO. The APE for this undertaking is the entire surface area within the disposal boundary fence.

In accordance with 36 CFR 800.4(d)(1), LM determined there is no historic property present within the APE of the proposed project. Additionally, this disposal site was extensively disturbed during construction and is not located on tribal land. Therefore, LM decided to consult only with the relevant SHPO on this undertaking.

3.6.7 Land Use and Recreation

3.6.7.1 Land Use

The Canonsburg site is a former uranium-ore-processing site in the Borough of Canonsburg, Washington County, in southwestern Pennsylvania, approximately 20 miles southwest of downtown Pittsburgh. The site lies within an arc made by Chartiers Creek on the west, north, and east and Pittsburgh and Ohio Central Railroad tracks on the south. The former mill processed uranium and other ores at the site between 1911 and 1957 and provided uranium for the U.S. government's national defense programs. Standard Chemical operated the site as a radium extraction plant from 1911 to 1922. Later, Vitro Corporation of America acquired the property and processed ore to extract radium and uranium salts. From 1942 until 1957, Vitro was under contract to the federal government to recover uranium from ore and scrap. Processing operations at the site ceased in 1957. For the next 9 years, the site was used for storage under a contract with the U.S. Atomic Energy Commission (AEC).

In 1966, the site was purchased by the Canon Development Company and was leased to tenant companies for light industrial use. Operations over the years produced radioactive mill tailings. Some of the mill tailings were transported 50 miles away to Burrell, Pennsylvania, to a railroad landfill there. The rest of the mill tailings were deposited in a disposal cell created on this site, as was other radioactive debris. Milling operations did impact groundwater under the site. The disposal cell was closed in 1985 after consolidation of tailings and other contaminated materials from onsite and from vicinity properties.

Title to the site came to the U.S. government in 14 different transactions. For tracts 101 and 102, the U.S. condemned the parcels in 1984 in Civil Action 84-1735 and Civil Action 84-1250 in U.S. District Court. The Commonwealth of Pennsylvania filed a condemnation action and received portions of the property in 1982. Deeds from individuals were obtained in 1983 and 1984 for the balance of the acreage.

The current land use for this site is to support the disposal cell and associated features. The site is zoned C – Conservation with the Borough of Canonsburg. The established purpose of this district is to protect environmentally sensitive lands. The site has the following zoning requirements:

Zoning District - C - Conservation
Minimum Lot Size - 1 acre
Minimum Lot Width - 100 ft
Maximum Impervious Surface - 25%
Minimum Front Yard - 35 ft
Minimum Side Yard - 35 ft
Minimum Rear Yard- 35 ft
Maximum Building Height - 35 ft

Urban Agriculture as defined in Article II of the Zoning Code is permitted as an accessory use to a detached single-family dwelling in any zoning district. The keeping of farm animals or livestock for agricultural purposes is strictly prohibited.

3.6.7.2 Recreation

No public use is allowed at the site; however, the site is unfenced and adjacent to the river. Canonsburg Lake and Peters Lake Park are recreational lakes with hiking trails east of the town. The Canonsburg Town Park is the primary park in the incorporated borough and features a swimming pool, playgrounds, skateboard park, baseball fields, and ball courts.

3.7 Falls City

The Falls City disposal site is a former uranium-ore-processing facility in Karnes County, Texas, approximately 40 miles southeast of San Antonio and approximately 8 miles southwest of Falls City. The mesquite-dominated woodlands and cleared ranchlands surrounding the site are used primarily for agriculture and are sparsely populated (Figure 13 and Figure 14).

LM manages the disposal site according to a site-specific LTSP to ensure that the disposal cell systems continue to prevent release of contaminants to the environment. Under provisions of this plan, LM conducts annual inspections of the site, performs site maintenance as necessary, and monitors groundwater to ensure protection of human health and the environment.

In accordance with 40 CFR 192.02(a), the disposal cell is designed to be effective over the long term. The NRC general license has no expiration date, and LM's responsibility for the safety and integrity of the Falls City disposal site will last indefinitely.

3.7.1 Biological Resources

3.7.1.1 Vegetation

The Falls City site is in the Southern Post Oak Savanna Level IV Ecoregion within the East Central Texas Plains (EPA 2019a). The East Central Texas Plains were originally covered by post oak savanna in contrast to open prairie regions to the north, south, and west and pine forests to the east. The Southern Post Oak Savanna ecoregion contained mostly hardwood forest but is now a mix of woodland, pasture, and rangeland with invasive stands of mesquite (*Prosopis* spp.) in places. Many areas have a dense, underlying clay pan affecting water movement and available moisture for plant growth.

The site is within the Northern Rio Grande Plain MLRA, characterized by open midgrass prairie with scattered mesquite, live oak (*Quercus virginiana*), and other trees (NRCS 2006). Little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), lovegrass tridens (*Tridens eragrostoides*), Arizona cottontop (*Digitaria californica*), and plains bristlegrass (*Setaria leucopila*) are common, along with forbs like orange zexmenia (*Wedelia acapulcensis*), catclaw sensitivebrier (*Mimosa nuttallii*), western indigo (*Indigofera miniata*), and bush sunflower (*Encelia californica*).

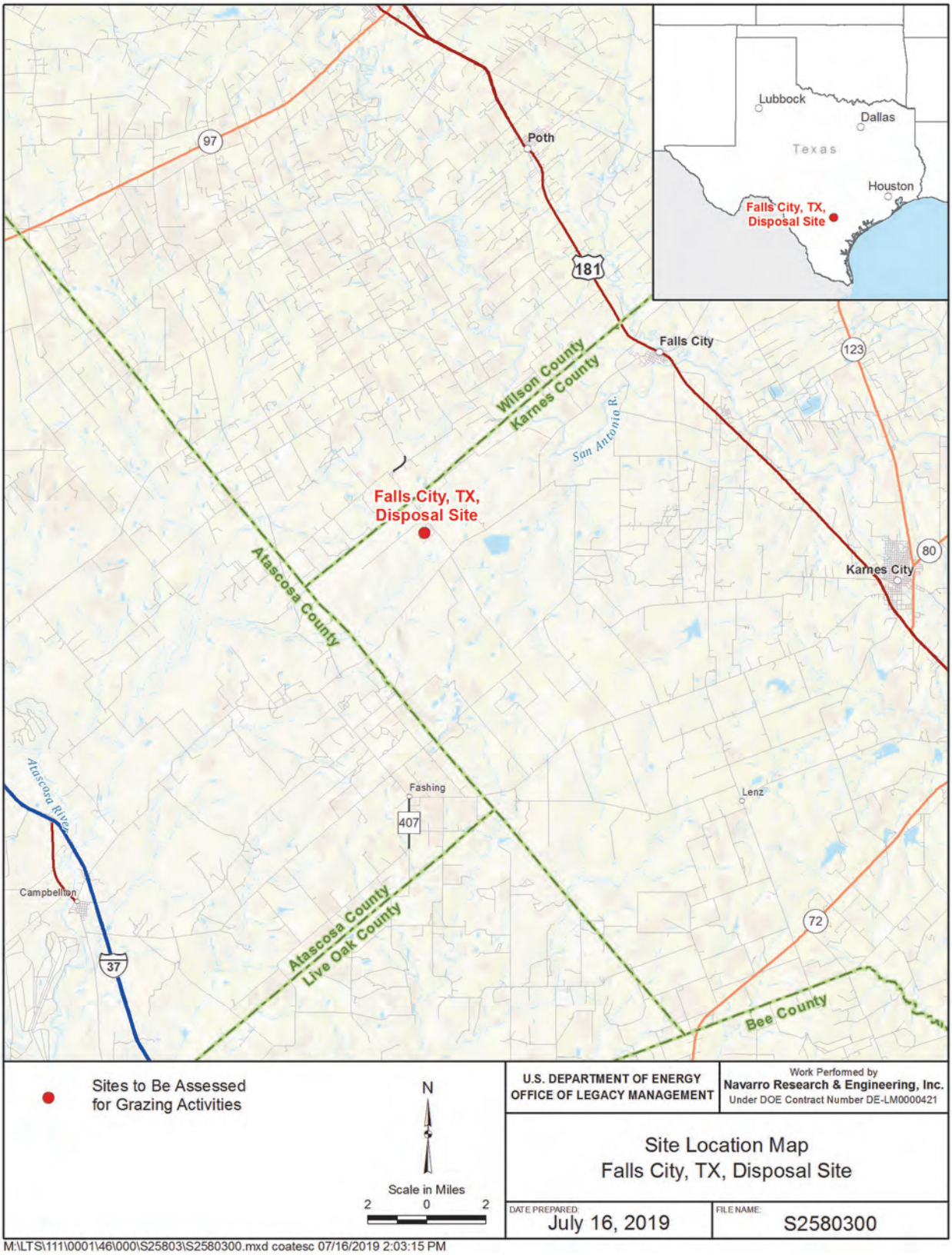

Figure 13. Location Map for Falls City, TX, Disposal Site

Figure 14. Site Map for Falls City, TX, Disposal Site

The site is 231 acres in size and contains a 127-acre disposal cell. The top of the cell (87 acres) and surrounding lands are covered in grass and managed for hay production by a local agricultural licensee. Hay production includes mowing, baling, and storing onsite as well as fertilizing, mechanical shredding, and weed control, all of which influence the site's vegetation. In 2016, vegetation was characterized at the Falls City site (DOE 2016).

Fifty-eight plant species were found at the site, none of which were State-listed noxious weeds. However, six invasive species were found: King Ranch bluestem (*Bothriochloa ischaemum* var. *songarica*, also known as yellow bluestem), rescuegrass (*Bromus catharticus*), crown vetch, Bermuda grass (*Cynodon dactylon*), sweetclover (*Melilotus officinalis*), and Johnsongrass (*Sorghum halepense*). Although King Ranch Bluestem is considered invasive in native areas, it is desirable for hay production.

LM identified three primary map units at the site: the cell top grasslands, the cell side slopes, and surrounding grasslands (Figure 15). The cell top grasslands are dominated by King Ranch bluestem, but 62% of the 29 species are noninvasive, native species. Total foliar cover was 85% to 100% on the cell top. The cell side slopes are covered in rock riprap and were not designed to support vegetation. Windblown sediments have accumulated in the rock and support some vegetation, which is occasionally treated with herbicide. Total foliar cover on the side slopes is less than 5%, and it is composed of 14 plant species, none of which is dominant.

Thirty-one plant species were found in the surrounding grasslands, with a total foliar cover of about 90%. King Ranch bluestem is dominant, and secondary species included Queen Anne's lace (*Daucus carota*), spring pygmycudweed (*Evax verna*), sweetclover (*Melilotus* sp.), and Texas wintergrass (*Nassella leucotricha*).

3.7.1.2 Wildlife

Major regional wildlife species include common mammals and birds like white-tailed deer, coyote, bobcat (*Lynx rufus*), raccoon, cottontail rabbit, fox squirrel (*Sciurus niger*), turkey (*Meleagris gallopavo*), bobwhite quail (*Colinus virginianus*), and mourning dove (NRCS 2006).

Any of these species could use the site from time to time, but most would not be expected to breed at the site or inhabit the hayfields for long periods, as the fields are frequently disturbed by haying activities. Feral hogs (*Sus scrofa*) and nine-banded armadillos (*Dasypus novemcinctus*) are also known to frequent the site.

Figure 15. Soil–Vegetation Map Units for Falls City, TX, Disposal Site

3.7.1.3 Special Status Species

The Falls City site is within the range of eight federally listed threatened or endangered species: Gulf Coast jaguarundi (*Herpailurus yagouraroundi*), ocelot (*Leopardus pardalis*), least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), whooping crane (*Grus americana*), golden orb (*Quadrula aurea*), and Texas fatmucket (*Lampsilis bracteata*). There is no onsite habitat for any of these species, but any of the birds could occur as transients. State-listed birds that could be transients at the site include the peregrine falcon (*Falco peregrinus*), white-faced ibis (*Plegadis chihi*), and wood stork (*Mycteria americana*).

Table 7 summarizes special-status species that could be present at the Falls City site.

Table 7. Special Status Species Potentially Occurring at the Falls City Site

Common Name	Scientific Name	Status	Potential Presence
Harris's sparrow	*Zonotrichia querula*	USFWS BCC	Main habitat is forest but may feed at the site.
Monarch butterfly	*Danaus plexippus*	Federal petitioned	Possibly present; site is within the eastern migration area for this species.
Sheep frog	*Hypopachus variolosus*	State threatened	A grassland species that hibernates in subterranean burrows; could be present at the site.
Texas indigo snake	*Drymarchon melanurus erebennus*	State threatened	Main habitat is thornbrush–chaparral woodland but could forage at the site.
Texas tortoise	*Gopherus berlandieri*	State threatened	Open grass and bare ground are usually avoided but may be found along the site's fence lines or small shrubby areas. This species was found in 2016 on an adjacent parcel of land.

3.7.2 Soils

NRCS describes several map units at the Falls City site (NRCS 2019). More than half of the site, including most of the disposal cell, is designated as pits and dumps (not described) or Conquista clay (derived from clayey human-transported material over mine spoil). A small portion of the disposal cell is Coy clay loam, derived from calcareous clayey alluvium derived from mudstone. Other soil units present around the disposal cell include Ecleto sandy clay loam, Fashing clay, Gillett fine sandy loam, Pavelek clay, Tordia clay, and Weigang fine sandy loam.

Soils were characterized at the site in 2016 (DOE 2016). On the disposal cell top, soils were fine or very fine, smectitic, hyperthermic Entic Haplustolls with an organic-rich surface horizon. On the disposal cell's rock-covered side slopes, windblown sediments have filled in rock interstices; this process will continue. The remainder of the site's soils consist of clayey, organic-rich surface horizons over light-colored fill or residuum materials that overlie weathered mudstone or siltstone. All of the site soils are well drained but slowly permeable and mildly to moderately alkaline. Four soil pits were characterized in the area surrounding the disposal cell. One was classified as a clayey, smectitic, hyperthermic Typic Ustorthent, and the others were clayey, smectic, hyperthermic Entic Haplustolls. These areas differed in classification due to differences in thickness of organic-rich surface horizons.

3.7.3 Water Resources

3.7.3.1 Surface Water

The Falls City site is on a broad drainage divide and is in both the San Antonio River Basin and the Nueces Basin. Runoff from the northern half of the site flows into natural drainages northeast and east of the site. These ephemeral drainages are tributaries of the San Antonio River. Runoff from the southern half of the site drains south and southwest into Tordilla Creek, an ephemeral tributary of the Nueces River. The site was constructed to direct runoff away from the disposal cell, and the disposal cell cover was designed to restrict infiltration of rainwater. The cell was engineered to withstand a probable maximum precipitation event of 19.2 inches of rainfall in 1 hour. No other waterways are present on the site (USFWS 2019).

3.7.3.2 Groundwater

The site is situated on sand, silt, and clay deposits of the Whitsett Formation, which dips gently southeast. Two members of the Whitsett Formation, the Deweesville and Conquista, lie within 30 ft of the surface and are grouped together as a single aquifer because no continuous impermeable strata separate them. The Dilworth Sandstone Member of the Whitsett is considered a second aquifer beneath the site. The Dilworth aquifer is separated from the Deweesville and Conquista aquifer by 30 to 50 ft of clay that acts as an aquitard that prevents downward seepage. However, commercial uranium exploration in the area during the 1950s and 1960s resulted in many improperly plugged boreholes that potentially created a decommissioned hydraulic connection between the Deweesville and Conquista aquifer and the Dilworth aquifer. Consequently, the Dilworth is included as part of the site's uppermost aquifer.

Groundwater in these aquifers is classified decommissioned as Class III, unsuitable for agricultural or domestic use because of widespread naturally occurring contamination and low yield. Naturally elevated levels of sulfate, total dissolved solids, and uranium are present in the shallow groundwater in the region.

At the Falls City site, groundwater is classified as limited use because of widespread ambient contamination not related to milling activities that cannot be cleaned up using treatment methods reasonably employed in public water systems (40 CFR 192.11[e][2]). DOE monitors groundwater annually at the Falls City site as a best management practice.

3.7.4 Wetlands and Floodplains

3.7.4.1 Wetlands

No wetlands or potential wetlands are present at the Falls City site. The NWI shows only an ephemeral stream onsite.

3.7.4.2 Floodplains

All portions of the Falls City site are outside of 1% and 0.2% annual chance floodplains (FEMA 2019).

3.7.5 Air Quality

The Falls City site is entirely within attainment areas for all criteria pollutants (EPA 2019b). EPA's Air Quality Index Report (EPA 2019b) does not report for Karnes County, but Victoria County, the nearest county for which data are available, reports no "unhealthy" days in 2018 (EPA 2019c). In 2018, 2 days were "unhealthy for sensitive groups," 7 days were in the "moderate" category, and 270 were categorized as "good." The site is within the Metropolitan San Antonio Intrastate AQCR (EPA 1972). In 2017, EPA reported six large GHG emitters in Karnes County (EPA 2019d). All are petroleum and natural gas facilities. Together, they emitted 497,777 metric tons of CO_2 equivalent GHGs. Multiple similar facilities also exist in nearby counties.

3.7.6 Cultural Resources

During a Section 106 consultation conducted in 2006 for a different project at this location, the Texas SHPO indicated that this location does not contain any historic property. This determination was reiterated by the SHPO for a more recent project in May 2019. Additionally, this disposal site was extensively disturbed during construction and is not located on tribal land. Therefore, LM decided to consult only with the relevant SHPO on this undertaking.

3.7.7 Land Use and Recreation

3.7.7.1 Land Use

The Falls City site is in Karnes County, Texas, approximately 8 miles southwest of Falls City on a broad drainage divide between the San Antonio and Nueces Rivers. The U.S. was conveyed the site under Cooperative Agreement DE-FC04-87AL20532 with the State of Texas through a Deed Without Warranty on May 12, 1997. The site comprises 231.15 acres, of which 127 acres contain the disposal cell, including the apron.

In 1954, the first uranium deposits on the Gulf Coastal Plain were discovered in western Karnes County in the Eocene sedimentary rocks that underlie the Falls City disposal site and surrounding area. Discovery of these deposits led to extensive exploratory drilling by Susquehanna Western Incorporated. Open pit mining began in 1959. Susquehanna Western built a mill at the site and operated it between 1961 and 1973. The mill used a sulfuric acid leach process to extract more than 700 tons of uranium oxide, or yellow cake, from approximately 2.5 million tons of ore.

In 1975, Susquehanna Western sold the mill site and tailings to Tepcore Inc., which in turn sold the property to Solution Engineering Inc. and its partner Basic Resources Inc. The milling operation generated more than 3.1 million tons of tailings. These tailings and acid raffinate waste solutions were impounded in seven settling ponds, four of which were formerly open pit mines. The ponds were 30 to 35 ft deep and unlined, except for naturally occurring clay-rich horizons in underlying foundation soils and sedimentary rocks. Once the ponds were filled with tailings, they were called tailings piles. From late 1978 to early 1982, Solution Engineering conducted secondary recovery operations from four of the tailings piles, recontoured the tailings piles, and filled the remaining ponds. The disturbed area was covered with 1 to 2 ft of local clay-rich soil and planted with native grasses.

The Falls City site was designated for cleanup under Title I of UMTRCA. At the start of remedial action in 1992, the processing site consisted of two parcels of land. Parcel A consisted of 473 acres and was northwest of the intersection of Farm to Market Road 1344 and Farm to Market Road 791. This parcel included the former mill site, one mill building, five tailings piles (Piles 1, 2, 4, 5, and 7), and one tailings pond (Pond 6). The Falls City disposal site occupies the northern part of this parcel. Parcel B was approximately 1 mile east of the first parcel and enclosed tailing Pile 3. The two parcels were connected by a corridor that accommodated a slurry line, which was used to transport waste materials from Parcel A to Parcel B while the mill was operating.

The approved site remediation strategy was to encapsulate tailings and other residual radioactive materials in an onsite engineered disposal cell. Remedial action began in 1992 and was completed in 1994. The current use of the site supports the disposal cell and associated features and structures.

In the past, the site has also been used for dry-land grain and hay farming and cattle, swine, and dairy production. The adjacent lands are privately owned and being used for agricultural production. A neighboring landowner has a haying agreement to mow and remove the grass on the disposal cell top and between the site boundaries and the disposal cell for the purposes of harvesting hay for cattle consumption. That same landowner has a vegetation management agreement that includes spraying, mowing, trimming, filling feral hog burrows, and doing other work to maintain site safety and appearance.

3.7.7.2 Recreation

There is no recreational use at the site, and no recreational facilities are near the site.

3.8 Monticello

The Monticello sites, managed as one site, are in and near the city of Monticello in the southeastern corner of Utah, about 250 miles southeast of Salt Lake City (Figure 16 and Figure 17). The 2010 census population of Monticello was approximately 2000 people. The processing site is the former location of a uranium mill that processed uranium and vanadium for the U.S. government and private industry.

During mill operations, properties in and near Monticello were contaminated by windblown tailings, tailings carried by water in Montezuma Creek, and tailings that were used for construction-related purposes such as fill dirt and in concrete mixtures. DOE completed surface remediation of the processing site and contaminated vicinity properties under CERCLA in 1999. Tailings and other contaminated materials were encapsulated in a DOE-owned disposal cell approximately 1 mile south of the processing site. The 90-acre disposal cell was completed in 2000 and is protected by liner systems and an engineered, vegetation-covered, evapotranspiration cover.

LM conducts active groundwater treatment at the site using pump-and-treat technology. Some of the groundwater treatment facilities, including an evaporation pond, are on the disposal site property.

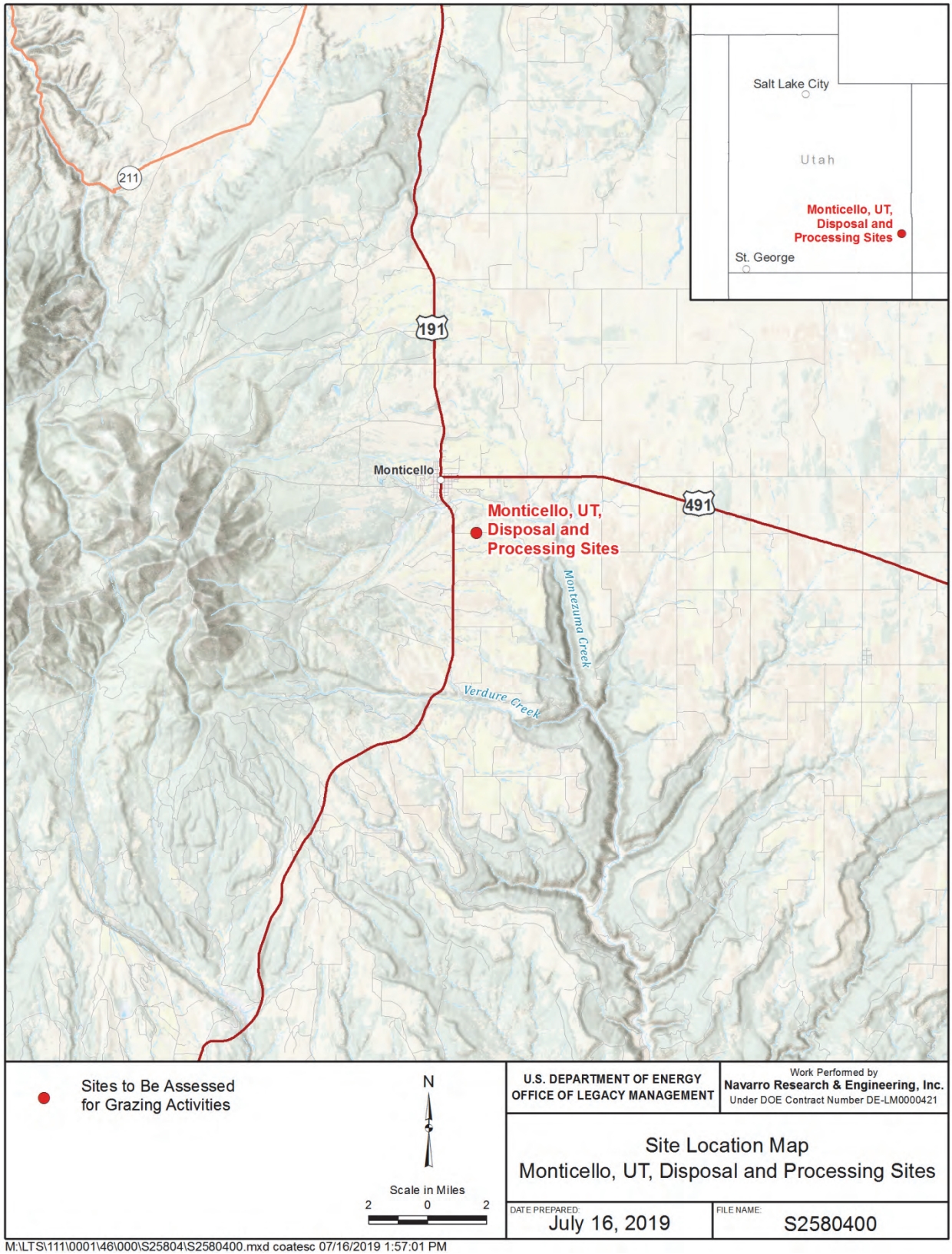

Figure 16. Location Map for Monticello, UT, Disposal and Processing Sites

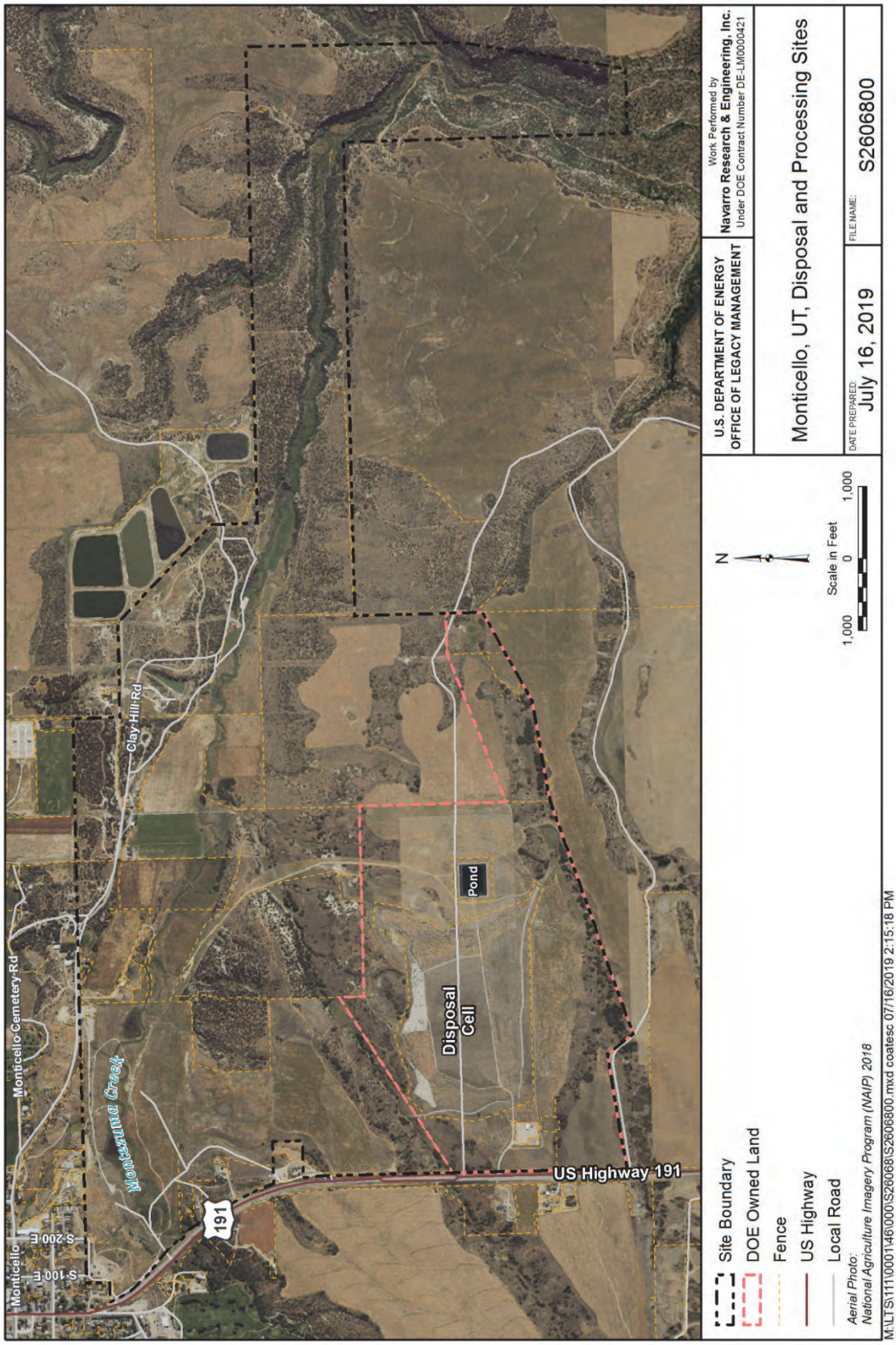

Figure 17. Site Map for Monticello, UT, Disposal and Processing Sites

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Regulations in 40 CFR 192.21 allow contaminated material to be left in place when attempts to reach cleanup standards greatly increase the risk of human injury or could cause excessive harm to the environment or when the cost of cleanup is unreasonably high compared to the long-term benefits to human health and the environment. Supplemental standards (i.e., site-specific remediation standards) have been applied at privately owned and city-owned properties in Monticello, in city streets and utilities rights-of-way, and in Utah Department of Transportation Highways 191 and 491 rights-of-way inside the city. This ensures that the chance for exposure to contaminated material on supplemental standards properties is minimal and that long-term management of the material is appropriate.

LM manages the Monticello site in accordance with the site-specific LTSP. Under this plan, LM manages the waste repository to ensure that encapsulated waste remains isolated from the environment; conducts radiological surveillance and controls contamination on supplemental standards properties; performs surveillance to ensure that land- and water-use controls continue to be relevant and effective, and maintains the pump-and-treat groundwater remedy optimization system, semiannual monitoring of water wells and surface water locations, and annual inspections and CERCLA Five-Year Reviews to ensure the site remains protective of human health and the environment.

3.8.1 Biological Resources

3.8.1.1 Vegetation

The Monticello site is in the Monticello Upland Level IV Ecoregion within the Colorado Plateau Level III Ecoregion (EPA 2019a). The Colorado Plateau is an uplifted, eroded, and deeply dissected tableland with benches, mesas, buttes, salt valleys, cliffs, and canyons. Juniper-pinyon woodland dominates at higher elevations, and saltbush-greasewood and blackbrush shrublands are common at lower elevations. The Monticello Upland ecoregion is characterized by large areas of dryland farming and rangeland, irrigated pastures, and alfalfa farming. The natural vegetation is sagebrush shrubland in areas with deep soils and scattered pinyon-juniper woodland or mixed sagebrush shrubland in areas with shallow or stony soils. In some areas, grasses outcompete shrublands and woodlands when not stressed by fire or grazing.

The site is within the Southwestern Plateaus, Mesas, and Foothills MLRA (NRCS 2006). Potential vegetation in this area is described as grass and sagebrush at lower elevations, pinyon-juniper woodland and ponderosa pine forest at mid elevations, and Douglas fir and white fir at high elevations. Plants commonly found at the elevation of the Monticello site are big sagebrush (*Artemisia tridentata*), western wheatgrass, James' galleta, needle and thread, blue grama, twoneedle pinyon (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), Indian ricegrass (*Achnatherum hymenoides*), Gambel oak (*Quercus gambelii*), Arizona fescue (*Festuca arizonica*), and muttongrass (*Poa fendleriana*).

The Monticello site contains a 90-acre disposal cell with a vegetated, engineered cover. The cover is dominated by native grasses (western wheatgrass, slender wheatgrass [*Elymus trachycaulus*], and bluebunch wheatgrass [*Pseudoroegneria spicata*]). Introduced grasses (crested wheatgrass [*Agropyron cristatum*], intermediate wheatgrass [*Thinopyrum intermedium*], and smooth brome [*Bromus inermis*]) are secondary. Big sagebrush makes up about 10% of the disposal cell cover along with rubber rabbitbrush.

The area outside of the disposal cell was disturbed during remediation in the late 1990s and now contains patches of grassland and shrubland. The grasslands are similar in composition to the disposal cell cover, but introduced grasses are more dominant in surrounding areas than on the cell. The shrubland is dominated by rubber rabbitbrush, Gambel oak, and big sagebrush with smaller amounts of native shrubs such as wild crab apple (*Peraphyllum ramosissimum*). Utah juniper and twoneedle pinyon are beginning to establish in places onsite.

3.8.1.2 Wildlife

Major wildlife species in this region include common mammals and birds like mule deer, elk, coyote, black bear, mountain lion (*Puma concolor*), black-tailed jackrabbit (*Lepus californicus*), Gunnison's prairie dog, badger (*Taxidea taxus*), pinyon jay (*Gymnorhinus cyanocephalus*), black-billed magpie (*Pica hudsoniana*), mountain chickadee (*Poecile gambeli*), red-breasted nuthatch (*Sitta canadensis*), white-breasted nuthatch (*Sitta carolinensis*), collared lizard (*Crotaphytus collaris*), western fence lizard (*Sceloporus occidentalis*), and western diamondback rattlesnake (*Crotalus atrox*) (NRCS 2006). Any of these species could use the Monticello site. Mule deer and elk currently graze the site, including the disposal cell cover, which is surrounded by a wildlife fence but contains openings in the fence to allow passage. Coyote, black-tailed jackrabbits, prairie dogs, and many species of songbirds, raptors, and lizards have also been observed at the site. Waterways near the Monticello site have poor water quality and do not support fish.

3.8.1.3 Special Status Species

The Monticello site is within designated critical habitat for the federally listed, threatened Gunnison sage-grouse (*Centrocercus minimus*), and this species may be present at the site. It is also within the range of seven additional federally listed species: the California condor (*Gymnogyps californianus*), Mexican spotted owl, southwestern willow flycatcher, three species of fish, and Jones cycladenia (*Cycladenia humilis* var. *jonesii*). The California condor or Mexican spotted owl could occur as transients at the site, but no habitat exists for the other species. The monarch butterfly (*Danaus plexippus*), a federally petitioned species, may migrate through the site, as it is within the western migration corridor for this species.

The State of Utah does not maintain a list of threatened or endangered species separate from the federal list but does designate species of concern and species for which conservation agreements are in effect. These and BLM-designated special status species that could be found at the site are summarized in Table 8. If there is no potential habitat at the site for a special status species, it is not included.

3.8.2 Soils

NRCS maps most of Monticello site, including the disposal cell, as very fine sandy loam, well-drained soils with parent material of Eolian deposits derived from sandstone. Other soil units at the site include Abajo cobbly loam and Abajo loam, both well drained soils with parent material of cobbly alluvium derived from intrusive igneous rock.

Table 8. Special Status Species Potentially Occurring at the Monticello Site

Common Name	Scientific Name	Status	Potential Presence
Bald eagle	*Haliaeetus leucocephalus*	State species of concern; BLM sensitive	May be present; this species has been observed at the site
Brewer's sparrow	*Spizella breweri*	BLM sensitive	May be present; habitat includes sagebrush areas
Burrowing owl	*Athene cunicularia*	State species of concern; BLM sensitive	May be present; associated with prairie dog burrows and prairie dogs are present at the site
Chatterley's onion	*Allium geyeri* var. *chatterleyi*	BLM sensitive	May be present; sagebrush areas are its habitat
Ferruginous hawk	*Buteo regalis*	State species of concern; BLM sensitive	May be present; prefers open grassland, shrub-steppe, and desert at low to moderate elevations
Gunnison's prairie dog	*Cynomys gunnisonii*	State species of concern; BLM sensitive	May be present; prairie dogs are present onsite but species have not been identified
Kit fox	*Vulpes macrotis*	State species of concern; BLM sensitive	May be present; habitat includes arid and semiarid desert scrub and grasslands
Loggerhead shrike	*Lanius ludovicianus*	BLM sensitive	May be present; habitat includes sagebrush areas
Monarch butterfly	*Danaus plexippus*	Federal petitioned	Possibly present; site is within the western migration area for this species
Peregrine falcon	*Falco peregrinus*	BLM sensitive	May forage at the site
Pinyon jay	*Gymnorhinus cyanocephalus*	BLM sensitive	May be present; habitat includes sagebrush areas
Prairie falcon	*Falco mexicanus*	BLM sensitive	May forage at the site
Sage sparrow	*Amphispiza belli nevadensis*	BLM sensitive	May be present; sagebrush areas are its habitat
Short-eared owl	*Asio flammeus*	State species of concern; BLM sensitive	May be present; lives in grasslands and shrublands
Silky pocket mouse	*Perognathus flavus*	State species of concern; BLM sensitive	May be present; habitat includes semiarid and arid grasslands and shrublands
Spineless hedgehog cactus	*Echinocereus triglochidiatus* var. *inermis*	BLM sensitive	Unlikely but possible; this species has not been observed at the site, but potential habitat exists
Swainson's hawk	*Buteo swainsonii*	BLM sensitive	May be present; lives in grasslands
White-tailed prairie dog	*Cynomys leucurus*	State species of concern	May be present; prairie dogs are present onsite but species have not been identified

3.8.3 Water Resources

3.8.3.1 Surface Water

The Monticello site is within the San Juan River subbasin of the Upper Colorado River Basin. The site contains engineered, rock-armored drainage channels that direct runoff away from the disposal cell. The south drainage channel drains into an ephemeral stream to the south, which crosses a portion of the disposal site outside the perimeter fence and discharges into Montezuma Creek, an intermittent-to-perennial waterway, east of the site. The disposal cell's east and west toe drains convey water to the north drainage channel, which drains into North Draw, an

ephemeral-to-intermittent waterway north of the disposal site. North Draw is also a tributary to Montezuma Creek, which eventually discharges into the San Juan River.

The site contains a lined, engineered solar evaporation pond. The pond is surrounded by a locked wildlife fence and primarily contains groundwater extracted from a contaminated aquifer near the Monticello processing site, but it also contains a small amount of drainage fluids from the disposal cell.

3.8.3.2 Groundwater

LM is remediating contaminated groundwater from the Monticello processing site. However, the proposed grazing action would take place only at the Monticello disposal site, which does not contain contaminated groundwater.

3.8.4 Wetlands and Floodplains

3.8.4.1 Wetlands

No wetlands or potential wetlands are present on the Monticello site. The NWI shows only ephemeral streams onsite that drain into North Draw, an ephemeral-to-intermittent stream.

3.8.4.2 Floodplains

No floodplain maps are available for the Monticello site (FEMA 2019). However, the site is unlikely to be within the floodplain of any perennial waterway because of its location, topography, and elevation.

3.8.5 Air Quality

The Monticello site is entirely within attainment areas for all criteria pollutants (EPA 2019b). EPA's Air Quality Index Report (EPA 2019b) reports no "unhealthy" or "unhealthy for sensitive groups" days in 2018 for San Juan County (EPA 2019c). In 2018, 115 days were in the "moderate" category, and 218 were categorized as "good." The site is within the Four Corners Interstate AQCR (EPA 1972). In 2017, EPA reported no facilities with significant emissions of GHGs in San Juan County (EPA 2019d).

3.8.6 Cultural Resources

Archaeological surveys conducted at this location in 1982, 1988, 1989, 1991, and 1992 (before construction) identified no archaeological sites where the disposal cell was later built. Additionally, this disposal site was extensively disturbed during construction and is not located on tribal land. Therefore, LM decided to consult only with the relevant SHPO on this undertaking.

3.8.7 Land Use and Recreation

3.8.7.1 Land Use

The Monticello NPL sites are located in and near Monticello, the San Juan County seat, about 250 miles southeast of Salt Lake City. DOE's property ownership is limited to the disposal site and a small parcel east of the disposal site.

The City has zoned the parcel G-1 (Governmental). The properties to the west, south, and southwest are privately owned and are zoned Controlled District (CD) through San Juan County. CD zoning provides a place where agricultural, industrial, commercial, and residential uses may coexist based on planned development for mutual benefit and flexible location uses. Utah Highway 191 borders the site to the north.

The area surrounding the site is primary used for ranching and dryland farming and is seasonally used for hunting. The *Record of Decision for Operable Unit III* states, "The projected use of the middle and lower canyon is expected to remain in open grazing for cattle and in seasonal recreational uses and hunting. The upper canyon is anticipated to remain in rural agricultural usage." (DOE 2004)

In 1942, the U.S. government, through its agent the Defense Plant Corporation, constructed the Monticello Mill at a former uranium and vanadium ore-buying station built and opened in 1940. The purpose of the mill was to produce vanadium and uranium for military purposes. Various government agencies operated the mill until 1948, when it was obtained by AEC. Ore was processed to recover vanadium at Monticello from 1942 to 1944, in 1945 and 1946, and again from 1948 to 1960, when both uranium and vanadium were recovered. The ore-buying station closed in 1962.

Between 1961 and 1965, various measures were taken to dismantle the mill, dispose of equipment and scrap, bury contaminated materials, grade and cover the impounded tailings and other contaminated materials with soil, and revegetate the site. A portion of the mill site (about 10 acres) that included a few intact administrative buildings was transferred to BLM in 1962. The remainder, including the tailings piles (approximately 68 acres), remained in the custody of AEC and its successor agencies, first the U.S. Energy Research and Development Administration and later DOE. As late as 1989, BLM used the former mill site as an office and equipment maintenance area. In 1990, this area was deeded back to DOE before remediation of the mill site.

As for ICs, the disposal site and associated features are under federal ownership. The Utah Office of the State Engineer issued the *Ground Water Management Policy for the Monticello Mill Tailings Site and Adjacent Areas,* which became effective May 21, 1999 (Utah 1999). The policy states that new applications to appropriate water for domestic use from the shallow alluvial aquifer within the boundaries of the Monticello Ground Water Restricted Area will not be approved; existing water rights are not affected. The policy states that applications to drill wells into the deeper Burro Canyon Formation would be approved if it could be demonstrated "that they can seal out the shallow contaminated groundwater and would not allow the flow of water between the shallow alluvial aquifer and the deeper bedrock aquifers/formations."

3.8.7.2 Recreation

There is no public recreational use of the site. Lloyd's Lake is a little more than a mile to the west of the property. The City-owned Millsite Park is adjacent to the northwest boundary of the site on property once occupied by the processing mill. The City of Monticello restored the park for public use by implementing erosion controls, reseeding the property with native plants, reconstructing the creek, and re-creating 4.7 acres of wetlands. This park has deed restrictions placed on the property: It is a day-use only public park for public recreation and can have no residential use or habitable structures, no disturbance or removal of soil, and no camping.

3.9 Parkersburg

The 15-acre Parkersburg site is 8 miles southwest of Parkersburg, West Virginia, in Wood County, near the east bank of the Ohio River. The surrounding land is primarily agricultural and industrial, with some residential use (Figure 18 and Figure 19).

During its years of operation, an onsite mill processed an estimated 2 million pounds of zirconium ore. The ore processed at the plant also contained oxides of several radioactive elements: hafnium, thorium, and uranium. Remediation of the site was completed by a private company in 1983 and included construction of a fenced, onsite stabilization mound to encapsulate contaminated materials and protect human health and the environment. Except for the mound, the mill site property has been certified as suitable for unrestricted use. LM assumed title and custody of the stabilization area under the Nuclear Waste Policy Act in 1994.

LM manages the disposal site according to a site-specific LTSP to ensure that the stabilization mound continues to prevent release of contaminants to the environment. Under provisions of this plan, LM conducts annual inspections of the site, performs site maintenance as necessary, and monitors groundwater to verify the continued integrity of the mound. The encapsulated materials will remain potentially hazardous for thousands of years. LM's responsibility for the safety and integrity of the Parkersburg disposal site will last indefinitely.

3.9.1 Biological Resources

3.9.1.1 Vegetation

The Parkersburg site is in the Permian Hills Level IV Ecoregion within the Western Allegheny Plateau (EPA 2019a), a mostly unglaciated, dissected plateau. The Permian Hills ecoregion is hilly with few flat areas, and forests are common. Forests are predominantly Appalachian Oak Forest dominated by white and red oaks and Mixed Mesophytic Forest that also contain beech, yellow poplar, American basswood, sugar maple, and yellow buckeye. The site is also within the Central Allegheny Plateau MLRA, described in Section 3.5.1.1 for the Burrell site.

Most of the Parkersburg site, including the stabilization mound, is covered with grass. Species seeded in 1982 include winter wheat (*Triticum* sp.), Kentucky bluegrass (*Poa pratensis*), rye (*Lolium* sp.), and red clover (*Trifolium pratense*). The grass is regularly mowed, and herbicide is spot-applied to control invasive plants. Dense stands of trees are found along an unnamed creek east of the site and along the southern border. Johnsongrass (a State-listed noxious weed), Canada thistle, teasel, poison hemlock, reed canarygrass (*Phalaris arundinacea*), all of which are invasive plants in West Virginia, are found onsite, as is poison ivy (*Toxicodendron radicans*), a poisonous plant.

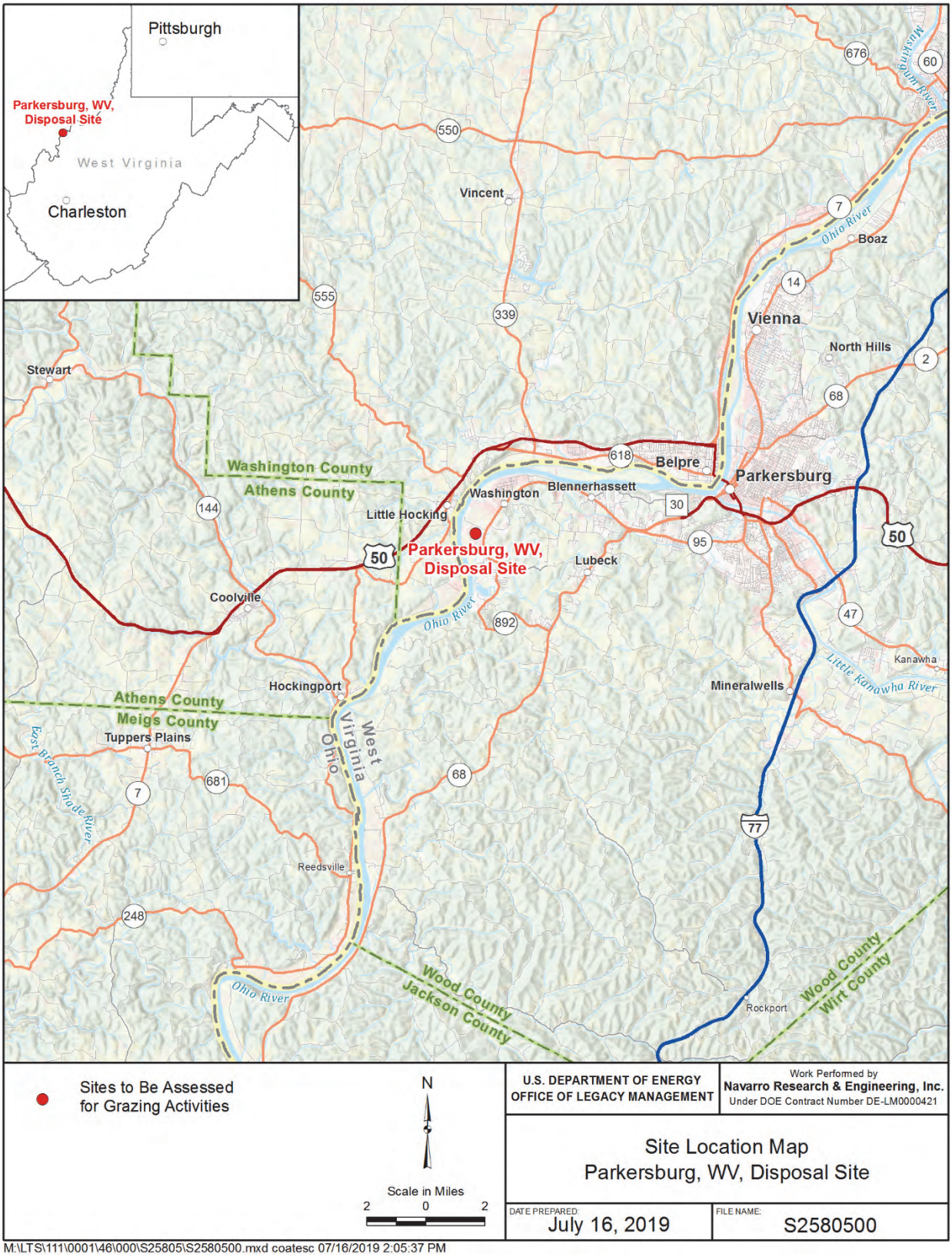

Figure 18. Location Map for Parkersburg, WV, Disposal Site

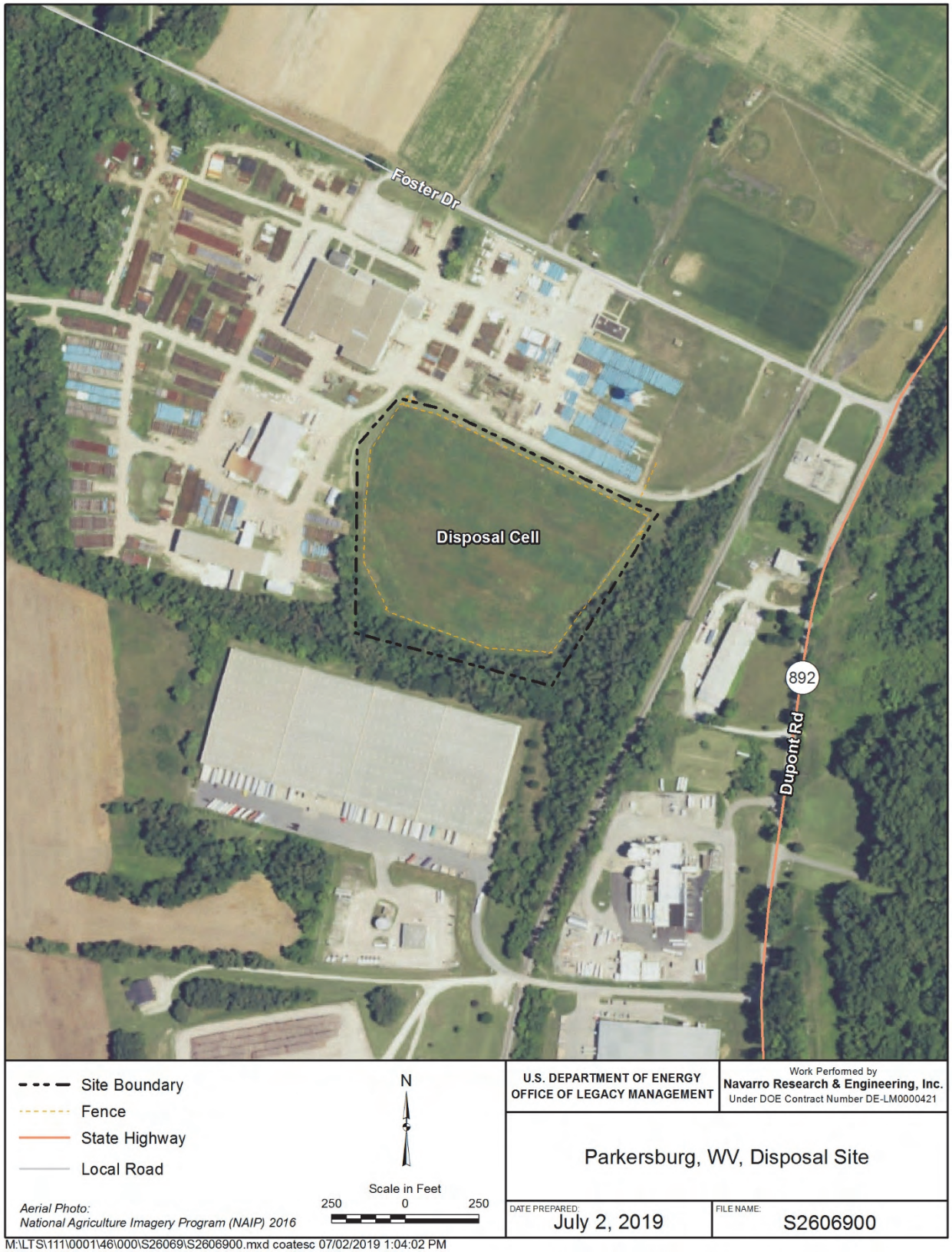

Figure 19. Site Map for Parkersburg, WV, Disposal Site

3.9.1.2 Wildlife

The site is in Central Allegheny Plateau, and because of its proximity to developed areas, would have similar wildlife to the Canonsburg site (see Section 3.6.1.2).

3.9.1.3 Special Status Species

The Parkersburg site is within the range of six federally listed threatened or endangered species: the Indiana bat, northern long-eared bat, and four species of aquatic clams and mussels. No habitat exists at the site for any of these species. The monarch butterfly, a federally petitioned species, may migrate through the site, as it is within the butterfly's eastern migration corridor. The site is also within range of three USFWS-designated BCC: bald eagle, prairie warbler (*Dendroica discolor*), and wood thrush (*Hylocichla mustelina*). These birds could fly over or forage briefly at the site, but they would not be expected to be residents, as the site is mostly covered in mowed grass. West Virginia has no state endangered species legislation and no other special status species besides those managed by USFWS.

3.9.2 Soils

Soils at the site are generally classified as the Huntington-Ashton-Wheeling association (DOE 2019b). They are deep, well-drained, and silty, and they occur on bottomlands and terraces along the Ohio River on level or gently sloping terrain. Soil classifications at the Parkersburg site include gravel pit, Lakin loamy sand, Sciotoville silt loam, and Wheeling silt loam (NRCS 2019). These soil types are described on the disposal cell, but the soil characterization was performed before the stabilization mound was constructed. Lakin loamy sand is a somewhat excessively drained soil with sandy eolian deposits derived from sedimentary rock as a parent material. Sciotoville silt loam is moderately well drained and developed from fine-loamy alluvium derived from sedimentary rock. Wheeling silt loam is a well-drained soil derived from fine-loamy alluvium over sandy and gravelly glaciofluvial deposits.

3.9.3 Water Resources

3.9.3.1 Surface Water

The Parkersburg site is within the Ohio River Basin. No surface water is present at the site, but runoff drains to the nearby Ohio River, a major perennial channel about 0.3 mile to the west. The site was contoured to direct water away from the stabilization mound.

3.9.3.2 Groundwater

Unconfined groundwater is present at depths of 50 to 75 ft below ground surface at the site. The alluvium bedrock contact is about 100 ft below ground surface. Six monitoring wells are present around the perimeter of the disposal cell. These wells predate remediation, and two are monitored by LM to verify that encapsulated materials and historical activities have not affected alluvial groundwater.

3.9.4 Wetlands and Floodplains

3.9.4.1 Wetlands

No wetlands or potential wetlands are present on the Parkersburg site.

3.9.4.2 Floodplains

All portions of the Parkersburg site are outside of 1% and 0.2% annual chance floodplains (FEMA 2019).

3.9.5 Air Quality

The Parkersburg site is entirely within attainment areas for all criteria pollutants (EPA 2019b). The EPA's Air Quality Index Report (EPA 2019b) reports no "unhealthy" or "unhealthy for sensitive groups" days in 2018 for Wood County (EPA 2019c). In 2018, 22 days were in the "moderate" category, and 341 were categorized as "good." The site is within the Parkersburg-Marietta Interstate AQCR (EPA 1972). EPA reports three facilities with reportable emissions of GHGs in Wood County. Two are landfills, and one is a manufacturing facility. Together, they emitted 649,922 metric tons of CO_2 equivalent in GHGs in 2017.

3.9.6 Cultural Resources

LM determined, in accordance with Section 106 of the NHPA and the operating regulations in 36 CFR 800, that the proposed project is defined as an undertaking in accordance with the definition found at 36 CFR 800.16(y). This undertaking is the type with potential to influence historic property, so LM initiated the Section 106 consultation process with the West Virginia SHPO. The APE for this undertaking is 15.6 acres, or the disposal cell boundary as shown in Figure 19.

In accordance with 36 CFR 800.4(d)(1), LM determined there is no historic property present within the APE of the proposed project because of the extensive disturbance that occurred during construction of the disposal cell. Additionally, this disposal site is not located on tribal land. Therefore, LM decided to consult only with the relevant SHPO on this undertaking.

3.9.7 Land Use and Recreation

3.9.7.1 Land Use

The Parkersburg site is 8 miles southwest of Parkersburg in Wood County near the east bank of the Ohio River. The site is currently owned by the U.S. government through a General Warranty Deed dated July 8, 1993. The surrounding land is primarily agricultural and industrial, with some residential use. North of Foster Drive, agricultural and grazing land extends for about 2500 ft (762 m) north to an industrial area. Land immediately to the east, south, and southwest of the site is used for grazing. DOE assumed ownership of the radioactive materials storage area (Parkersburg site) under the terms of the Nuclear Waste Policy Act of 1982 (42 USC 101719).

The Carborundum Company built the original facility at the site in 1957 to produce zirconium metal for use in constructing nuclear reactors for the U.S. Navy. In May 1967, Amax Inc., a division of American Metals Climax Inc., became the sole owner of the facility. During its years of operation, the mill processed an estimated 2 million pounds of zirconium ore, mainly from Nigeria. The ore processed at the plant also contained oxides of hafnium, thorium, and uranium. The initial processing methods generated waste material that was pyrophoric, meaning it would catch fire or explode easily. Ore and waste material were stored in drums onsite.
By 1968, some of the drums began to deteriorate, and the radioactive contents spilled onto the soils in the storage area.

In September 1968, approximately 3000 drums were transported to AEC's low-level radioactive waste site at Maxey Flats, Kentucky. Amax ceased production in 1974 and began conducting laboratory-scale experiments on baddeleyite ore, an oxide of zirconium. In 1977, Amax sold the site to the L.B. Foster Company, a manufacturer of steel pipe. NRC conducted site inspections in September and October 1977 and removed 70 drums of contaminated soil, which were shipped offsite to an NRC-approved disposal site. During expansion construction in 1978 by L.B. Foster Company, a backhoe excavation uncovered pyrophoric waste materials that caused several fires and explosions.

Amax subsequently repurchased the property and began radiological, geological, and hydrological characterization for cleanup. In 1980, the company issued a remedial action plan that included construction of a disposal cell. The cell was completed in 1983. In 1984, Oak Ridge Associated Universities surveyed the site to verify that remedial action had removed contaminants to acceptable levels. In 1987, NRC concurred with Amax's request to release the area outside the disposal cell for unrestricted use. In November 1987, Amax requested that DOE assume title and custody of the site. On July 8, 1993, a General Warranty Deed transferred the disposal cell and an access road easement from Amax to the federal government. DOE formally assumed ownership of the site March 4, 1994.

3.9.7.2 Recreation

There is no public recreation at the site, though there is recreation nearby. A small island in the Ohio River, Blennerhassett Island, features a historical state park that features a Palladian mansion and museum visited by 40,000 people each year. This historical park is accessed by a sternwheeler riverboat from Point Park on Second Street in Parkersburg. Once on the island, visitors may enjoy tours of the grounds and mansion and horse-drawn carriage rides. Tours are offered when the park is open, from May through the last weekend of October (https://wvstateparks.com/park/blennerhassett-island-historical-state-park/).

4.0 Environmental Consequences and Mitigation

This section provides brief descriptions of the anticipated impacts of the No Action Alternative (Alternative 1) and the Preferred Alternative (Alternative 2) on resources present in the project area. Impacts are defined in general terms and are qualified as adverse or beneficial and as short-term or long-term. For the purposes of this PEA, short-term impacts are generally considered the type that would have temporary effects. Long-term impacts are generally considered the type that would result in permanent effects. Potential impacts were identified and assessed for each environmental issue by assigning significance criteria for comparison against existing conditions, which is the No Action Alternative. These significance criteria are contained below in Table 9 and are applied across all sites.

The thresholds of change for the intensity of impacts are defined as follows:

- *Negligible* means the impact is localized and not measurable or at the lowest level of detection
- *Minor* means the impact is localized and slight but detectable
- *Moderate* means the impact is readily apparent and appreciable
- *Major* means the impact is severely adverse and highly noticeable

Table 9. Resource Impact Significance Criteria

Resource	Significance Criteria
Biological Resources	
Vegetation	• Any action that affects ecological processes, population size, population connectivity, or individual fecundity to the extent that it threatens the long-term viability of any plant species would be significant. • Any action that results in the permanent loss or substantial degradation of sensitive biological resources would be significant. • Any action that promotes the establishment of nonnative and invasive plant species in areas that have not been previously exposed to these species or results in the long-term expansion of existing populations would be significant.
Wildlife	• Any action that affects ecological processes, population size, population connectivity, migration, or individual fecundity to the extent that it threatens the long-term viability of any distinct population of wildlife would be significant. • Any action that conflicts with the provisions of an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved federal, state, or local conservation plan would be significant. • Any action that results in substantial interference with the movement of any native, resident, or migratory fish or wildlife species, or with established native resident, or migratory wildlife corridors, or impedance of the use of native wildlife nursery sites would be significant.
Special status species	• Any action that cannot be mitigated and has a substantial adverse effect, either directly or indirectly through habitat modifications, on any special status species would be significant. • Any action that results in adverse modification of designated critical habitat would be significant.

Table 9. Resource Impact Significance Criteria (continued)

Resource	Significance Criteria
Soils	
Soils	• Any action that exposes people or structures to substantial adverse effects, including the risk of injury or death, would be significant. This includes infrastructure on inappropriate soil types creating risks to life or property. • Any action that entirely removes a geologic resource, thus removing the potential for scientific investigation of that geologic resource, would be significant. • Any action that results in substantial soil erosion or loss of topsoil would be significant.
Water Resources	
Surface water	• Any action that impairs water bodies or substantially increases the impairment of existing impaired waters would be significant. • Any action that substantially alters existing drainage patterns of the site or area, resulting in substantial erosion, would be significant.
Groundwater	• Any action that substantially depletes groundwater supplies or interferes substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table, would be significant.
Wetlands and Floodplains	
Wetlands	• Any action that threatens or damages unique hydrologic characteristics or violates established wetland laws or regulations would be significant. • Any action that results in a permanent loss of a wetland or wetland function that cannot be mitigated or compensated would be significant.
Floodplains	• Any action that places structures within a 1% flood hazard area or hazardous materials within a 0.2% flood hazard area would be significant. • Any action that permanently modifies a floodplain resulting in impeding or redirecting flood flows would be significant.
Air quality	• Any action that results in a substantial deterioration in air quality within a region or AQCR would be significant. This could include a violation of National Ambient Air Quality Standards.
Cultural resources	• Any action that would alter characteristics that qualify a historic property for the NRHP or diminish the historic property's integrity may be significant. • Any action that would disturb any human remains, including those interred outside of formal cemeteries, may be significant.
Land Use and Recreation	
Land use	• Any action that violates or is inconsistent with current and applicable land use plans, policies, or regulations would be significant. • Any action that precludes continued use or occupation of the surrounding area would be significant. • Any action that is functionally incompatible with surrounding land use would be significant.
Recreation	• Any action that results in long-term reductions in participation or expenditures for outdoor recreation after implementation of an alternative would be significant.

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4.1 Ambrosia Lake

4.1.1 Biological Resources

4.1.1.1 Vegetation

No Action Alternative

Under the No Action Alternative, grazing activities would continue to be excluded at the Ambrosia Lake site. Revegetated areas in arid climates can take decades to fully establish, and until they are mature, they can be vulnerable to adverse effects from grazing pressure. On the other hand, rangeland vegetation evolved with grazing animals, and appropriate grazing practices in mature areas can improve rangeland health.

Current conditions show that the site is early successional rangeland, and several invasive weedy species exist on the proposed grazing lands. If grazing is excluded in the short term, invasive species may decrease, and ecological succession in reclaimed areas is likely to progress faster as volunteer native species become established. Once vegetation becomes established and mature, long-term exclusion of grazing could result in unhealthy rangeland conditions such as excess plant litter that can hinder new plant growth. Therefore, the No Action Alternative would result in minor beneficial impacts in the short term and minor adverse impacts in the long term to vegetation at the Ambrosia Lake site.

Preferred Alternative

Under the Preferred Alternative, grazing would be permitted at Ambrosia Lake under the planning framework criteria listed in Section 2.2. Continuous grazing methods can be sustainable if livestock are properly distributed across the landscape, appropriate stocking rates are applied, and the proper season of use is employed; however, negative impacts on vegetation occur when this is not the case (Heady and Child 1994; Vavra et al 1994).

Changes in vegetation composition are likely to occur if the site were grazed. Highly palatable grasses and shrubs are likely to decrease in cover and abundance, while less palatable species may increase (NPS 1993; Schlesinger et al. 1990; Van Auken 2000). Species considered tolerant to grazing increase under grazing pressure, and intolerant species would decrease. Species that could potentially increase include rubber rabbitbrush and broom snakeweed, while species that could decrease include winterfat and alkali sacaton (DOE 2014; NPS 2018). Horsetail milkweed, a habitat plant for monarch butterflies, is toxic to livestock and would be expected to increase. Additionally, the physical structure of plant communities is often changed by grazing (Huntly 1991).

Defoliation by grazing could alter plant height and canopy cover and change species composition (Fleischner 1994). Grazing livestock also have the potential to introduce or spread invasive, weedy species to an area through weed seeds that may be transported on or in hooves, coats, or manure. Research has shown, however, that although grazing animals do disturb rangelands, most rangelands gain few benefits when livestock are totally excluded for long periods (Lyons and Hanselka 2001). Therefore, well-managed grazing can result in a higher ecological condition (i.e., more climax vegetation would be present) (Holechek et al. 2006).

The level of grazing intensity plays an important role in determining impacts to vegetation cover, abundance, and production. Light grazing may benefit plant productivity by removing plant litter, but heavy grazing could reduce overall productivity and vegetation cover. Reduction of vegetation cover would increase bare ground surface (soil and rock), which is directly related to increased potential for wind or water erosion (Morgan 2005). Grazing during the growing season could inhibit the development of reproductive parts of plants and thereby reduce productivity and abundance. Total grass production may be reduced under grazing during drought years (Holechek et al. 2006) and could potentially increase the size of unvegetated areas.

If grazing were implemented at the site, vegetation in the mesic area would be expected to be adversely affected by livestock grazing and trampling, as animals are preferentially attracted to water and areas with denser vegetation. Livestock watering areas, if installed at the site, would also be adversely affected by trampling. Livestock trails would develop across the site, increasing the potential for erosion. Active erosion gullies exist north and northeast of the disposal cell. Such gullies could become deeper, or new gullies could form as a result of livestock use. Livestock could also mitigate some of the gullies by knocking down their steep walls and creating areas more favorable to vegetation establishment. The disposal cell cover would not be substantially affected by grazing, as livestock would be likely to avoid the cell's steep slopes and areas covered in rock riprap. Small areas of the site could be impacted by installing and removing temporary structures that support grazing, such as watering systems, shelters, or corrals.

Adverse effects resulting from overgrazing would be reduced by using the framework and performing regular rangeland monitoring. Under the framework, the site would not be grazed until LM determined that it could support grazing. The licensee would adhere to accepted livestock management practices to ensure that vegetation is maintained in a healthy condition and to avoid undue damage or erosion to the site. Examples may include, but are not limited to, appropriate stocking rates and rotational grazing. In this case, short-term effects would be similar to those described under the No Action Alternative, and long-term effects would be similar to those described in this section. Therefore, the Preferred Alternative would result in minor beneficial short-term impacts and moderate adverse and beneficial long-term impacts to vegetation at the Ambrosia Lake site.

4.1.1.2 Wildlife

No Action Alternative

The No Action Alternative would have no short- or long-term adverse or beneficial impacts on wildlife or wildlife habitat.

Preferred Alternative

The Preferred Alternative may change how wildlife use the site by modifying soils and vegetation, which are components of wildlife habitat. Changes would likely be greater for small species like deer mice that could inhabit the site than for species, such as coyotes, with larger ranges that could only occasionally use the site. Changes would be difficult to predict and would depend on changes in vegetation resulting from specific grazing practices. In any case, adverse and beneficial effects would be expected to be minor because they would occur over a small area, and they would take place gradually as a grazing program was implemented. Therefore, the

Preferred Alternative would result in minor long-term impacts to wildlife at the Ambrosia Lake site that are neither beneficial nor adverse.

4.1.1.3 Special Status Species

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on special status species.

Preferred Alternative
No special status species are known to inhabit the site, although their habitat may be present. Livestock grazing could change soils and vegetative cover, which are components of wildlife habitat, but the special status species potentially occurring at the site have larger ranges and, if they do use the Ambrosia Lake site, would not be expected to be greatly affected by such changes. The number of horsetail milkweed plants, which are habitat plants for monarch butterflies, could increase under grazing pressure because they are unpalatable and toxic to livestock. Grazing can improve habitat for prairie dogs in general (Knowles 1986). Impacts to milkweed and prairie dogs would be small because of the small site acreage. Therefore, the Preferred Alternative would have negligible adverse or beneficial long-term effects on special status species at the Ambrosia Lake site.

4.1.2 Soils

No Action Alternative
The No Action Alternative would have no short- or long-term beneficial or adverse impacts on soil.

Preferred Alternative
Livestock grazing can increase exposure of bare soil, compact soil surfaces, and destroy biological soil crusts (Willatt and Pullar 1984; Warren et al. 1986; Floyd et al. 2003; Amiri et al. 2008), all of which can decrease infiltration rates, increase erosion, increase water runoff, and negatively affect soil fertility. Most soils subjected to even minimal grazing are impacted by it — to a small degree in dry soils and to a greater depth in wet soils (Greenwood and McKenzie 2001) — and a decrease in plant cover can increase erosion (Meeuwig 1970). Thus, the mesic area may experience increased compaction of soil and decreased soil infiltration of water.

Clay soils exhibiting erosional gullies northeast of the cell may also experience increased compaction leading to decreased soil infiltration of water. Both altered soil conditions may result in increased overland water flow (Pellant et al. 2018).

In undisturbed soils in the west, biological crusts regulate the infiltration of water into soil. These crusts become increasingly important for soil resilience to wind and water erosion in arid environments as plant cover decreases due to grazing (Pellant et al. 2018). Loamy mesic soils in the southern and western portions of the site may experience disturbance of biological crusts and increased compaction, which may result in increased erosion by wind and water. Evidence suggests that long-term grazing may result in decreased soil fertility due to loss of soil nutrients

(carbon [C], nitrogen [N], magnesium, sodium, phosphorus [P], and manganese) via wind erosion (Neff et al. 2005).

Erosive soils throughout the site may also experience increased compaction and decreased water infiltration, resulting in pooling, evaporating surface water, and runoff and erosion. Well managed grazing can mitigate some of these effects by incorporating organic matter (plant material and manure) into the soil, increasing soil fertility, infiltration, moisture, and plant growth. Therefore, the Preferred Alternative would result in moderate adverse and minor beneficial short- and long-term impacts to soils at the Ambrosia Lake site.

4.1.3 Water Resources

4.1.3.1 Surface Water

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on surface water.

Preferred Alternative
There are no streams onsite, and thus bank stability and downstream quality of surface water would not be impacted by livestock crossings. The 2-acre mesic area with native grass and perennials could experience vegetation trampling that would result in decreased ground cover, increased runoff, and increased N and P input downstream of the site (Greenwood and McKenzie 2001; Meeuwig 1970; Hubbard et al. 2004). However, the Arroyo del Puerto, an intermittent stream, is about a mile south of the site, and changes to the mesic area are unlikely to cause impacts so far downstream. A fence around the mesic area that excluded livestock could mitigate these negative impacts (Miller et al. 2010). The Preferred Alternative would thus have negligible short-term and long-term adverse impacts on surface water.

4.1.3.2 Groundwater

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on groundwater.

Preferred Alternative
Changes to vegetation or soils under a grazing regime could change infiltration rates into the aquifer, but the changes would be negligible. The low-yield aquifer would not be used as a water source for livestock, so no impacts related to withdrawing water would occur. The Preferred Alternative would thus have negligible short- and long-term impacts on groundwater.

4.1.4 Wetlands and Floodplains

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts on wetlands or floodplains, because there are no potential wetlands or floodplains present at the Ambrosia Lake site.

4.1.5 Air Quality

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on air quality.

Preferred Alternative
Under the Preferred Alternative, impacts on air pollutants such as O_3 or PM from vehicles used to transport or manage grazing animals would be negligible due to their small scale. Indirect beneficial or adverse effects on GHGs could result from changes in vegetation and the resulting changes in C storage. Although they are difficult to predict, these effects would also be negligible due to the relatively small acreage of arid rangeland available for grazing.

Unconfined livestock generate CH_4 and N_2O. These GHGs mainly come from two sources: enteric fermentation and manure. At the Ambrosia Lake site, a maximum of 250 metric tons of CO_2 equivalent emissions would be expected to be generated annually from livestock grazing[2]. This is less than 0.007% of GHG emissions generated from the agriculture sector in the State of New Mexico (NMED 2007). Therefore, the Preferred Alternative would result in minor long-term adverse impacts to air quality through GHG emissions.

4.1.6 Cultural Resources

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

Preferred Alternative
A determination of "no historic property subject to effect" was conveyed to the New Mexico SHPO by LM on July 16, 2019 (Appendix A). The Preferred Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

4.1.7 Land Use and Recreation

4.1.7.1 Land Use

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on land use.

Preferred Alternative
Under the Preferred Alternative, grazing may be permissible following the procedures set forth in Section 2.2; however, the LTSP might need to be modified to allow this use. The current zoning for the site location does not indicate any restrictions on livestock or agricultural use in either county. However, the Quitclaim Deed and the Public Land Order note that the property

[2] This calculation is based on the following assumptions: 800 pounds per acre forage production for cold desert rangeland, 200 acres of available rangeland at the Ambrosia Lake site, and 100 kilograms (kg) of CO_2 equivalent emissions per animal unit month (AUM), primarily from CH_4, as N_2O emissions from unconfined livestock are typically small and difficult to measure.

was conveyed for UMTRCA purposes, and grazing was not identified as an allowable use under either document or the LTSP. In addition, since this is an UMTRCA Title I site, any change in the permitted uses would require revision to the LTSP. Land uses onsite may change during grazing periods. Because there would be no changes to surrounding land uses, no short- or long-term adverse impacts to land uses are anticipated.

4.1.7.2 Recreation

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on recreation.

Preferred Alternative
There is no public access to the site even though it is near the El Malpais National Monument and Cibola National Forest. Because there would be no changes to recreational use, no short- or long-term adverse impacts to recreation use is anticipated.

4.2 Bluewater

4.2.1 Biological Resources

4.2.1.1 Vegetation

No Action Alternative
The No Action Alternative would continue to exclude grazing from the Bluewater site. Impacts to vegetation would be similar to those at the Ambrosia Lake site (Section 4.1.1.1). The No Action Alternative would result in minor beneficial impacts in the short term and minor adverse impacts in the long term to vegetation at the Bluewater site.

Preferred Alternative
Under the Preferred Alternative, grazing would be permitted at Bluewater under the planning framework criteria listed in Section 2.2. Using the framework, LM would not authorize grazing at the Bluewater site until ecologists determined that the site could support grazing. Impacts would be similar to those at the Ambrosia Lake site (Section 4.1.1.1) except that trampling and grazing impacts from livestock would be expected to occur in and near potential wetland areas rather than the mesic area described at Ambrosia Lake.

Other vegetation communities that could be impacted at the Bluewater site are the lava complex and limestone hill. The rocky terrains of the areas have precluded disturbances experienced in areas adjacent to the site, and some high-quality native vegetation communities remain intact. Introduction of livestock could result in concentration areas where desirable vegetation would be targeted and possibly overgrazed. Therefore, the Preferred Alternative would result in minor beneficial short-term impacts and moderate adverse long-term impacts to vegetation at the Bluewater site.

4.2.1.2 Wildlife

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on wildlife.

Preferred Alternative
The Preferred Alternative would have similar impacts to those described for the Ambrosia Lake site (Section 4.1.1.2) and would result in minor long-term impacts to wildlife that are neither beneficial nor adverse at the Bluewater site.

4.2.1.3 Special Status Species

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on protected species.

Preferred Alternative
The Preferred Alternative would have similar impacts to those described for the Ambrosia Lake site (Section 4.1.1.3). Monarch butterflies have been confirmed at the Bluewater site, and Gunnison prairie dogs may be present. The Bluewater site is larger than the Ambrosia Lake site, but the acreage of the Bluewater site is still a negligible part of the range of these species. Therefore, as with the Ambrosia Lake Site, the Preferred Alternative would have negligible adverse or beneficial long-term effects on special status species at the Bluewater site.

4.2.2 Soils

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on soils.

Preferred Alternative
The Preferred Alternative would result in impacts similar to those at the Ambrosia Lake site (Section 4.1.2) except that at the Bluewater site impacts would occur in soil vegetation units 3, 4, 6, and 7 and in potential wetlands rather than the mesic area.

4.2.3 Water Resources

4.2.3.1 Surface Water

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on surface water.

Preferred Alternative
Grazing in ponded areas can trample vegetation, resulting in decreased ground cover and increased erosion, resulting in increased runoff (Meeuwig 1970). Nitrogen and P inputs into wetlands can adversely affect water quality and temperature, resulting in changes to vegetation

and animal community structure (Morris and Reich 2013). Light grazing under a framework to monitor and maintain ecosystem quality would lessen the effects on surface water quality, which can be negatively impacted by organic inputs to streams at cattle crossings (Hubbard et al. 2004). Therefore, the Preferred Alternative would result in short-term and long-term negligible to minor adverse impacts on surface water.

4.2.3.2 Groundwater

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on groundwater.

Preferred Alternative
The Preferred Alternative would have similar impacts to groundwater as those at the Ambrosia Lake Site (Section 4.1.3.2) and would result in negligible long-term impacts on groundwater at the Bluewater site that are neither beneficial nor adverse.

4.2.4 Wetlands and Floodplains

4.2.4.1 Wetlands

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on wetlands.

Preferred Alternative
If grazing were implemented at the site, vegetation in wetland areas would be expected to be adversely affected by livestock grazing and trampling, as animals are preferentially attracted to water and areas with denser vegetation. However, the potential wetland areas at the Bluewater site are generally dominated by invasive and exotic species that tend to be persistent and resilient. The Preferred Alternative would result in moderate short-term and long-term adverse impacts to wetlands at the Bluewater site.

4.2.4.2 Floodplains

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts on floodplains because no floodplains are present.

4.2.5 Air Quality

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on air quality.

Preferred Alternative
Under the Preferred Alternative, impacts on air pollutants such as O_3 or PM from vehicles used to transport or manage grazing animals would be negligible due to their small scale. Indirect beneficial or adverse effects on GHGs could result from changes in vegetation and the resulting

changes in C storage. Although they are difficult to predict, these effects would also be negligible due to the relatively small acreage of arid rangeland available for grazing.

Unconfined livestock generate CH_4 and N_2O. These GHGs mainly come from two sources: enteric fermentation and manure. At the Bluewater site, a maximum of 813 metric tons of CO_2 equivalent emissions would be expected to be generated annually from livestock grazing[3]. This is less than 0.02% of GHG emissions generated from the agriculture sector in New Mexico (NMED 2007). Therefore, the Preferred Alternative would result in minor, long-term adverse impacts to air quality through GHG emissions.

4.2.6 Cultural Resources

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on historic resources.

Preferred Alternative
The Preferred Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources. Should unidentified archaeological resources be discovered in the course of the proposed grazing, activities would be interrupted until the resources have been evaluated for NRHP eligibility criteria (36 CFR 60.4) in consultation with the New Mexico SHPO in accordance with 36 CFR 800.13. NHPA Section 106 consultation was initiated with the SHPO on July 16, 2019 (Appendix A); no response has been received to date.

4.2.7 Land Use and Recreation

4.2.7.1 Land Use

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on land use.

Preferred Alternative
Under the Preferred Alternative, grazing may be permissible following the procedures set forth in Section 2.2; however, some modifications may need to be made to the LTSP to allow this use. The current zoning for the area where the site is located does not indicate any restrictions on livestock or agricultural use. In addition, since this is an UMTRCA Title II site, any change in the permitted uses to the surface or subsurface estates would need to comply with 10 CFR 40.28. While onsite land uses may change during grazing periods, there would be no changes to surrounding land uses and thus no anticipated short- or long-term adverse impacts to land uses.

[3] This calculation is based on the following assumptions: 800 pounds/acre forage production for cold desert rangeland, 650 acres of available rangeland at the Bluewater site, and 100 kg CO_2 equivalent emissions per AUM, primarily from methane, as N_2O emissions from unconfined livestock are typically small and difficult to measure.

4.2.7.2 Recreation

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on recreation.

Preferred Alternative
There is no public access to the site even though it is near the El Malpais National Monument and Cibola National Forest. There would be no changes to recreational uses and thus no anticipated short- or long-term adverse impacts to recreational uses.

4.3 Burrell

4.3.1 Biological Resources

4.3.1.1 Vegetation

No Action Alternative
Under the No Action Alternative, grazing would not be used to manage vegetation at the Burrell site. Herbicide application, prescribed burns, and mowing would continue to be used as the primary options to control invasive plants. These methods have been partially effective in controlling weeds but less effective on Japanese knotweed in the forested areas. If grazing continues to be excluded at the site, Japanese knotweed would continue to spread and prevent native understory vegetation from developing. The No Action Alternative would therefore result in minor short- and long-term adverse impacts to vegetation.

Preferred Alternative
Under the Preferred Alternative, grazing would be permitted at the Burrell site under the planning framework criteria listed in Section 2.2. Nontraditional livestock grazing would be implemented as a vegetation management tool. For vegetation management, livestock would graze on vegetation that was previously managed with mowing, prescribed burns, or herbicide application, and they would graze on Japanese knotweed within the forested portions of the site.

Grazing as a vegetation management tool could reduce the need for herbicides and physical clearing, or replace them completely, by more effectively controlling invasive plants that reduce plant diversity, forage quality, and wildlife habitat (Davy et al. 2015). Prescribed grazing (proper timing, frequency, and intensity) has shown to be an effective tool in managing noxious and invasive weeds (DiTomaso et. al 2008; George et al. 1989; Lusk et al. 1961; Thomsen et al. 1993). Changes in vegetation composition would be expected to include reducing invasive species over the short and long term and increasing desirable and native species.

Grazing could also impact LM's 2018 pollinator seeding in beneficial or adverse ways. Traditional livestock grazing is generally not compatible with pollinator habitat; however, if proper timing of grazing were implemented (e.g., grazing was timed to avoid flowering or seeding windows), negative impacts would be reduced. Livestock could also be excluded with temporary fencing during critical periods if they are present in other areas to control vegetation

(e.g., Japanese knotweed control in the forest). Periodic disturbance via grazing within seeded prairie areas could reduce the need for mowing and prescribed burns.

Prescribed grazing could reduce vegetative cover and abundance of noxious and invasive weeds. However, livestock generally feed on a variety of species and thus could impact the cover, abundance, and production of other, nontargeted species. Adverse impacts (e.g., erosion) associated with traditional grazing (similar to those described in Section 4.1.1.1) would be negligible at sites grazed nontraditionally, because grazing would occur for substantially shorter periods.

Implementing grazing under the framework would require assessing and monitoring the site's vegetation. Under the framework, grazing would not be permitted if ecologists determined that adverse impacts outweighed benefits. If grazing is permitted, the licensee would adhere to accepted livestock management practices to ensure that vegetation is maintained in a healthy condition and to avoid undue damage or erosion to the site. Examples may include, but are not limited to, appropriate stocking rates and rotational grazing. At the Burrell site, the Preferred Alternative would result in moderate short- and long-term beneficial impacts to vegetation.

4.3.1.2 Wildlife

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on wildlife.

Preferred Alternative
The Preferred Alternative would not directly impact wildlife but would impact wildlife habitat. Moderate, long-term beneficial impacts to wildlife habitat may result by removing Japanese knotweed within forested areas of the site, as this would permit the establishment of native understory species that can fill forest canopy gaps over time. These changes, and beneficial impacts to the site's prairie areas, could improve wildlife habitat across the site.

4.3.1.3 Special Status Species

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on protected species.

Preferred Alternative
The Preferred Alternative would not directly impact special status species but could impact their habitat. Long-term, minor beneficial impacts may result from removing Japanese knotweed within forested areas of the site, as this would permit the establishment of native understory species that can fill forest canopy gaps over time. These changes, and beneficial impacts to the site's prairie areas, could improve habitat for special status species across the site.

4.3.2 Soils

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on soils.

Preferred Alternative
Increased compaction of soils could alter water infiltration rates and overland flows. Combined with decreased plot cover, soil could be lost due to water erosion, especially near streambanks if livestock are permitted to use riparian areas (Pellant et al. 2018). Therefore, the Preferred Alternative would result in minor adverse impacts.

4.3.3 Water Resources

4.3.3.1 Surface Water

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on surface water.

Preferred Alternative
Grazing is associated with increased soil compaction. At the Burrell site, increased compaction of soils could alter water infiltration rates and overland flows. Combined with decreased vegetative cover from grazing, soil could be lost due to water erosion, especially near streambanks if livestock are permitted to use riparian areas (Pellant et al. 2018). Adverse impacts would be expected to be short-term and minor, because livestock would be used for short periods, allowing vegetation and soils to recover between grazing cycles.

Long-term beneficial impacts may result from removing Japanese knotweed within forested riparian areas of the site, as this would allow native understory species to increase over time. Higher quality, intact riparian zones can mitigate eutrophication through shading (Burrell et al. 2014). Surface water quality may also benefit over time by reduced herbicide use, mowing, or prescribed burns, all of which can adversely impact nearby waters. However, livestock within the onsite wetland slough would trample and graze the vegetation, potentially resulting in decreased ground cover, increased runoff, and increased N and P input into the nearby Conemaugh River.

Because of the small scale of activities and the small size of the site, beneficial or adverse impacts are expected to be negligible. Therefore, the Preferred Alternative would result in negligible short- and long-term beneficial and adverse impacts to surface water.

4.3.3.2 Groundwater

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts on groundwater at the Burrell site.

4.3.4 Wetlands and Floodplains

4.3.4.1 Wetlands

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on wetlands.

Preferred Alternative
If nontraditional grazing were implemented at the Burrell site, livestock could impact the onsite wetland slough that contains emergent woody vegetation. Livestock are preferentially attracted to wetland areas because of the availability of water and lush vegetation, so impacts from grazing and trampling would be more intense in the slough than in surrounding areas. However, the slough contains primarily woody vegetation, which would be less attractive to grazing animals and more resilient under grazing pressure than the herbaceous invasive plants (common reed and purple loosestrife) within this wetland area. This could allow noninvasive woody species to increase over time. The Preferred Alternative would result in minor short-term adverse and minor long-term beneficial impacts to wetlands.

4.3.4.2 Floodplains

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts to floodplains at the Burrell site.

4.3.5 Air Quality

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on air quality.

Preferred Alternative
Under the Preferred Alternative, potential impacts on air pollutants such as O_3 or PM from vehicles used to transport or manage grazing animals would be negligible due to their small scale. Indirect beneficial or adverse effects on GHGs could result from changes in vegetation and resulting changes in C storage. Although they are difficult to predict, these effects would also be negligible due to the small amounts of forage available for grazing.

Unconfined livestock generate CH_4 and N_2O. These GHGs mainly come from two sources: enteric fermentation and manure. At the Burrell site, a maximum of 225 metric tons of CO_2 equivalent emissions would be expected to be generated annually from livestock grazing[4]. This is less than 0.003% of GHG emissions generated from the agriculture sector in Pennsylvania in 2015 (PADEP 2018). Therefore, the Preferred Alternative would result in minor long-term adverse impacts to air quality through GHG emissions.

[4] This calculation is based on the following assumptions: 2000 pounds per acre forage production, 72 acres of available forage at the Burrell site, and 100 kg CO_2 equivalent emissions per AUM, primarily from CH_4, as N_2O emissions from unconfined livestock are typically small and difficult to measure. This calculation is conservative, as livestock used for vegetation management typically graze for shorter periods and do not consume forage up to the carrying capacity of the land as traditional grazing animals would.

4.3.6 Cultural Resources

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

Preferred Alternative
A determination of "no historic property subject to effect" was conveyed to the Pennsylvania SHPO by LM on June 25, 2019 (Appendix A); no response has been received to date. The Preferred Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

4.3.7 Land Use and Recreation

4.3.7.1 Land Use

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on land use.

Preferred Alternative
Under the Preferred Alternative, grazing may be permissible following the procedures set forth in Section 2.2, though some modifications may need to be made to the LTSP to allow this use. The current zoning for the site location does not indicate any restrictions on livestock or agricultural use. In addition, since this is an UMTRCA Title I site, any change in the permitted uses would require the LTSP to be revised as grazing was not identified as a potential land use. Land uses on onsite areas may change during grazing periods. But because there would be no changes to surrounding land uses, no adverse impacts to land uses are anticipated.

4.3.7.2 Recreation

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on recreation.

Preferred Alternative
There is no public access to the site. There would be no changes to surrounding recreational uses, therefore, no adverse impacts to recreational uses are anticipated.

4.4 Canonsburg

4.4.1 Biological Resources

4.4.1.1 Vegetation

No Action Alternative
The No Action Alternative would have similar impacts to those of the Burrell site (see Section 4.3.1.1). The No Action Alternative would result in minor short- and long-term adverse impacts to vegetation.

Preferred Alternative
The Preferred Alternative would have similar impacts to those of the Burrell site (see Section 4.3.1.1) except that there would be no impacts to areas planted with pollinator species, as the Canonsburg site has no such area. The Preferred Alternative would result in moderate short- and long-term beneficial impacts to vegetation.

4.4.1.2 Wildlife

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on wildlife.

Preferred Alternative
The Preferred Alternative would result in impacts similar to those at the Burrell site (Section 4.3.1.3).

4.4.1.3 Special Status Species

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on special status species.

Preferred Alternative
The Preferred Alternative would have similar impacts to those described for the Burrell site in Section 4.3.1.3.

4.4.2 Soils

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on soils.

Preferred Alternative
Impacts would be similar to those at the Burrell site (Section 4.3.2).

4.4.3 Water Resources

4.4.3.1 Surface Water

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on surface water.

Preferred Alternative
Impacts would be similar to those described for the Burrell site in Section 4.3.3.1.

4.4.3.2 Groundwater

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts on groundwater at the Burrell site.

4.4.4 Wetlands and Floodplains

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts to wetlands or floodplains at the Canonsburg site.

4.4.5 Air Quality

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on air quality.

Preferred Alternative
Under the Preferred Alternative, impacts on air pollutants such as O_3 or PM from vehicles used to transport or manage grazing animals would be negligible due to their small scale. Indirect beneficial or adverse effects on GHGs could result from changes in vegetation and the resulting changes in C storage. Although they are difficult to predict, these effects would also be negligible due to the small amounts of forage available for grazing.

Unconfined livestock generate CH_4 and N_2O. These GHGs mainly come from two sources: enteric fermentation and manure. At the Canonsburg site, a maximum of 116 metric tons of CO_2 equivalent emissions would be expected to be generated annually from livestock grazing[5]. This is less than 0.002% of GHG emissions generated from the agriculture sector in Pennsylvania in 2015 (PADEP 2018). Therefore, the Preferred Alternative would result in minor long-term adverse impacts to air quality through GHG emissions.

[5] This calculation is based on the following assumptions: 2000 pounds per acre forage production, 37 acres of available forage at the Canonsburg site, and 100 kg CO_2 equivalent emissions per AUM, primarily from CH_4, as N_2O emissions from unconfined livestock are typically small and difficult to measure. This calculation is conservative, as livestock used for vegetation management typically graze for shorter periods and do not consume forage up to the carrying capacity of the land as traditional grazing animals would.

4.4.6 Cultural Resources

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

Preferred Alternative
Determination of "no historic property subject to effect" was conveyed to Pennsylvania SHPO on June 25, 2019 (Appendix A); no response has been received to date. The Preferred Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

4.4.7 Land Use and Recreation

4.4.7.1 Land Use

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on land use.

Preferred Alternative
Under the Preferred Alternative, grazing may be permissible following the procedures set forth in Section 2.2; however, some modifications may be needed in the LTSP to allow this use. The current zoning for the site location does indicate restrictions on livestock or agricultural use. LM could pursue a variance Zoning Hearing Board in accordance with the criteria established by the Pennsylvania Municipalities Planning Code (Act 247, as amended) because of special circumstances that apply.

In addition, since this is an UMTRCA Title I site, any change in the permitted uses would require revisions in the LTSP, as grazing was not identified as a potential land use. But because there would be no changes to surrounding land uses, no adverse impacts to land uses are anticipated.

4.4.7.2 Recreation

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on recreation.

Preferred Alternative
The site perimeter is identified with a 7-foot-high chainlink fence, and the mowed grass creates an empty, parklike atmosphere for the surrounding neighborhood. The Proposed Action would not substantially change the view shed but would alter it at times from a parklike atmosphere to a more pastoral view. Impacts to visual resources are generally associated with cultural resources impacts discussed under Section 3.6.6. No adverse impacts to surrounding recreational uses are anticipated.

4.5 Falls City

4.5.1 Biological Resources

4.5.1.1 Vegetation

No Action Alternative

The No Action Alternative would continue to exclude grazing at the Falls City site, but haying and mowing activities would continue. Because machinery cannot access all vegetation onsite (e.g., along fences), herbicide would continue to be used for vegetation management in these areas. Herbicide would continue to suppress vegetation, prevent ecological succession, and generate herbicide residue in the environment. Therefore, minor short- and long-term adverse impacts would result from the No Action Alternative at the Falls City site.

Preferred Alternative

Under the Preferred Alternative, grazing would be permitted at Falls City under the planning framework criteria listed in Section 2.2. Traditional livestock grazing could be implemented instead of hay production, or nontraditional grazing could be authorized as a vegetation management tool in conjunction with hay production in areas that are inaccessible to machinery. In the latter scenario, livestock would graze on vegetation that was previously managed with herbicide, and herbicide would no longer be used for this purpose. Traditional or nontraditional grazing could be authorized in a given season, depending on site conditions. For example, in a year with lower than average rainfall, traditional grazing may be more appropriate for pasture health than haying.

For traditional grazing, impacts would be similar to those described for the Ambrosia Lake site (Section 4.1.1.1). However, due to differences in vegetation composition, different plants would increase or decrease. At the Falls City site, palatable grasses like King Ranch bluestem, which compose most of the current site vegetation, would potentially decrease while unpalatable or toxic plants like Johnsongrass would increase.

Toxicity of Johnsongrass is dependent on environmental and seasonal conditions (Glidewell 2008). If this plant were to become toxic at the site, the rancher could remove the cattle from the pasture or cattle might avoid grazing the plant. Under this condition, Johnsongrass could become an increaser, and this could elevate the need to control it with herbicide or other techniques. On the other hand, traditional grazing could prevent stands of invasive woody plants like mesquite from developing, reducing the need for onsite herbicide application. Fewer applications of fertilizer and broadleaf herbicide would be needed in years where traditional grazing is implemented rather than haying operations.

At the Falls City site, nontraditional grazing would be used in conjunction with haying operations but only in areas inaccessible to machinery. Grazing these areas would be beneficial by avoiding regular herbicide use, but vegetation composition, cover, abundance, and production

would be expected to change in ways similar to those described for the Ambrosia Lake site (Section 4.1.1.1).

The Preferred Alternative would result in minor to moderate short-term and long-term beneficial and adverse impacts to vegetation at the Falls City site depending on grazing practices.

4.5.1.2 Wildlife

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on wildlife.

Preferred Alternative
The Falls City site is intensively managed for hay production. This use limits wildlife species that could be present. Changes in vegetation resulting from grazing would not significantly change wildlife habitat at the site. Therefore, the Preferred Alternative would not adversely or beneficially impact wildlife over the short or long term.

4.5.1.3 Special Status Species

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on special status species.

Preferred Alternative
Changes in vegetation resulting from grazing would not significantly change wildlife habitat at the site. Therefore, the Preferred Alternative would not adversely or beneficially impact special status species over the short or long term.

4.5.2 Soils

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on soils.

Preferred Alternative
Impacts would be similar to those described for the Ambrosia Lake site (Section 4.1.2). At the Falls City site in particular, the well-drained and slowly permeable soils across the highly disturbed site could be compacted by hoof action, resulting in ever-decreasing permeability and increased overland water flow. The organic-rich soil surface horizons surrounding the disposal cell could be diminished due to plant cover decline by grazing. Increased exposure to wind and water erosion may disperse organic materials or deposit them elsewhere (Neff et al. 2005).

4.5.3 Water Resources

4.5.3.1 Surface Water

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on surface water.

Preferred Alternative
The Preferred Alternative would result in long-term minor adverse impacts on surface water. Livestock could affect the site as described in Section 4.1.3.1 by increasing erosion, runoff, and N and P inputs to downstream water bodies. Appropriate grazing densities as prescribed in the framework would mitigate these adverse impacts. Also, nutrient loading from fertilizer applications and possible residue from herbicide applications would be reduced under livestock grazing, lessening impacts to downstream water bodies. Therefore, the Preferred Alternative would result in minor short- or long-term beneficial or adverse impacts on surface water.

4.5.3.2 Groundwater

No Action Alternative
The No Action Alternative would have no short- or long-term beneficial or adverse impacts on groundwater.

Preferred Alternative
Since this is an UMTRCA Title I site, any change in the permitted uses would require revisions in the LTSP (DOE 2008c), which notes, "This ground water is unsuitable for agricultural or domestic use because of the widespread ambient contamination that results from elevated levels of naturally occurring constituents." An IC at the site restricts the use of groundwater near the site's surface aquifers and also restricts the construction of wells or any means of exposing groundwater without written approval of the Texas Health and Human Services Commission and DOE. Any grazing of livestock would require water to be brought in from an outside source.

Any changes in N or residual herbicide reaching the site's groundwater under the Preferred Alternative would be negligible. The Preferred Alternative would have no short- or long-term adverse or beneficial impacts on groundwater.

4.5.4 Wetlands and Floodplains

Neither the No Action Alternative nor the Preferred Alternative would adversely or beneficially impact wetlands or floodplains over the short or long term because these resources are not present at the Falls City site.

4.5.5 Air Quality

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on air quality.

Preferred Alternative
Under the Preferred Alternative, impacts on air pollutants such as O_3 or PM from vehicles used to transport or manage grazing animals would be negligible due to their small scale. Indirect beneficial or adverse effects on GHGs could result from changes in vegetation and the resulting changes in C storage. Although they are difficult to predict, these effects would also be negligible due to the relatively small acreage of arid rangeland available for grazing.

Unconfined livestock generate CH_4 and N_2O. These GHGs mainly come from two sources: enteric fermentation and manure. At the Falls City site, a maximum of 500 metric tons of CO_2 equivalent emissions would be expected to be generated annually from livestock grazing[6]. No GHG emissions information for the agricultural sector is available for Texas for comparison. However, very small emissions associated with the Preferred Alternative would result in minor long-term adverse impacts to air quality.

4.5.6 Cultural Resources

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

Preferred Alternative
Determination of "no historic property subject to effect" was conveyed to the Texas SHPO on August 21, 2019 (see Appendix A). LM received a response on September 20, 2019, stating No Historic Properties Affected, Project May Proceed (Appendix A). The Preferred Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

4.5.7 Land Use and Recreation

4.5.7.1 Land Use

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on land use.

Preferred Alternative
Under the Preferred Alternative, grazing may be permissible following the procedures set forth in Section 2.2. The currently zoning for the site location does not indicate any restrictions on livestock or agricultural use. The Preferred Alternative would have no short- or long-term adverse or beneficial impacts on land use.

[6] This calculation is based on the following assumptions: 1600 pounds per acre forage production for shortgrass prairie rangeland, 200 acres of available acreage available for grazing at the Falls City site, and 100 kg CO_2 equivalent emissions per AUM, primarily from CH_4, as N_2O emissions from unconfined livestock are typically small and difficult to measure.

4.5.7.2 Recreation

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on recreation.

Preferred Alternative
There are no recreational facilities near this site, which is 8 miles from the town of Falls City in a rural area that is surrounded by farms and ranches. According to the American Community Survey conducted by the U.S. Census in 2017, Falls City is home to 838 residents (https://datausa.io/profile/geo/falls-city-tx/). ICs restrict the use of water and the construction of any structures on the property. The location and ICs would most likely restrict recreational use of this site.

4.6 Monticello

4.6.1 Biological Resources

4.6.1.1 Vegetation

No Action Alternative
The No Action Alternative would continue to exclude grazing from the Monticello site, which is grazed by wild animals (e.g., mule deer, elk, and rabbits) that mitigate long-term adverse impacts of excluding grazing on rangeland vegetation. The No Action Alternative would result in no short- or long-term beneficial or adverse impacts.

Preferred Alternative
To protect sensitive site features (e.g., scientific equipment associated with the lysimeter installed in the disposal cell cover), portions of the site may need to be fenced to exclude livestock. Under the Preferred Alternative, grazing would be permitted in unfenced portions of the Monticello site using the planning framework criteria listed in Section 2.2. Impacts would be similar to those described for the Ambrosia Lake site (Section 4.1.1.1).

Because of differences in vegetation cover, different species would be increasers and decreasers under grazing pressure. Species that could potentially increase include big sagebrush, James' galleta, rubber rabbitbrush, and smooth brome, while species that could decrease include western wheatgrass and bluebunch wheatgrass (DOE 2014; NRCS 2002). The Preferred Alternative would result in moderate adverse and beneficial short- and long-term impacts to vegetation at the Monticello site, depending on grazing practices.

4.6.1.2 Wildlife

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on wildlife.

Preferred Alternative
The Preferred Alternative may change how wildlife use the site by modifying soils and vegetation, which are components of wildlife habitat. Changes would likely be more profound for small species like voles that could inhabit the site than for species with larger ranges such as coyotes that would occasionally use the site. Changes would be difficult to predict and would depend on changes in vegetation resulting from specific grazing practices. In any case, adverse and beneficial effects would be expected to be minor because they would occur over a small area, and they would take place gradually over time as a grazing program was implemented. Therefore, the Preferred Alternative would result in minor long-term impacts to wildlife at the Monticello site that are neither beneficial nor adverse.

4.6.1.3 Special Status Species

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on protected species.

Preferred Alternative
The Preferred Alternative would modify designated critical habitat for the Gunnison sage-grouse, a species federally listed as threatened. If grazing were implemented, adverse effects to this habitat are possible. To authorize grazing, LM would consult with USFWS and mitigate any adverse impacts. However, under the framework, the benefits of grazing would not be great enough to justify modifying critical habitat, especially because the site is not remote (thereby negating beneficial effects provided by local ranchers), and it is already grazed by wildlife (thereby negating some of the effects of livestock grazing).

Other special status species that could be impacted by implementing traditional livestock grazing at the Monticello site include bald eagles, Brewer's sparrows, burrowing owls, ferruginous hawks, Gunnison's prairie dog, loggerhead shrike, monarch butterfly, sage sparrow, silky pocket mouse, Swainson's hawk, and white-tailed prairie dog. Because minor impacts would result from changes in vegetation, changes in habitat that could be beneficial or adverse over the long term.

The Preferred Alternative would result in moderate short- and long-term adverse impacts to special status species. However, these impacts would be avoided by LM's decision, through the framework, not to graze the site; this decision would be in place for as long as the site was within critical habitat.

4.6.2 Soils

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on soils.

Preferred Alternative
Impacts would be similar to those described for the Ambrosia Lake site (Section 4.1.2). At Monticello specifically, the site's sandy soils can probably withstand compaction by minor grazing with negligible impact to water infiltration. However, C, N, and P inputs to soil from

grazing activity may alter soil biochemistry, resulting in changes to regulation of water infiltration.

4.6.3 Water Resources

4.6.3.1 Surface Water

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on surface water.

Preferred Alternative
Large areas of the Monticello site could experience vegetation trampling under a grazing regime, resulting in decreased ground cover, increased erosion and runoff, and increased N and P input downstream of the site. Runoff water reaches Montezuma Creek more than a mile from the site. The Preferred Alternative would therefore result in long-term negligible adverse impacts on surface water.

4.6.3.2 Groundwater

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts on groundwater.

4.6.4 Wetlands and Floodplains

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts because these resources are not present.

4.6.5 Air Quality

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on air quality.

Preferred Alternative
Under the Preferred Alternative, impacts on air pollutants such as O_3 or PM from vehicles used to transport or manage grazing animals would be negligible due to their small scale. Indirect beneficial or adverse effects on GHGs could result from changes in vegetation and the resulting changes in C storage. Although they are difficult to predict, these effects would also be negligible due to the relatively small acreage of arid rangeland available for grazing.

Unconfined livestock generate CH_4 and N_2O. These GHGs mainly come from two sources: enteric fermentation and manure. At the Monticello site, a maximum of 2000 metric tons of CO_2 equivalent emissions would be expected to be generated annually from livestock grazing[7]. No GHG emissions information for the agricultural sector is available for Utah for comparison.

[7] This calculation is based on the following assumptions: 800 pounds per acre forage production for cold desert rangeland, 1600 acres of available acreage available for grazing at the Monticello site, and 100 kg CO_2 equivalent emissions per AUM, primarily from CH_4, as N_2O emissions from unconfined livestock are typically small and difficult to measure.

However, very small emissions associated with the Preferred Alternative would result in minor long-term adverse impacts to air quality.

4.6.6 Cultural Resources

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

Preferred Alternative
Determination of "no historic property subject to effect" was conveyed to the Utah SHPO on July 8, 2019 (Appendix A); no response has been received to date. The Preferred Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

4.6.7 Land Use and Recreation

4.6.7.1 Land Use

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on land use.

Preferred Alternative
Under the Preferred Alternative, grazing may be permissible following the procedures set forth in Section 2.2; however, since this is an NPL site, modifications to the use of the disposal cell and associated features would need to be addressed in accordance with CERCLA and the state of Utah to assure that the remedy remains protective.

4.6.7.2 Recreation

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts on recreation because these resources are not present.

4.7 Parkersburg

4.7.1 Biological Resources

4.7.1.1 Vegetation

No Action Alternative
Under the No Action Alternative, herbicide applications and mowing would continue to be the primary methods to control vegetation at the site. These methods are generally effective, so the No Action Alternative would result in no short- or long-term beneficial or adverse impacts to vegetation.

Preferred Alternative
The Preferred Alternative would impact vegetation in ways that are similar to those described for the Burrell site (Section 4.3.1.1). Impacts related to forested areas and the pollinator area would not apply at the Parkersburg site because these resources are not present at the Parkersburg site.

4.7.1.2 Wildlife

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts on wildlife.

4.7.1.3 Special Status Species

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts on protected species.

4.7.2 Soils

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on soils.

Preferred Alternative
Impacts would be similar to those described for the Burrell site (Section 4.3.2).

4.7.3 Water Resources

4.7.3.1 Surface Water

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on surface water.

Preferred Alternative
Surface water quality may increase over time by reduced herbicide use, mowing, or prescribed burns, all of which can adversely impact nearby waters. Beneficial impacts are expected to be negligible, however, because of the small scale of activities and the small size of the site. Therefore, the Preferred Alternative would result in negligible short- and long-term beneficial impacts to surface water.

4.7.3.2 Groundwater

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts on groundwater at the Parkersburg site.

4.7.4 Wetlands and Floodplains

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts on wetlands or floodplains because there are no potential wetlands or floodplains present at the Parkersburg site.

4.7.5 Air Quality

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on air quality.

Preferred Alternative
Under the Preferred Alternative, impacts on air pollutants such as O_3 or PM from vehicles used to transport or manage grazing animals would be negligible due to their small scale. Indirect beneficial or adverse effects on GHGs could result from changes in vegetation and the resulting changes in C storage. Although they are difficult to predict, these effects would also be negligible due to the small amounts of forage available for grazing.

Unconfined livestock generate CH_4 and N_2O. These GHGs mainly come from two sources: enteric fermentation and manure. At the Parkersburg site, a maximum of 47 metric tons of CO_2 equivalent emissions would be expected to be generated annually from livestock grazing[8]. No GHG emissions information for the agricultural sector is available for West Virginia for comparison. However, very small emissions associated with the Preferred Alternative would result in minor long-term adverse impacts to air quality.

4.7.6 Cultural Resources

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

Preferred Alternative
Determination of "no historic property subject to effect" was conveyed to the West Virginia SHPO on June 25, 2019 (Appendix A); no response has been received to date. The Preferred Alternative would have no short- or long-term adverse or beneficial impacts on cultural resources.

4.7.7 Land Use and Recreation

4.7.7.1 Land Use

No Action Alternative
The No Action Alternative would have no short- or long-term adverse or beneficial impacts on land use.

Preferred Alternative
Under the Preferred Alternative, grazing may be permissible following the procedures set forth in Section 2.2; however, some modifications to restrictions may be needed to allow this use.

4.7.7.2 Recreation

Neither the No Action Alternative nor the Preferred Alternative would have short- or long-term adverse or beneficial impacts on recreation because these resources are not present.

[8] This calculation is based on the following assumptions: 2000 pounds per acre forage production, 15 acres of available forage at the Parkersburg site, and 100 kg CO_2 equivalent emissions per AUM, primarily from CH_4, as N_2O emissions from unconfined livestock are typically small and difficult to measure. This calculation is conservative, as livestock used for vegetation management typically graze for shorter periods and do not consume forage up to the carrying capacity of the land as traditional grazing animals would.

4.8 Conclusions

Implementing Alternative 2 (Preferred Alternative) or the No Action Alternative would result in negligible to minor impacts to the physical environment at LM sites. The conclusion, a FONSI, is predicated upon implementing best management practices and mitigation measures during and immediately following proposed activities. Collectively, best management practices and mitigation measures to be implemented have been identified and are summarized in Table 10.

Based on the analyses presented in this PEA and information provided by all consulted personnel, the proposed activities would not have significant impacts on the resources considered. Therefore, preparing an Environmental Impact Statement is not warranted at this time. This decision is documented through a FONSI.

Table 10. Summary of Best Management Practices and Mitigation Measures

Resource Area	Proposed Best Management Practices and Mitigation Measures under Alternative 2
Overall site conditions	• Implement the planning framework to guide decision-making about implementing grazing at a site based on ecological health and regulatory constraints. • Use fencing to exclude livestock from sensitive site resources such as scientific measurement devices, telemetry equipment, and other potentially fragile structures.
Biological resources and soils	• Establish baseline vegetation and soils data at sites for which no data have been collected. Collect rangeland health monitoring data periodically to compare to baseline conditions. Use this information to inform land management decisions and ensure that proper stocking rates and grazing practices are being implemented by licensees. • Use fencing to exclude livestock as needed from sensitive plant communities, riparian areas, wetlands, and other sensitive portions of a site. • Establish erosion control measures to the extent practicable. • Avoid areas of designated critical habitat.
Water resources, wetlands, and floodplains	• Use fencing to exclude livestock if necessary from sensitive wetland or riparian environments to maintain water quality and preserve wetland vegetation.
Air quality	No mitigation measures.
Cultural resources	No mitigation measures.
Land use and recreation	No mitigation measures.

5.0 Cumulative Impacts

This section considers cumulative impacts for each of the seven sites identified as candidates for grazing activities.

CEQ regulations for implementing NEPA define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). CEQ guidance states, "It is not practical to analyze the cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful."

Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies or individuals. Informed decision-making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future, regardless of whether they are approved or funded. Cumulative impacts were determined by combining the incremental impacts of the Preferred Alternative with other past, present, and reasonably foreseeable future actions.

Present actions include livestock grazing, development, and vegetation management in areas surrounding LM sites. LM is not aware of any development projects near the seven sites that would contribute to cumulative effects. No related past or reasonably foreseeable future actions could be identified.

5.1 Cumulative Impacts Analysis

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time in which the effects could occur. Potential impacts of the Preferred Alternative at each of the seven identified sites are generally considered negligible to minor and would only occur at the specific site.

Analysis from this PEA has determined that there would be negligible adverse additive impacts from any ongoing or concurrent activity within the local surrounding communities of these sites. A summary of impact potential and the type of impacts are listed in Table 11.

4203 *Table 11. Potential Cumulative Impacts to Resources from Implementation of the Preferred Alternative*
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Resource	Cumulative Impact Potential	Type of Impact
Vegetation	Negligible	Adverse impacts resulting from livestock trails; negative changes to vegetation, trampling, erosion, and weed spread at sites traditionally grazed. While these impacts would be moderate on the sites themselves, cumulative impacts would be negligible due to the small acreage of the LM sites compared to surrounding grazed lands.
	Negligible	Beneficial impacts from increased productivity and positive changes in vegetation at sites traditionally grazed. While these impacts would be minor on the sites themselves, cumulative impacts would be negligible because of the small acreage of LM sites.
	Minor	Beneficial impacts from enhanced invasive weed control and reduced herbicide use at sites where nontraditional grazing is proposed. More effective weed control would positively contribute to weed control efforts by surrounding landowners and agencies by removing or reducing sources of noxious weeds that could continue to spread.
Wildlife	Negligible	Neither beneficial nor adverse. Due to the small size of the LM sites compared to wildlife habitat in surrounding areas, cumulative impacts to wildlife would be negligible.
Special status species	Negligible	Adverse impacts to special status species only at the Monticello site. However, mitigation measures (implementing the framework) would not allow grazing at this site and avoid impacts.
	Negligible	Beneficial impacts from nontraditional grazing could improve habitat for special status species potentially using LM sites or surrounding areas. The small acreage would make cumulative effects negligible.
Soils	Negligible	Adverse impacts resulting from soil compaction and vegetation removal. While these impacts would be moderate on the sites themselves, cumulative impacts would be negligible due to the small acreage of the LM sites compared to surrounding grazed lands.
	Negligible	Beneficial impacts resulting from increased soil organic matter. While these impacts would be minor on the sites themselves, cumulative impacts would be negligible due to the small acreage of the LM sites compared to surrounding grazed lands.

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6.0 People and Agencies Consulted

NEPA and CEQ regulations require federal agencies to consult with other federal agencies, federally recognized tribal governments, and state and local agencies with jurisdiction or special expertise on any environmental impact of federal actions. Agencies include those with authority to issue applicable permits, licenses, and other regulatory approvals, as well as those responsible for protecting significant resources (such as endangered species, critical habitats, or historic resources).

The following agencies, organizations, or individuals were contacted as part of the consultation process or were contacted to provide subject matter expertise. The scoping notification letter template is included in Appendix B, and Appendix C lists all the stakeholders who received a notification letter.

Federal Agencies

Nuclear Regulatory Commission, Division of Decommissioning, Uranium Recovery, and Waste Programs MS T-5A10

Office of Sustainable Environmental Stewardship, DOE (AU-21)

U.S. Bureau of Indian Affairs

U.S. Department of the Interior, Office of Environmental Policy and Compliance, Albuquerque Region

U.S. Department of the Interior, Office of Environmental Policy and Compliance, Denver Region

U.S. Department of the Interior, Office of Environmental Policy and Compliance, Philadelphia Region

USEPA Region 3

USEPA Region 6

USEPA Region 8

State Agencies

Field Representative/Navajo Nation Liaison, New Mexico

Field Representative for Tom Udall, U.S. Senate, New Mexico

Nanbé Ówîgeh, New Mexico Field Representative

New Mexico Environment Department
Office of Energy, State of West Virginia

Pennsylvania Department of Environmental Protection
Public Lands Policy Coordination Office, State of Utah

Texas Commission on Environmental Quality

Victims of Mill Tailings Exposure, Utah

Local Agencies

Acoma Environment Department
Acoma, New Mexico

City of Milan, New Mexico

City of Grants, New Mexico

Mayor, Canonsburg, Pennsylvania

Pueblo of Laguna Environmental Program
Laguna, New Mexico

Tribes

State and Tribal Government Working Group
Executive Committee
DOE STGWG Point of Contact, EM 3.2

AML/UMTRCA Department Manager
Navajo Nation, Arizona

Other Organizations

Policy Advisor, Western Governors Association

Natural Resources Committee, National Governors Association

U.S. Closed Sites Manager

Multicultural Alliance for a Safe Environment

Utah Cattleman's Association

7.0 References

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10 CFR 40.27. U.S. Nuclear Regulatory Commission, "General license for custody and long-term care of residual radioactive material disposal sites," *Code of Federal Regulations*.

10 CFR 40.28. U.S. Nuclear Regulatory Commission, "General license for custody and long-term care of uranium or thorium byproduct materials disposal sites," *Code of Federal Regulations*.

10 CFR 1021. U.S. Department of Energy, "National Environmental Policy Act Implementing Procedures," *Code of Federal Regulations*.

32 CFR 229. "Protection of Archaeological Resources: Uniform Regulations," *Code of Federal Regulations*.

36 CFR 60.4. National Park Service, U.S. Department of the Interior, "Criteria for evaluation," *Code of Federal Regulations*.

36 CFR 800. "Protection of Historic Properties," *Code of Federal Regulations*.

40 CFR 61. "National Emission Standards for Radon Emissions from Department of Energy Facilities," Subpart Q, *Code of Federal Regulations*.

40 CFR 192. "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," *Code of Federal Regulations*.

40 CFR 1500–1508. Council on Environmental Quality, "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act," *Code of Federal Regulations*.

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33 USC 1251 et seq. "Clean Water Act of 1977," *United States Code.*

42 USC 300f et seq. "Safe Drinking Water Act," *United States Code.*

42 USC 4321 et seq. "National Environmental Policy Act of 1969," *United States Code.*

42 USC 6901 et seq. "Resource Conservation and Recovery Act," *United States Code*.

42 USC 7401 et seq. "Clean Air Act of 1970," *United States Code*.

42 USC 9601 et seq. "Comprehensive Environmental Response, Compensation, and Liability Act of 1980," *United States Code*.

42 USC 101719. "Nuclear Waste Policy Act of 1982," Subtitle D Section 151(c), *United States Code.*

54 USC 300101 et seq. "National Historic Preservation Act of 1966," *United States Code.*

54 USC 300308. "Historic Property," *United States Code*.

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8.0 List of Preparers

Joyce Chavez, LM, NEPA Compliance Officer and Document Manager

Padraic Benson, LM, Public Affairs Specialist

Jim Denier, LMS, NEPA Coordinator

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Ken Greenhill, LMS, Contributing Author

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Linda Sheader, LMS, Contributing Author

Joe Trnka, LMS, Contributing Author

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Appendix A

National Historic Preservation Act Section 106 Consultation Letters

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Department of Energy
Washington, DC 20585

July 2, 2019

Jeff Pappas, Ph.D., State Historic Preservation Officer
New Mexico Historic Preservation Division
Department of Cultural Affairs
Battan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, NM 87501

Subject: Consultation Regarding Proposed Grazing at the Ambrosia Lake, New Mexico, Disposal Site

Dear Dr. Pappas:

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is evaluating the use of controlled grazing to manage vegetation at this location. Cattle or goats would be brought in to graze; thereby reducing vegetation to manageable levels. The use of grazing is anticipated to reduce or eliminate the need to control vegetation using either mechanical methods or using herbicides. The on-site vegetation would be managed for control by animals. The grazing activity would be monitored so that it is stopped at the correct time to prevent the land from being overgrazed. Access is provided by existing roads.

It is our determination, in accordance with Section 106 of the National Historic Preservation Act of 1966 and the operating regulations in Title 36 *Code of Federal Regulations* Section 800 (36 CFR 800), the proposed project is defined as an undertaking (36 CFR 800.16(y)). This undertaking is the type of activity that has the potential to influence historic properties, and so we are initiating the Section 106 consultation process with your office.

The area of potential effect for this undertaking is the entire 290-acre disposal site. Access would be provided via existing roads. The enclosed map depicts the location of the area previously surveyed for archaeological sites and the location of the previously identified sites at the Ambrosia disposal site. Given the age of the available data, we are delaying our decision regarding the determination of effect. Instead, we intend to collect additional data regarding the archaeological resources at the Ambrosia site. To that end, we intend on sending a cultural resource professional to your office in July to obtain copies of relevant Ambrosia reports and correspondence found in your files that would inform our determination of effect on the resources at this location. It is our intent that a determination of effect on grazing at Ambrosia would be made after this data collection effort.

Please contact me at (970) 248-6550 or Bernadette.Tsosie@lm.doe.gov, if you have any questions. Please address any correspondence to:

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

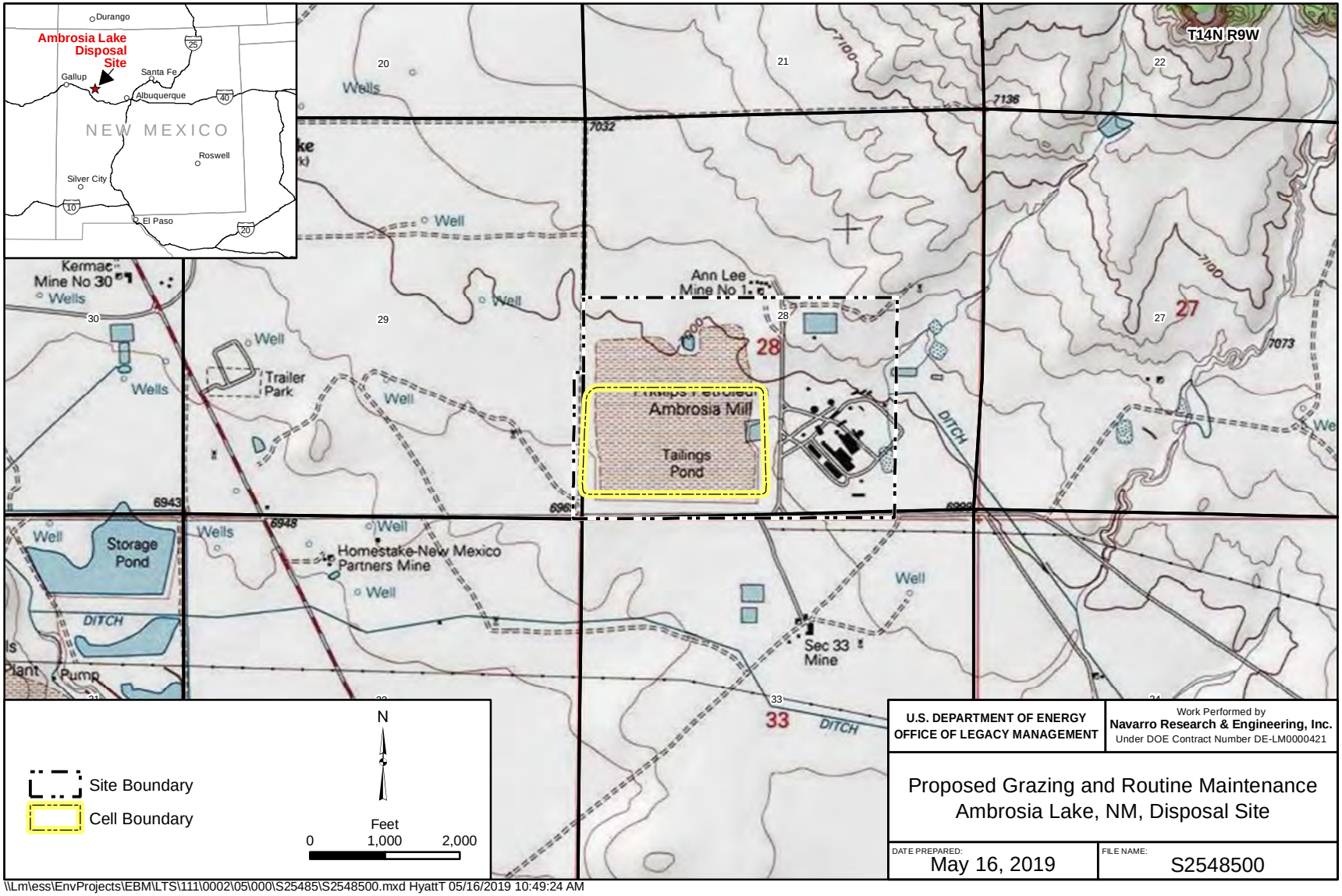
Sincerely,

Bernadette Tsosie

Bernadette Tsosie
Site Manager

Enclosure

cc w/enclosure:
P. Benson, DOE-LM (e)
J. Chavez, DOE-LM (e)
T. Ribeiro, DOE-LM (e)
J. Denier, Navarro (e)
A. Houska, Navarro (e)
A. Kuhlman, Navarro (e)
S. Osborn, Navarro (e)
J. Trnka, Navarro (e)
DOE Read File
File: AMB 3000-07



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Department of Energy
Washington, DC 20585

July 16, 2019

Jeff Pappas, Ph.D., State Historic Preservation Officer
New Mexico Historic Preservation Division
Department of Cultural Affairs
Battan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, NM 87501

Subject: Consultation Regarding Proposed Grazing at the Bluewater, New Mexico, Disposal Site

Dear Dr. Pappas:

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is evaluating the use of controlled grazing to manage vegetation at the Bluewater Uranium Mill Tailings Radiation Control Act (UMTRCA) Disposal Site. Cattle, sheep, or goats would be brought in to control vegetation in parts of the site where mechanical methods or herbicides are now used. The grazing activity would be monitored so it is stopped at the correct time to prevent the land from being overgrazed, and to preclude grazing where vegetation control is not needed.

It is our determination, in accordance with Section 106 of the National Historic Preservation Act of 1966 and the operating regulations in Title 36 *Code of Federal Regulations* Section 800 (36 CFR 800), that the proposed project is defined as an undertaking (36 CFR 800.16(y)). This undertaking is the type of activity that has the potential to influence historic properties; therefore, we are initiating the Section 106 consultation process with your office.

The area of potential effect for this undertaking is the entire 3300-acre disposal site. Access would be provided via existing roads. The enclosed map depicts the location of the area previously surveyed for archaeological sites and the location of the previously identified sites at the Bluewater disposal site. To make an informed determination, we are delaying the determination of effect until we have completed a records review at your office. To that end, we intend on sending a cultural resource professional to your office in July to obtain copies of relevant Bluewater reports and correspondence found in your files that would inform our determination of effect on the resources at this location. It is our intent that a determination of effect on grazing at Bluewater would be made subsequent to this data collection effort.

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Please contact me at (970) 248-6550 or Bernadette.Tsosie@lm.doe.gov, if you have any questions. Please address any correspondence to:

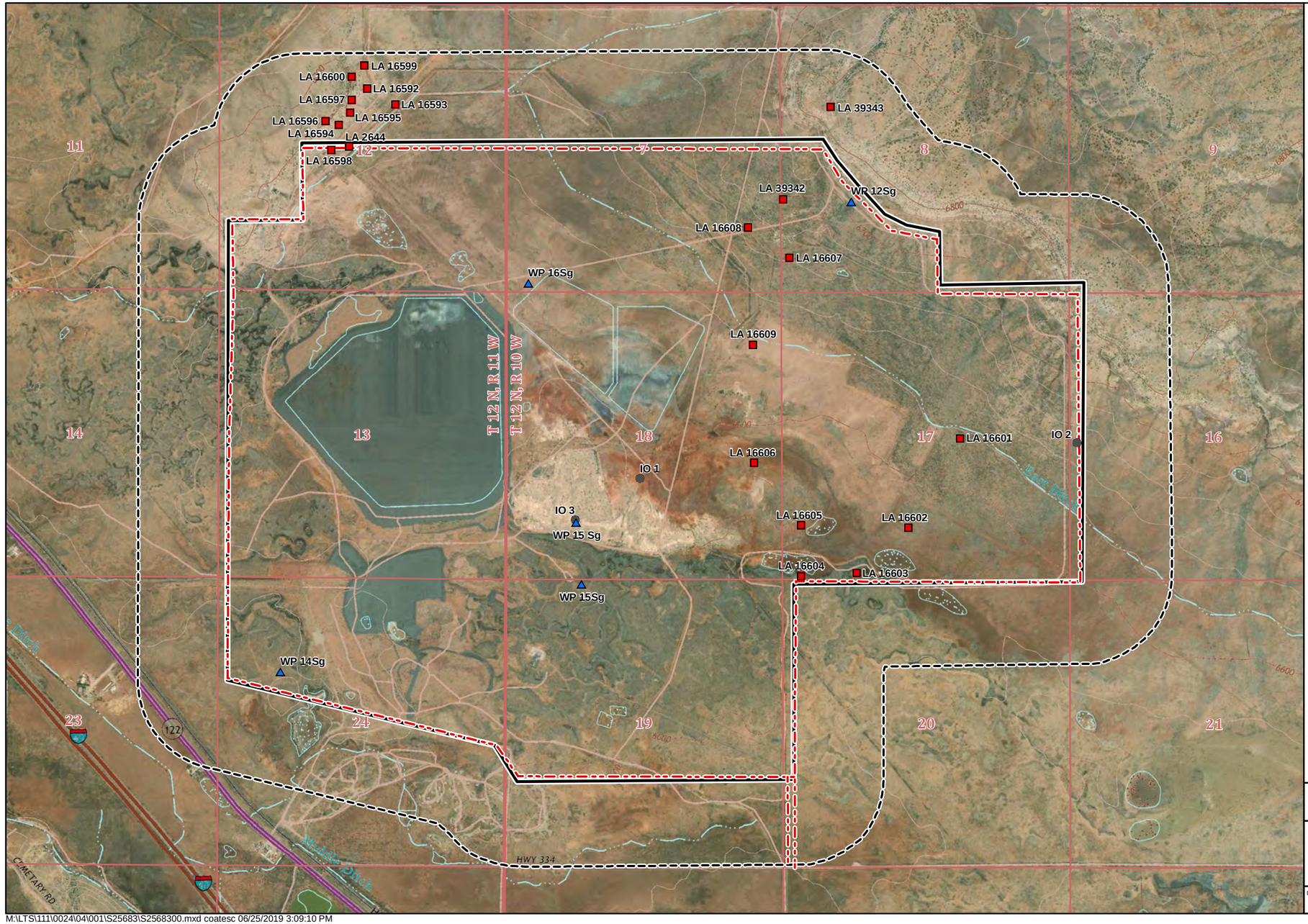
U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

Sincerely,

Bernadette Tsosie
Site Manager

Enclosure

cc w/enclosure:
P. Benson, DOE-LM (e)
J. Chavez, DOE-LM (e)
T. Ribeiro, DOE-LM (e)
J. Denier, Navarro (e)
A. Houska, Navarro (e)
A. Kuhlman, Navarro (e)
S. Osborn, Navarro (e)
J. Trnka, Navarro (e)
DOE Read File
File: BLU 3000-07



Legend

- Previously Recorded Site [1]
- Well Pad [1]
- Isolated Occurances [1]
- DOE Bluewater Disposal Site Boundary
- 500 Meter ARMS Buffer [1]
- Project Area [1]
- Township [2]
- Section [2]

Data Sources:
[1] Digitized from Lone Mountain Archaeological Services Bluewater Disposal Site Cultural Resource Survey map.
[2] BLM Cadastral National Spatial Data Infrastructure (CadNSDI)

Base Map:
USGS 7.5" Topographic Maps
Bluewater and Milan, NM (2017)

World Imagery Service Layer Credits:
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Imagery Date:
April 4, 2016

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Scale in Feet
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U.S. DEPARTMENT OF ENERGY
OFFICE OF LEGACY MANAGEMENT

Work Performed by
Navarro Research & Engineering, Inc.
Under DOE Contract Number DE-LM0000421

Proposed Grazing
Bluewater, NM, Disposal Site

DATE PREPARED: June 25, 2019

FILE NAME: S2568300

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Department of Energy
Washington, DC 20585

June 25, 2019

Ms. Andrea L. MacDonald, Deputy State Historic Preservation Officer
Pennsylvania Historical and Museum Commission
State Historic Preservation Office
Commonwealth Keystone Building, Second Floor
400 North Street
Harrisburg, PA 17120-0093

Subject: Consultation Regarding Grazing and Minor Maintenance Activity at the Burrell, Pennsylvania, Disposal Site

Dear Ms. MacDonald:

Thank you for your recent correspondence dated March 5, 2019, regarding our consultation with your office regarding our proposal to construct four permanent concrete aerial survey monument markers at the Burrell, Pennsylvania, Uranium Mill Tailings Radiation Control Act Title I Disposal Site in the next 12 months. Your office responded with a "No Effect" finding to our determination.

At this time, the U.S. Department of Energy (DOE), Office of Legacy Management (LM) would like to introduce a new proposed action for the Burrell disposal site. LM is contemplating the use of controlled grazing to manage vegetation at this location. Cattle or goats would be brought in to graze, thereby reducing vegetation to manageable levels. The use of grazing is anticipated to reduce or eliminate the need to control vegetation using either mechanical methods or herbicides. The onsite vegetation would be managed for control by animals. The grazing activity would be monitored so it is stopped at the correct time to prevent the land from being overgrazed.

There are other, minor tasks that may take place at the Burrell disposal site in the next few years. Primarily, these are associated with the maintenance and upkeep of the site boundary fence. Fence posts or fencing may need to be repaired or replaced, both to continue to provide site security and to facilitate controlled grazing of the site. Access to the disposal cell is provided by existing roads.

It is our determination, in accordance with Section 106 of the National Historic Preservation Act of 1966 and the operating regulations in Title 36 *Code of Federal Regulations* Section 800 (36 CFR 800), that the proposed project is defined as an undertaking in accordance with the definition found at 36 CFR 800.16(y). This undertaking is the type of activity with the potential to influence historic property, so we are initiating the Section 106 consultation process with your office. The areas of potential effect for this undertaking is the entire surface area within the disposal boundary fence as shown on the enclosed map.

In accordance with 36 CFR 800.4(d)(1), it is our determination there is no historic property present within the area of potential effect of the proposed project. This is due to the extensive disturbance that occurred during construction of the disposal cell.

Should unidentified archaeological resources be discovered during the project, work would be interrupted until the resources have been evaluated for National Register of Historic Places eligibility criteria (36 CFR 60.4) in consultation with your office, in accordance with 36 CFR 800.13. If the scope of work changes substantially, additional consultation with your office may be required.

Please contact me at (304) 413-0807 or Cliff.Carpenter@lm.doe.gov, if you have any questions. Please send any correspondence to:

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

Sincerely,

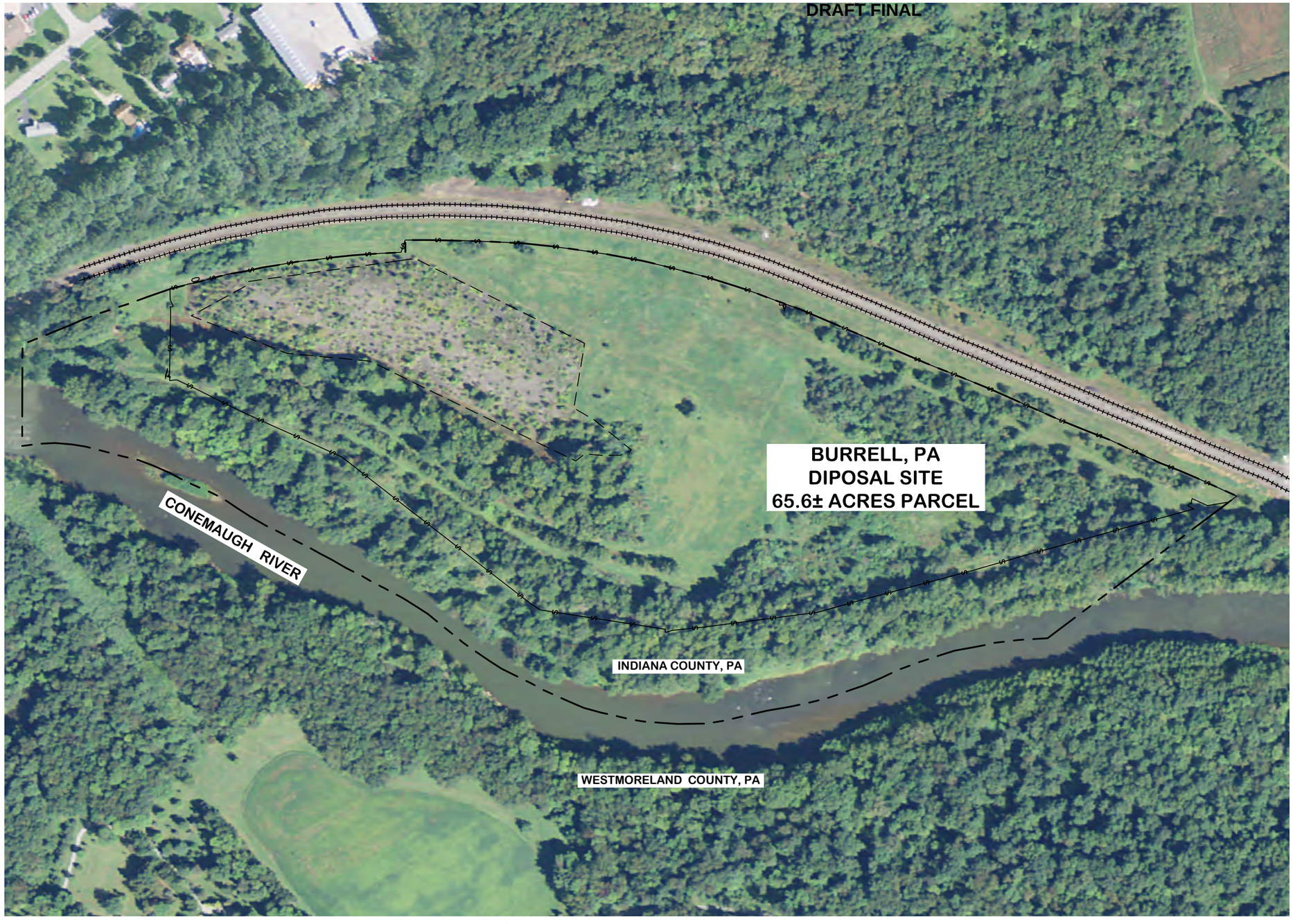
Cliff Carpenter
Site Manager

Enclosures

cc w/o enclosures:
P. Benson, DOE-LM (e)
T. Ribeiro, DOE-LM (e)
K. Broberg, Navarro (e)
S. Osborn, Navarro (e)
A. Palmieri, Navarro (e)
J. Trnka, Navarro (e)

cc w/ enclosures:
DOE Read File
File: BUR 3000-03

DRAFT FINAL



SITE MAP

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SCALE IN FEET
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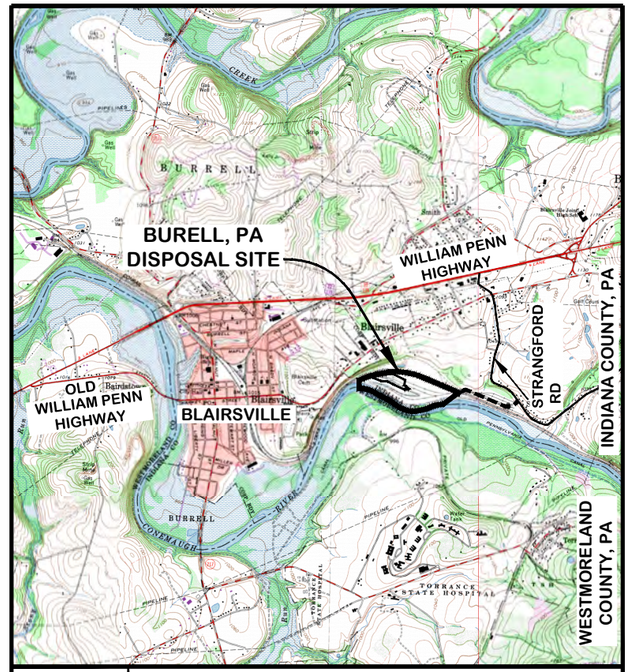

VICINITY MAP

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SCALE IN FEET
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LEGEND

- SITE BOUNDARY
- DISPOSAL CELL BOUNDARY
- CHAINLINK FENCE
- RAILROAD TRACKS

U.S. DEPARTMENT OF ENERGY | Legacy Management
GRAND JUNCTION, COLORADO

Work Performed Under DOE Contract No. DE-LM0000421
NAVARRO Navarro Research and Engineering, Inc.
Contractor to the U.S. Department of Energy Office of Legacy Management

Figure 1 — Proposed Grazing & Minor Maintenance
Burrell, Indiana County,
Pennsylvania Disposal Site

DATE PREPARED: May 15, 2019

FILENAME: S2547700

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Department of Energy
Washington, DC 20585

June 25, 2019

Ms. Andrea L. MacDonald, Deputy State Historic Preservation Officer
Pennsylvania Historical and Museum Commission
State Historic Preservation Office
Commonwealth Keystone Building, Second Floor
400 North Street
Harrisburg, PA 17120-0093

Subject: Consultation Regarding Grazing and Minor Maintenance Activity at the Canonsburg, Pennsylvania, Disposal Site

Dear Ms. MacDonald:

Thank you for your recent correspondence dated March 5, 2019, regarding our consultation with your office regarding our proposal to construct four permanent concrete aerial survey monument markers at the Canonsburg, Pennsylvania, Uranium Mill Tailings Radiation Control Act Title I Disposal Site in the next 12 months. Your office responded with a "No Effect" finding to our determination.

At this time, the U.S. Department of Energy (DOE), Office of Legacy Management (LM) would like to introduce a new proposed action for the Canonsburg disposal site. LM is contemplating the use of controlled grazing to manage vegetation at this location. Cattle or goats would be brought in to graze, thereby reducing vegetation to manageable levels. The use of grazing is anticipated to reduce or eliminate the need to control vegetation using either mechanical methods or herbicides. The onsite vegetation would be managed for control by animals. The grazing activity would be monitored so it is stopped at the correct time to prevent the land from being overgrazed.

There are other, minor tasks that may take place at the Canonsburg disposal site in the next few years. Primarily, these are associated with the maintenance and upkeep of the site boundary fence. Fence posts or fencing may need to be repaired or replaced, both to continue to provide site security and to facilitate controlled grazing of the site. Access to the disposal cell is provided by existing roads.

It is our determination, in accordance with Section 106 of the National Historic Preservation Act of 1966 and the operating regulations in Title 36 *Code of Federal Regulations* Section 800 (36 CFR 800), that the proposed project is defined as an undertaking in accordance with the definition found at 36 CFR 800.16(y). This undertaking is the type of activity with the potential to influence historic property, so we are initiating the Section 106 consultation process with your office. The areas of potential effect for this undertaking is the entire surface area within the disposal boundary fence as shown on the enclosed map.

In accordance with 36 CFR 800.4(d)(1), it is our determination there is no historic property present within the area of potential effect of the proposed project. This is due to the extensive disturbance that occurred during construction of the disposal cell.

Should unidentified archaeological resources be discovered during the project, work would be interrupted until the resources have been evaluated for National Register of Historic Places eligibility criteria (36 CFR 60.4) in consultation with your office, in accordance with 36 CFR 800.13. If the scope of work changes substantially, additional consultation with your office may be required.

Please contact me at (304) 413-0807 or Cliff.Carpenter@lm.doe.gov, if you have any questions. Please send any correspondence to:

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

Sincerely,

Cliff Carpenter
Site Manager

Enclosures

cc w/o enclosures:
P. Benson, DOE-LM (e)
T. Ribeiro, DOE-LM (e)
K. Broberg, Navarro (e)
S. Osborn, Navarro (e)
A. Palmieri, Navarro (e)
J. Trnka, Navarro (e)

cc w/ enclosures:
DOE Read File
File: CAN 3000-03

DRAFT FINAL

SITE MAP

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SCALE IN FEET
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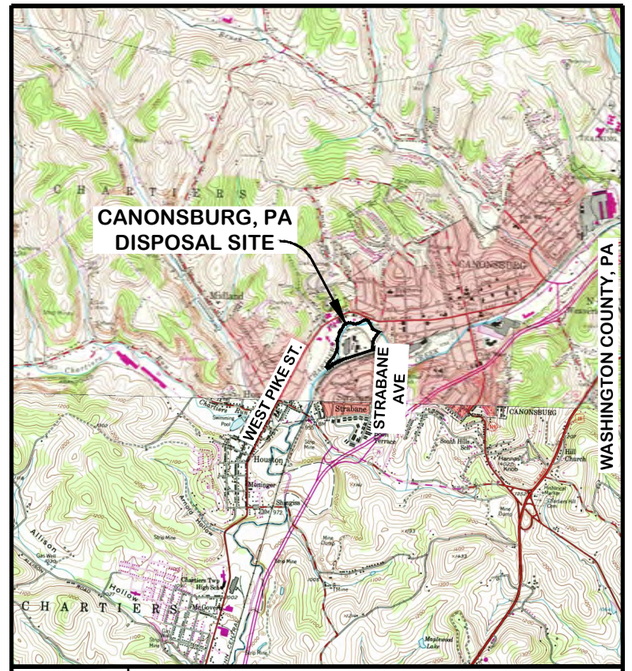

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VICINITY MAP

SCALE IN FEET
2640 1320 0 2640 5280 7920

LEGEND

- SITE BOUNDARY
- DISPOSAL CELL BOUNDARY
- CHAINLINK FENCE

U.S. DEPARTMENT OF ENERGY | Legacy Management
GRAND JUNCTION, COLORADO

Work Performed Under DOE Contract No. DE-LM0000421
NAVARRO Navarro Research and Engineering, Inc.
Contractor to the U.S. Department of Energy Office of Legacy Management

Figure 1 — Proposed Grazing & Minor Maintenance Canonsburg, Washington County, Pennsylvania Disposal Site

DATE PREPARED: May 15, 2019

FILENAME: S2547700

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Department of Energy
Washington, DC 20585

August 21, 2019

Mr. Casey Hanson
Texas Historical Commission
PO Box 12276
Austin, TX 78711

Subject: Consultation Regarding Grazing and Installation of Aerial Survey Monument Markers at the Falls City, Texas, Site

Dear Mr. Hanson:

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is proposing to conduct controlled grazing at the Falls City, Texas, Uranium Mill Tailings Radiation Control Act Title I Disposal Site located in Karnes County, Texas, to manage vegetation at this location. Cattle or goats would be brought in to graze, thereby reducing vegetation to manageable levels. The use of grazing is anticipated to reduce or eliminate the need to control vegetation using either mechanical methods or herbicides. The grazing activity would be monitored to prevent the land from being overgrazed.

LM is also proposing to construct permanent aerial survey monument markers at this location in the next 12 months. These monuments, as described on the enclosed engineering drawing, would be constructed near the engineered disposal cell to provide reliable, repeatable monuments for aerial surveys. The surveys are expected to be conducted by unmanned aerial vehicles, aircraft, or helicopters, depending on the types of sensors being used. The data being collected is expected to facilitate long-term management of the engineered cover at this disposal cell. Access would be via existing roads.

It is our determination, in accordance with Section 106 of the National Historic Preservation Act of 1966, and the operating regulations in Title 36 *Code of Federal Regulations* Section 800 (36 CFR 800), that the proposed grazing activity and the proposed construction of aerial survey monuments are defined as undertakings in accordance with the definition found at 36 CFR 800.16(y). This undertaking is the type of activity that has the potential to influence historic property, so we are initiating the Section 106 consultation process with your office.

The area of potential (APE) effect for grazing would be the surface of the entire 231-acre disposal site. The APE for installation of the monuments are approximately 10 feet by 10 feet within the exterior boundary of the disposal site; work would not exceed a depth of four feet.

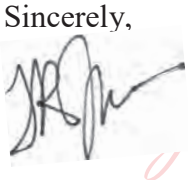
Also enclosed is a letter from your agency informing us there are no historic properties at the Falls City site. In 2006, your office stated, “even though there has never been a formal survey of the tract, we consider the entire tract to be ineligible for inclusion in the National Register of Historic Places” (Texas Historical Commission letter dated October 17, 2006). Therefore, in accordance with 36 CFR 800.4(d)(1), it is our determination that there is no historic property present within the APE of the proposed project.

Should unidentified archaeological resources be discovered during the project, work would be interrupted until the resources have been evaluated for National Register of Historic Places eligibility criteria (36 CFR 60.4) in consultation with your office, in accordance with 36 CFR 800.13. If the scope of work changes substantially, additional consultation with your office may be required.

Please contact me at (970) 248-6378 or Tashina.Jasso@lm.doe.gov, if you have any questions. Please address any correspondence to:

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

Sincerely,



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TASHINA JASSO
Date: 2019.08.21
16:00:32 -06'00'

Tashina R. Jasso
Site Manager

Enclosures

cc w/enclosures:
P. Benson, DOE-LM (e)
T. Ribeiro, DOE-LM (e)
C. Boger, Navarro (e)
J. Denier, Navarro (e)
S. Osborn, Navarro (e)
J. Trnka, Navarro (e)
DOE Read File
File: FCT 3000-03

DRAFT FINAL Falls City no buildings on site

TEXAS HISTORICAL COMMISSION

The State Agency for Historic Preservation

RICK PERRY, GOVERNOR

JOHN L. NAU, III, CHAIRMAN

F. LAWERENCE OAKS, EXECUTIVE DIRECTOR

October 17, 2006

Polly A. Robinson
Realty Specialist
The S.M. Stoller Corporation
2597 B3/4 Road
Grand Junction, CO 81503

Re: Project review under Section 106 of the National Historic Preservation Act of 1966
Falls City, Texas Disposal Area
(DOE)

Dear Ms. Robinson:

This letter serves as a response to your inquiry from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission.

The review staff, led by Bill Martin, has completed its review. The disposal area has never been surveyed by a professional archeologist, but the tract immediately adjacent has been surveyed and several archeological sites have been recorded. None of the sites appear to contain intact deposits and are considered ineligible for inclusion in the National Register of Historic Places. Any sites located on the Disposal Area tract would have been destroyed by the tailings and construction of the Disposal Area designed to contain them. Therefore, even though there has never been a formal survey of the tract, we consider the entire tract to be ineligible for inclusion in the National Register of Historic Places.

Thank you for your cooperation in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Debra L. Beene at 512/463-5865.**

Sincerely,

William A. Martin

for
F. Lawerence Oaks, State Historic Preservation Officer

FLO/wam

FCT 105.02
V-5

P.O. BOX 12276 · AUSTIN, TX 78711-2276 · 512/463-6100 · FAX 512/475-4872 · TDD 1-800/735-2989
www.thc.state.tx.us

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Department of Energy
Washington, DC 20585

July 8, 2019

Christopher Merritt, Ph.D.
Utah Division of State History
Utah Deputy State Historic Preservation Officer
300 S. Rio Grande Street
Salt Lake City, UT 84101

Subject: Proposed Grazing at the Monticello, Utah, Processing and Disposal Site, San Juan County, Utah; National Historic Preservation Act (NHPA) Section 106 Consultation

Dear Dr. Merritt:

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is proposing to use controlled grazing to manage vegetation at this location. Cattle or goats would be brought in to graze, thereby reducing vegetation to manageable levels. The use of grazing is anticipated to reduce or eliminate the need to control vegetation using either mechanical methods or herbicides. The onsite vegetation would be managed for control by animals. The grazing activity would be monitored and stopped as needed to prevent the land from being overgrazed. Access is provided by existing roads.

It is our determination, in accordance with Section 106 of the National Historic Preservation Act of 1966 and the operating regulations in Title 36 Code of Federal Regulations Section 800 (36 CFR 800), that the proposed project is defined as an undertaking (36 CFR 800.16(y)). This undertaking is the type of activity that has the potential to influence historic properties, so we are initiating the Section 106 consultation process with your office. The area of potential effect for this undertaking is the entire disposal site.

In accordance with 36 CFR 800.4(d)(1), it is our determination there is no historic property present within the area of potential effect of the proposed project. This is due to the extensive disturbance that occurred during construction of the disposal cell and the remediation of the surrounding area.

Should unidentified archaeological resources be discovered during grazing the grazing would be interrupted near the discovery until the resources have been evaluated in terms of the National Register of Historic Places eligibility criteria found at 36 CFR 60.4 in consultation with your office in accordance with 36 CFR 800.13. If the scope of the described grazing changes substantially, additional consultation with your office may be required.

Please let us know if copies of any of the archaeological reports referenced in this letter are needed, and we will provide them as requested.

Please contact me at (970) 248-6707 or Jason.Nguyen@lm.doe.gov, if you have any questions. Please address any correspondence to:

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

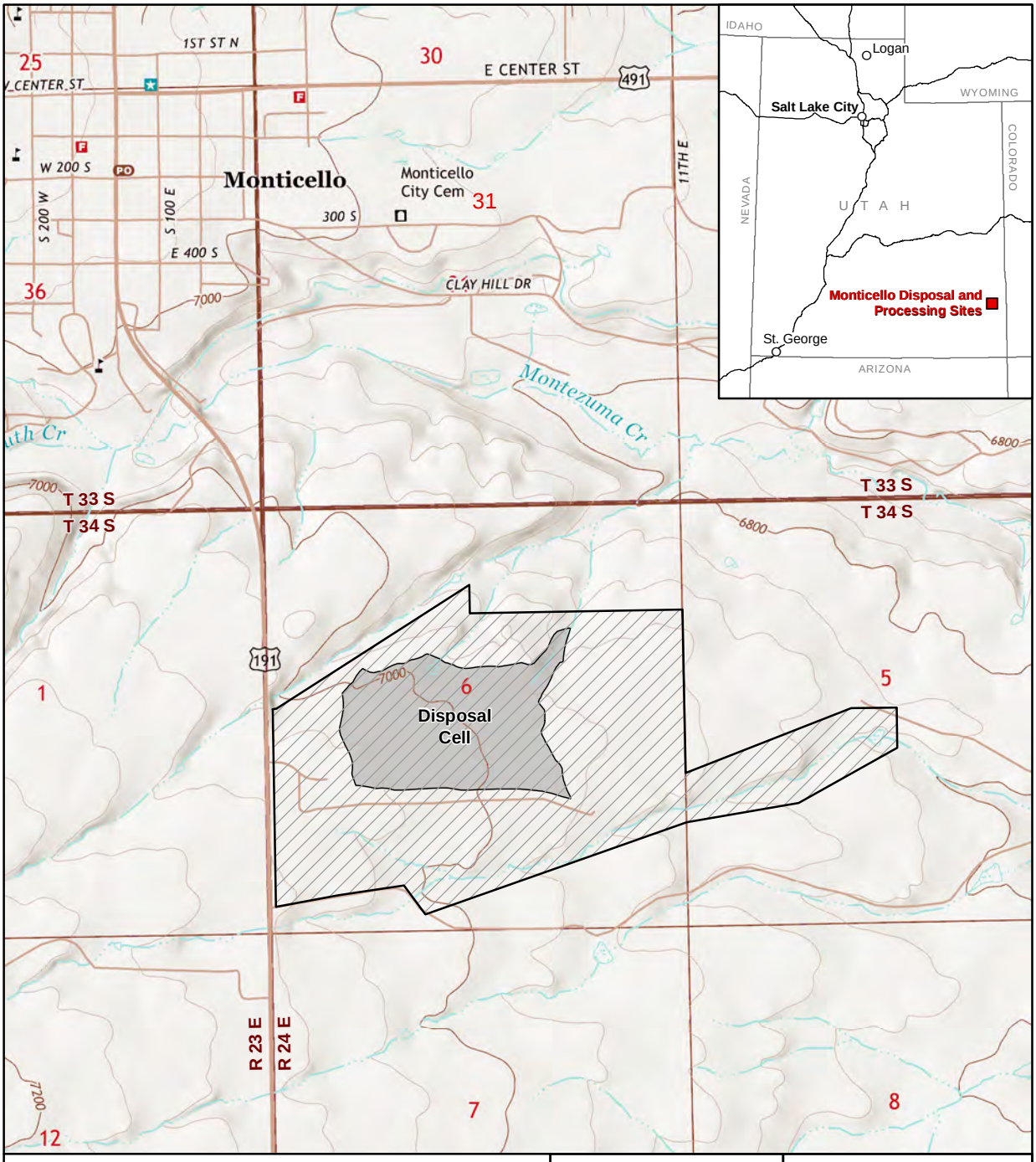
Sincerely,

2019.07.08
09:25:11 -06'00'

Jason Nguyen,
Site Manager

Enclosure

cc w/enclosure:
P. Benson, DOE-LM (e)
T. Ribeiro, DOE-LM (e)
K. Karp, Navarro (e)
G. McKinnon, Navarro (e)
F. Smith, Navarro (e)
J. Trnka, Navarro (e)
P. Wetherstein, Navarro (e)
File: MNT 3000-03



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WEST VIRGINIA
Division of Culture and History

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300
Randall Reid-Smith, Commissioner
Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

August 5, 2019

Mr. Cliff Carpenter
U.S. Department of Energy
Office of Legacy Management
99 Research Park Road
Morgantown, WV 26505

RE: Consultation Regarding Grazing and Minor Maintenance Activity at the Parkersburg, West Virginia Disposal Site
FR: 19-1209-WD

Dear Mr. Carpenter:

We have reviewed the information that was submitted for the aforementioned project to determine any effects it may have on historic resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

We have reviewed a letter that was submitted by Mr. Cliff Carpenter indicating that the U.S. Department of Energy Office of Legacy Management would like the option to use controlled grazing at the Parkersburg, Wood County, West Virginia Disposal Site to manage vegetation. We understand that cattle or goats would be used graze within the 15.6-acre disposal area, eliminating the need to control vegetation through the use of mechanical methods or pesticides. In addition, Legacy Management would like to reconstruct two corner markers in the corners of the disposal site to replace existing, deteriorated markers.

Archaeological Resources:
A search of our records indicates that no previously documented archaeological resources are located within the proposed project. In addition, available information suggests minimal ground disturbance will be involved. As a result, the proposed project will have no effect on archaeological historic properties. No further consultation is necessary regarding archaeological resources. However, if cultural materials are encountered while the pipeline is under construction, all activity must cease in the area of discovery and this office contacted immediately.

Architectural Resources:
We have reviewed the submitted project information. It is our opinion the proposed grazing will have *no effect* on historic resources, direct or indirect. Also, the indicated "monuments" are simple geological survey markers. Such objects are minimalistic and have no demonstrable connection with individuals or events associated with the broad patterns of our nation's history, at a local, state, or national level. Your office proposes to replace them with appropriate similar markers. In our opinion the proposed replacements will have *no effect* on historic resources. No further consultation is necessary regarding

aboveground resources; however, we ask that you contact our office if your project should change.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Lora A. Lamarre-DeMott, Senior Archaeologist, or Mitchell K. Schaefer, Structural Historian, at (304) 558-0240.*

Sincerely,

Jennifer Brennan for

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/LLD/MKS

CC: Mr. Joe Trnka
Navarro Research and Engineering, Inc.
Contractor to the US Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

Appendix B

Scoping Notification Letter Template

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Template of Notification Letter to Agencies, Tribes, and Other Interested Parties

August 26, 2019

from mailing list

Subject: Programmatic Environmental Assessment for Grazing Activities at Office of Legacy Management Sites

Dear TBD,

In accordance with the National Environmental Policy Act (NEPA), the U.S. Department of Energy Office of Legacy Management (LM) is notifying you of (1) our intent to initiate the preparation of a Programmatic Environmental Assessment (PEA) to support LM planning-level decisions and (2) the adoption of an LM process for livestock grazing at LM candidate sites nationwide. This PEA will evaluate the potential impacts from grazing activities for each of the following seven LM-owned disposal sites: Ambrosia Lake, New Mexico; Bluewater, New Mexico; Burrell, Pennsylvania; Canonsburg, Pennsylvania; Falls City, Texas; Monticello, Utah; and Parkersburg, West Virginia. The PEA will also describe a framework for grazing at other LM sites, including LM transitioning sites and LM sites containing withdrawn lands that are appropriate for grazing.

LM is committed to reusing its sites for beneficial purposes, one of which is livestock grazing. LM manages its sites to protect remedies, natural resources, human health, and the environment. LM determined that grazing activities could include the traditional concept of grazing, whereby livestock graze vegetation for the purposes of weight gain and meat production, or a nontraditional use, whereby livestock are used to control unwanted vegetation. Traditional grazing typically occurs once a year for several months and continues for numerous years, whereas nontraditional grazing for vegetation management typically occurs once or twice a year for relatively short time frames (for a few days or weeks) and may be repeated for several years. The goal of traditional grazing is to feed livestock while not "overgrazing." In contrast, the goal of grazing for vegetation management is to target undesirable plants and "overgraze" them, thereby weakening them and allowing desirable species to eventually take their place.

LM proposes to utilize traditional and nontraditional grazing at some of its sites. Proposed grazing activities would be done in accordance with LM planning-level decisions and within a framework for implementing or excluding grazing at specific sites. The PEA will be distributed for public review and comment before a decision is made. LM expects that, at the end of the process, the PEA and our public involvement process will satisfy NEPA requirements, including those related to project alternatives, environmental consequences, and mitigation.

We look forward to consulting with your agency and addressing your comments on this notification. If you have any questions or would like to discuss in more detail the project or our agencies' respective roles and responsibilities during the preparation of this PEA, please contact Ms. Joyce Chavez at (720) 377-3820 or at Joyce.Chavez@lm.doe.gov. The mailing address is: 11035 Dover Street, Suite 600, Westminster, CO 80021-5587. Please forward your comments to us by TBD.

Sincerely,

Joyce Chavez
Reuse Asset Manager
Enclosures (TBD):

Appendix C

Scoping Stakeholder List

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Stakeholder Contacts for Grazing PEA

Stakeholders for Notifications & Early Reviews-

Host State	**Ambrosia Lake and Bluewater, New Mexico, Disposal Site:** Ms. Michaelene Kyrala Director, Strategic Initiatives & Policy New Mexico Environment Department 1190 St. Francis Drive, Room N4050 Santa Fe, NM 87502 (505) 827-2892 michaelene.kyrala@state.nm.us Brian Lee Field Representative/Navajo Nation Liaison 800 Municipal Drive Farmington, NM 87401 Brian.Lee@mail.house.gov Cal H. Curley Field Representative for Tom Udall, United States Senate, New Mexico 400 Gold Avenue SW, Suite 300 Albuquerque, NM 87102 Calvert_curley@tomudall.senate.gov Brenda G. McKenna Nanbé Ówîgeh, New Mexico Field Representative 400 Gold Avenue SW, Suite 680 Albuquerque, NM 87102 Brenda.McKenna@mail.house.gov Joshua Sanchez Field Representative for Tom Udall, United States Senate, New Mexico 400 Gold Avenue SW, Suite 300 Albuquerque, NM 87102 Joshua_sanchez@tomudall.senate.gov **Burrell and Canonsburg, Pennsylvania, Disposal Sites:** Mr. Patrick McDonnell Pennsylvania Department of Environmental Protection Rachel Carson State Office Building 400 Market Street, 16th Floor Harrisburg, PA 17101 (717) 783-2300 (Email not available)

	Mr. Dwight Shearer P.E., Manager, Bureau of Radiation Protection Radiation Protection Program Pennsylvania Department of Environmental Protection 400 Waterfront Drive Pittsburgh, PA 15222 **Falls City, Texas, Disposal Site:** Alisha Stallard Special Assistant to the Director Radioactive Materials Division Texas Commission on Environmental Quality PO Box 13087 Austin, TX 78711-3087 (512)239-6453 alisha.stallard@tceq.texas.gov **Monticello, Utah, Disposal Site:** Ms. Sindy Smith RDCC Coordinator, Office of the Governor Public Lands Policy Coordination Office State of Utah 5110 State Office Building Salt Lake City, UT 84114-1107 (801) 537-9193 sindysmith@utah.gov Cindi Holyoak cindi@monticelloutah.org 435-587-3724 17 N 100 E PO Box 457 Monticello, Utah 84535 POC for Victims of Mill Tailings Exposure **Parkersburg, West Virginia, Disposal Site:** Ms. Kelly A. Bragg Energy Development Specialist, Office of Energy State of West Virginia 1900 Kanawha Boulevard Building #3, Suite 200 Charleston, WV 25305 (304) 558-2234 (ext. 2004) kelly.a.bragg@wv.gov
Host Tribe	Madeline M. Roanhorse AML/UMTRCA Department Manager Navajo Nation PO Box 1875 Window Rock, AZ 86515
Other state or American Indian tribe	**N/A**

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Potential Interested Parties

Federal, State, or Local Agencies	Mr. John Tappert, P.E. Director, Division of Decommissioning, Uranium Recovery, and Waste Programs MS T-5A10 Nuclear Regulatory Commission Washington, DC 20555 (301) 415-7319 john.tappert@nrc.gov Gregory Jojola-Laguna Pueblo of Laguna Environmental Program PO Box 194 22 Capital Road Laguna, NM 87026 gjojola@pol-nsn.gov Donna J. Martinez, Program Coordinator Acoma Environment Department P.O. Box 309 Acoma, NM 87034 dmartinez@puebloofacoma.org Phone: 505-552-5161 Fax: 505-552-9700 City of Milan Jack Moleres, Public Works Director 623 Uranium Ave Milan, NM 87021 City of Milan Denise Baca, Village Clerk 623 Uranium Ave Milan, NM 87021 City of Grants Laura Jaramillo, City Manager 600 W. Santa Fe Ave Grants, NM 87020 David Rhome - Canonsburg Mayor 68 E Pike St, Canonsburg, PA 15317 (724) 745-1800 mayorrhome@canonsburgpolice.com

U.S. Department of the Interior	Ms. Susan King Regional Environmental Officer Office of Environmental Policy and Compliance U.S. Department of the Interior Albuquerque Region 1001 Indian School Road, NW, Suite 348 Albuquerque, New Mexico 87104 (505) 563-3572 Fax: (505) 563-3066 Ms. Courtney Hoover Regional Environmental Officer U.S. Department of the Interior Office of Environmental Policy and Compliance Denver Region PO Box 25007 (D-108) Denver Federal Center Denver, CO 80225-0007 (303) 445-2500 Fax: (303) 445-6320 Lindy Nelson Regional Environmental Officer U.S. Department of the Interior Office of Environmental Policy and Compliance Philadelphia Region Custom House, Room 244 200 Chestnut Street Philadelphia, PA 19106 (215) 597-5378 Fax: (215) 597-9845
U.S. Environmental Protection Agency	**EPA Region 3 – DC, DE, MD, PA, VA, WV** www.epa.gov/nepa/national-environmental-policy-act-epa-region-3 Ms. Barbara Rudnick NEPA Program Manager Environmental Protection Agency, Region 3 1650 Arch Street, 3EA30 Philadelphia, PA 19103 (215) 814-3322 rudnick.barbara@epa.gov **EPA Region 6 – AR, LA, NM, OK, TX** www.epa.gov/nepa/national-environmental-policy-act-epa-region-6 Mr. Robert Houston Chief, Special Project Section Environmental Protection Agency, Region 6 Special Projects Section 1445 Ross Avenue, Mail Code 6EN-WS Dallas, TX 75202-2733 (214) 665-8565 houston.robert@epa.gov

	EPA Region 8 – CO, MT, ND, SD, UT, WY www.epa.gov/nepa/national-environmental-policy-act-epa-region-8 Mr. Philip Strobel NEPA Program Director Environmental Protection Agency, Region 8 1595 Wynkoop Street (8EPR-N) Denver, CO 80202-1129 (303) 312-6704 strobel.philip@epa.gov
Environment, Health, Safety, and Security	Ms. Beverly Whitehead Senior Environmental Program Manager Office of Sustainable Environmental Stewardship Department of Energy (AU-21) 1000 Independence Avenue, SW Washington, DC 20585 (202) 586-6073 beverly.whitehead@hq.doe.gov
Western Governors' Association www.westgov.org	Ms. Britta Beckstead Policy Advisor Western Governors' Association 1600 Broadway, Suite 1700 Denver, CO 80202 (720) 897-4541 bbeckstead@westgov.org
National Governors Association http://www.nga.org/	Ms. Alex Schaefer Legislative Director Natural Resources Committee National Governors Association 444 North Capitol Street, Suite 267 Washington, DC 20001-1512 (202) 624-5300 aschaefer@nga.org
State and Tribal Government Working Group (STGWG)	Mr. Albert (Brandt) Petrasek State and Tribal Government Working Group Executive Committee DOE STGWG Point of Contact, EM 3.2 1000 Independence Avenue SW Washington, DC 20585 (202) 586-4818 albert.petrasek@hq.doe.gov
Bureau of Indian Affairs www.bia.gov	Mr. Marvin (Marv) Keller NEPA Coordinator, Division of Environmental and Cultural Resources Management Bureau of Indian Affairs 2051 Mercator Drive Reston, VA 20191 (703) 390-6470 marvin.keller@bia.gov

Nongovernmental Organizations	Sandra L. Ross, P.G. US Closed Sites Manager Rio Algom Mining, LLC P.O. Box 218 Grants, NM 87020 (916) 947-7637 sandra.ross@bhp.com
	Susan Gordon Multicultural Alliance for a Safe Environment PO Box 4524 Albuquerque, NM 87196 (505)577-8438 sgordon@swuraniumimpacts.org info@swuraniumimpacts.org
	Utah Cattlemen's Association 150 S 600 E #10-B Salt Lake City, UT 84102

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