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PARADISE FOSSIL PLANT DECONTAMINATION AND DECONSTRUCTION
DRAFT ENVIRONMENTAL ASSESSMENT
Muhlenberg County, Kentucky

Prepared by:
TENNESSEE VALLEY AUTHORITY
Knoxville, Tennessee

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To request further information, contact:
Ashley Pilakowski
NEPA Compliance
Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902
Phone: 865-632-2256
Email: aapilakowski@tva.gov

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SYMBOLS, ACRONYMS, AND ABBREVIATIONS

µg	Microgram
AADT	Annual Average Daily Traffic
ACM	Asbestos-Containing Materials
ACS	American Community Survey
BMP	Best management practice
CAA	Clean Air Act
CCR	Coal Combustion Residuals
CCR Rule	EPA Final Rule on Disposal of Coal Combustion Residuals from Electric Utilities
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon monoxide
CO_2	Carbon Dioxide
CT	Census tract
CWA	Clean Water Act
dB	Decibels
dBA	A-weighted decibels
DNL	Day-night average sound level
EA	Environmental Assessment
EEC	Kentucky Energy and Environment Cabinet
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FFCA	Federal Facilities Compliance Agreement
FFPA	Farmland Protection Policy Act
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GEW	Gypsum Dewatering
GHG	Greenhouse gas
gpm	Gallons per minute
GRM	Green River Mile
GWPS	Groundwater Protection Standards
HUD	U.S. Department of Housing and Urban Development
IPaC	Information for Planning and Consultation
IRP	Integrated Resource Plan
KAR	Kentucky Administrative Regulation
KDFWR	Kentucky Department of Fish and Wildlife Resources
KGS	Kentucky Geological Survey
KPDES	Kentucky Pollution Discharge Elimination System
KRS	Kentucky Revised Statute
kV	Kilovolt
KYTC	Kentucky Transportation Cabinet

L	Liter
m^3	Cubic meter
MATS	Mercury and Air Toxics Standards
Mg	Milligram
MGD	Million gallons per day
MSL	Mean Sea Level
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NC DWQ	North Carolina Division of Water Quality
NEPA	National Environmental Policy Act
NGCC	Natural gas-fired combined-cycle
NHPA	National Historic Preservation Act
NO_2	Nitrogen Dioxide
O_3	Ozone
OSH	Kentucky Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PAF	Paradise Fossil Plant
Pb	Lead
PCB	Polychlorinated biphenyls
PEM	Palustrine Emergent
PFO	Palustrine Forested
pH	Potential hydrogen
PM	Particulate matter
PM_{10}	Particulate matter less than 10 microns in diameter
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
ppb	Parts per billion
ppm	Parts per million
RCRA	Resource Conservation and Recovery Act
RFFA	Reasonably Foreseeable Future Action
ROW	Right-of-Way
SCR	Selective Catalytic Reduction System
SO_2	Sulfur Dioxide
SPL	Sound Pressure Level
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan
TENORM	Technologically Enhanced Naturally Occurring Radioactive Materials
TVA	Tennessee Valley Authority
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	Vibration decibels
VOC	Volatile organic compound
WMA	Wildlife Management Area

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1. Introduction and Background

The Tennessee Valley Authority's (TVA) Paradise Fossil Plant (PAF) is located in Muhlenberg County in western Kentucky, approximately 35 miles northwest of Bowling Green and 95 miles southwest of Louisville. The plant is on a large reservation of approximately 3,400 acres located on the west bank of the Green River near the former community of Paradise and about eight miles southeast of Central City (Figure 1-1).

PAF was originally constructed with two coal-fired cyclone generating units. Each of these units, known as Units 1 and 2, had a generating capacity of 704 megawatts (MW) and went on-line in 1963. A third unit, Unit 3, became operational in 1970 with a capacity of 1,150 MW. Combined, the three units had a generating capacity of 2,558 MW and could produce more than 14 billion kilowatt-hours of electricity each year, enough to supply more than 950,000 homes. Each unit also had an associated large natural-draft cooling tower. PAF is TVA's only coal-fired power plant with cooling towers. In order to comply with the United States (U.S.) Environmental Protection Agency (EPA) 2010 Mercury and Air Toxics Standards (MATS), TVA retired PAF Units 1 and 2 in April 2017 and replaced their generation with a new 1,100-MW natural gas-fired combined-cycle (NGCC) plant located on the PAF reservation just north of the coal units. PAF Unit 3 was retired in February 2020 due to repair and maintenance costs.

TVA is investigating options for the future disposition of PAF including the proposed action of decontaminating/deconstructing the plant or taking no action. The project area includes the buildings and structures located within the approximately 407.5-acre decontamination and deconstruction project area boundary (Figure 1-2). TVA has also identified four areas proposed for use as temporary laydown areas during deconstruction, resulting in a total area of approximately 464.5 acres directly affected by the proposed action.

TVA has prepared this Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) and TVA's procedures for implementing NEPA to assess the site-specific and system-wide environmental impacts of alternatives for the future disposition of PAF, including its potential decontamination and deconstruction. This EA was prepared consistent with Council on Environmental Quality (CEQ) regulations for implementing NEPA at 40 CFR 1500-1508 issued in 1978 (43 FR 55990, Nov. 29, 1978), with minor revisions in 1979 and 1986, as well as TVA regulations at 18 CFR 1318 issued in 2020 (85 FR 17434, Mar. 27, 2020). Because TVA began this EA before CEQ issued revised NEPA regulations (85 FR 43304-43376, Jul. 16, 2020), TVA applied the previously promulgated 1978 CEQ regulations and TVA's 2020 NEPA regulations in the preparation of this EA (see 40 CFR 1506.13).

This EA does not address the closure of the ash disposal areas at PAF, as they were previously addressed in the Paradise Coal Combustion Residuals (CCR) Management Operations Environmental Assessment (EA) (TVA 2017) and would occur independent of the disposition of PAF.

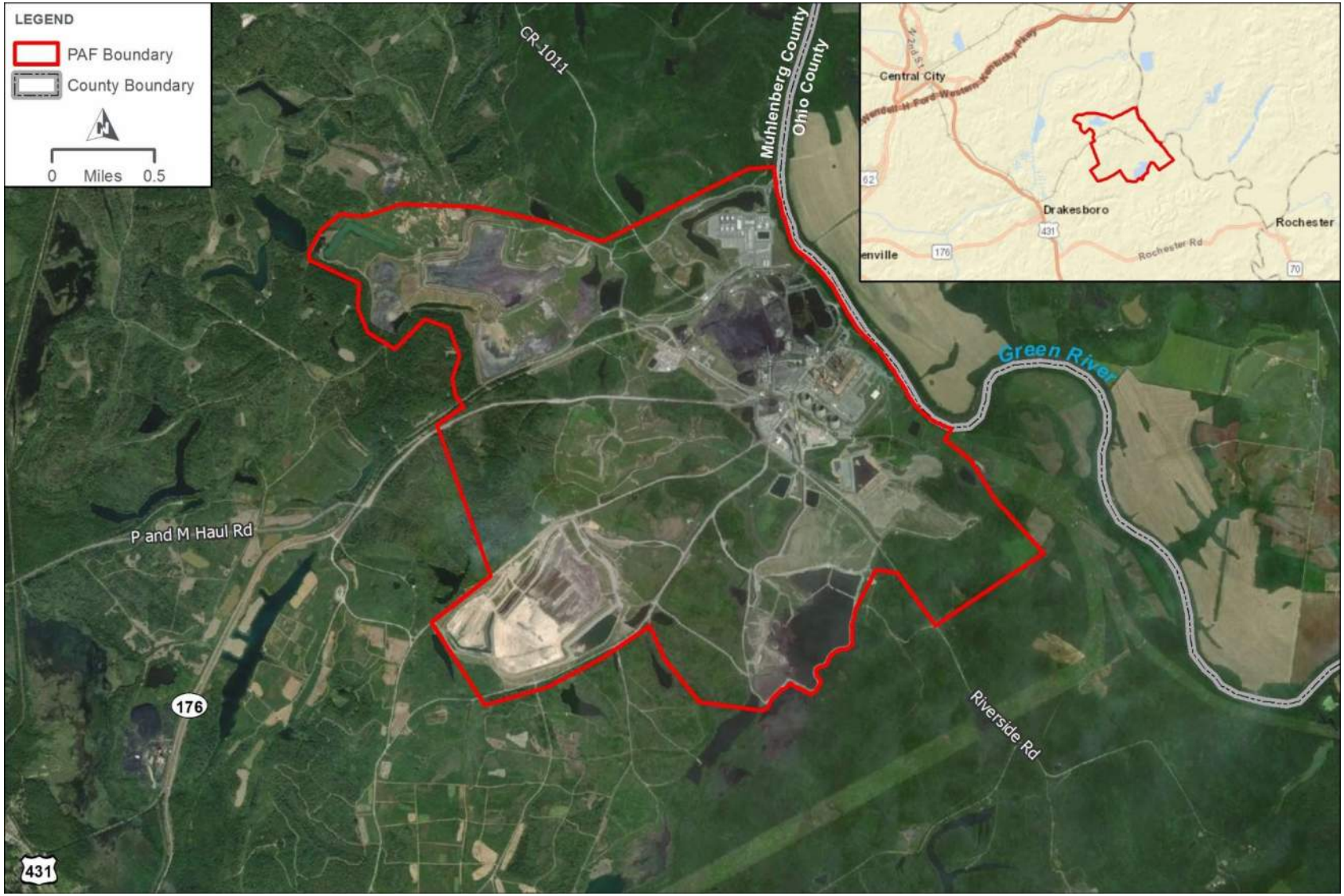

Figure 1-1. PAF Project Location

Figure 1-2. PAF Decontamination and Deconstruction Project Overview

1.2. Purpose and Need

The purpose of the Proposed Action is to appropriately manage the disposition of the buildings, physical structures, coal yard, and limestone yard at PAF that are no longer needed for their original purpose of power generation. TVA needs to manage the disposition of the PAF site to provide necessary structures and facilities for ongoing site activities while considering capital cost, long-term operations and maintenance costs, environmental risks, safety and security at the plant site, and making the land available for future economic development.

1.3. Decision to be Made

The decision TVA must make is whether to demolish the facility or to take no action.

1.4. Related Environmental Reviews

The environmental impact statements (EISs) and EAs listed below provide information relevant to this EA. The contents of these documents help describe the PAF proposed decontamination and deconstruction project area and are incorporated by reference as appropriate.

- *Ash Impoundment Closure Environmental Impact Statement* (TVA 2016). This programmatic EIS was prepared to address the closure of impoundments at all of TVA's fossil plants to support the implementation of TVA's goal to eliminate all wet CCR storage at its fossil plants.
- *Integrated Resource Plan, 2019 Final Report and Environmental Impact Statement* (TVA 2019a). This plan provides direction for how TVA will meet the long-term energy needs of the TVA power service area. The report and EIS evaluate scenarios that could unfold over the next 20 years. It discusses ways that TVA can meet future power demand economically while supporting TVA's equally important mandates for environmental stewardship and economic development across the TVA power service area.
- *Paradise CCR Management Operations Environmental Assessment* (TVA 2017). This EA reviewed actions necessary to convert CCR storage from wet to dry and included the construction and operation of a Gypsum Dewatering Facility, Dry Fly Ash Handling System, and an onsite CCR landfill. The Proposed Action also included the closure of the Gypsum Disposal Area, Slag Impoundment 2A/2B, Stilling Impoundment 2C, and the Peabody Ash Impoundment.
- *Paradise Fossil Plant Units 1 and 2 Mercury and Air Toxics Standards Compliance Project Environmental Assessment* (TVA 2013). This EA evaluated two alternatives to comply with EPA's 2010 MATS. These included installation and operation of pulse jet fabric filter systems or replacing Units 1 and 2 with a combustion turbine/combined-cycle plant.
- *Potential Retirement of Paradise Fossil Plant Environmental Assessment* (TVA 2019b). This EA evaluated the potential retirement of operating Unit 3 at a coal-fired plant in Muhlenberg County, Kentucky. Units 1 and 2 were replaced with natural gas generation in spring 2017.

1.5. Scope of the Environmental Assessment

TVA considered the possible environmental effects of the Proposed Action and determined that potential effects to the environmental resources listed below were relevant to the

decision to be made; thus, the following environmental resources are addressed in detail in this EA:

- Land Use and Prime Farmland
- Geology and Groundwater
- Surface Water
- Floodplains
- Wetlands
- Aquatic Ecology
- Wildlife
- Vegetation
- Threatened and Endangered Species
- Air Quality and Climate Change
- Hazardous Materials and Solid and Hazardous Waste
- Transportation
- Noise
- Visual Resources
- Natural Areas, Parks, and Recreation
- Cultural Resources
- Utilities and Service Systems
- Safety
- Socioeconomics and Environmental Justice

1.6. Public and Agency Involvement

TVA's public and agency involvement include publication of a notice of availability and a 30-day public review of the draft EA. The availability of the draft EA will be announced in newspapers that serve the Muhlenberg County, Kentucky area. The draft EA will also be posted on TVA's website. TVA's interagency review includes circulation of the draft EA to local, state, and federal agencies for comments. Chapter 5 provides a list of agencies and organizations notified of the availability of the draft EA. Comments will be accepted for 30 days from the publication of the notice, i.e., from November 19, 2020 through December 18, via TVA's website, mail, and e-mail.

1.7. Necessary Permits or Licenses and Consultation Requirements

TVA holds the permits necessary for the current operation of PAF. To implement the proposed action, TVA would have to obtain or seek amendments to the following permits:

- Kentucky Pollution Discharge Elimination System (KPDES) Individual Permit: KY0004201
- Title V Air permits for air emissions
- Permits associated with disposal of sewage and sanitary wastewater into a nearby municipal wastewater treatment facility.
- Aboveground storage tank registrations and permits would require updating, provided the tanks are abandoned or removed.

- Oil Spill Prevention, Control, and Countermeasure Plan or Integrated Pollution Prevention and Spill Response Plan would be updated to reflect the removal of PAF.
- During project demolition activities, TVA would modify the site operational Stormwater Pollution Prevention Plan (SWPPP) or Best Management Practices plan, as necessary to reflect current site conditions.
- Any work conducted in jurisdictional waters may require a Clean Water Act (CWA) Section 404 permit administered by the U.S. Army Corps of Engineers (USACE) and state Section 401 Water Quality Certification depending on the project impacts and location.
- Notification of Demolition (State of Kentucky and/or Muhlenberg and Ohio Counties).
- Consistent with the Federal Emergency Management Agency (FEMA) National Flood Insurance Program, the local floodplain administrator would be contacted, when appropriate, to determine the actions necessary to ensure substantive compliance with local floodplain regulations, and thereby minimize adverse impacts to floodplains and their natural and beneficial values.

No permits or licenses would be required specifically for solid or hazardous materials transportation-related activities under the potential alternatives, with the exception of hauling hazardous materials for the purpose of disposal offsite. The selected contractor would be responsible for ensuring necessary permits are obtained and implemented, manifests completed, and hazardous waste disposal properly reported. Other necessary permits would be evaluated based on site-specific conditions. Additionally, if new hazardous waste streams are generated during demolition, notification and registration of these must be made to the Kentucky Division of Waste Management.

CHAPTER 2 – ALTERNATIVES

This chapter describes the alternatives analyzed in this EA, summarizes the environmental impacts associated with each alternative, identifies potential mitigation measures, and presents the preferred alternative.

2.1. Description of Alternatives

2.1.1. Alternative A – Full Demolition of All Structures and Closure of the Coal and Limestone Yards

Alternative A includes the proposed decontamination and demolition of all buildings and structures within the proposed demolition boundary to three feet below grade or to the top of the mooring cells. All environmental issues associated with identified structures would be assessed and abated, including the decontamination of all buildings, structures, conveyers, and tunnels associated with plant operations, to remove hazardous materials. Demolition could be conducted via mechanical deconstruction and/or explosives. Alternative A could create approximately 8,000 cubic yards of demolition debris, 20,000 cubic yards of asbestos-containing materials (ACM), and approximately 120,000 tons of scrap metal, that would be hauled offsite to be recycled or disposed at an appropriate facility in accordance with all federal, state, and local regulations. Scrap metal could also be sold to local or regional vendors. No specific disposal site has been identified at this time and ultimate disposition site selection would be determined by the contractor.

Below-grade building areas would be backfilled with suitable concrete/masonry materials or other suitable clean fill material, and the site would be restored to grade while providing proper drainage. All disturbed areas would be covered with topsoil and seeded to establish a permanent vegetative cover or otherwise permanently stabilized. Borrow would be obtained onsite. If there is a need for borrow material from an offsite location, borrow would be obtained from one or more previously developed or permitted commercial borrow site(s) within 30 miles of PAF. TVA would perform any necessary due diligence and reviews in association with the use of such an offsite borrow source.

All buried utilities would be cut and capped within the project boundary and abandoned in place if they do not interfere with other ongoing projects that overlap the project footprint. All hollow pipe utilities would be decommissioned and sealed with a mechanical cap or plug.

The following buildings and structures are proposed for demolition:

Powerhouse Area

- Units 1 – 3 Powerhouse
- Three Cooling Towers
- Cooling Tower Flume
- Units 1 – 3 Scrubbers
- Units 1 – 3 Selective Catalytic Reduction systems (SCRs)
- Unit 3 Precipitator
- Units 1 – 2 Scrubber Control Building
- Units 1 – 2 Scrubber Transformer Yard

- Units 1 – 3 Lime Systems
- Big Top storage building
- Units 1 and 3 Breaker Building
- Units 1 – 3 Transformer Yard
- Units 1 and 2 Filter Plant Buildings and Tanks
- Multiple storage warehouses
- Intake pump station deck pumps
- Office Service Building
- Unit 3 Condensate Tanks
- Auxiliary Boiler
- Units 1 – 3 Intake Tunnel Bulkheads
- Units 1 – 2 Discharge Tunnel Bulkheads
- Unit 3 Warm Water Tunnel Bulkheads
- Unit 3 Cool Water Tunnel Bulkheads
- Underground Tunnel Bulkheads
- Cable Tunnel Bulkheads
- Four Chimneys
- Aboveground Storage Tanks
- Underground Storage Tanks
- Oil/Water Separators
- Above Grade Pipe Trenches
- Ductwork
- Electrical Control Wing
- All aboveground conveyors
- Ammonia Storage Facility
- Utility Building
- Two Quonset Huts
- Miscellaneous unnamed structures

Coal Yard Area

- Coal Yard Lighting Structures
- Barge Unloader
- Fish Screen superstructure
- Miscellaneous structures on top of mooring cells (with the exception of the solar powered navigation lights)
- Surge Hopper Building
- Truck Hoppers 1 and 2
- Rail Car Dump Building and Hopper
- Reclaim Hopper 1
- Transfer Stations A, B, G, H, N, and P

- Concrete Storage Silos 5 and 6
- Breaker 3
- Live Piles 1 and 2
- Stair and Elevator Tower to belt conveyor 9
- Conditioner Building
- New Conditioner Building
- All aboveground conveyors
- Miscellaneous unnamed structures
- Egress tunnels (removed and replaced with structural fill)

Limestone Yard

- Limestone Rail Unloader Units 1 – 3
- Limestone Storage Silo Units 1 – 3
- All aboveground conveyors
- Limestone Prep Building Units 1 – 3
- Miscellaneous unnamed structures

Transmission Yards

- 161-kilovolt (kV) Transmission Yard
- 500-kV Transmission Yard
- 69-kV Transmission Line

Additional activities include:

- Closure of the Coal Yard
- Closure of the Limestone Yard
- Closure and demolition of the Gypsum Dewatering Facility
- Closure and demolition of the Dry Fly Ash Facility
- Demolition of the Plant Perimeter Fencing

The following structures and facilities located within the 407.5-acre project area are not part of this Alternative. These structures and facilities will either remain in place or will be evaluated under a separate NEPA analysis:

- Intake trash boom
- Livewell or credit union building
- Out Building 4
- Closure of the Coal Yard Runoff Pond
- Closure of the Redwater Ponds

2.1.2. Alternative B – No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities at PAF. If the facility is left in the “as-is” condition, it likely would present a higher risk than Alternative A for the potential to contaminate soil and groundwater as systems and structures degrade. It would also hinder the future use of the

site for economic development. As such, this alternative is not a reasonable alternative. However, being the No Action Alternative, it will be discussed in the EA and used as a basis for comparison to the other alternatives.

2.1.3. Alternatives Considered but Eliminated from Further Discussion

TVA considered several options for the disposition of PAF. This section identifies alternatives that TVA considered but rejected from detailed analysis because they did not meet the purpose and need of TVA's proposed action or were otherwise unreasonable.

2.1.3.1. Assess, Close, and Secure Units 1, 2, and 3 and Establish an Ongoing Operations and Maintenance Program

TVA considered closing, securing, and maintaining PAF. This alternative entails de-energizing the plant and placing it in an "idle and vacant" status during which basic maintenance is continued to prevent safety and environmental issues. The primary objective of this alternative is to de-energize all systems at PAF and minimize environmental and safety risks. All existing buildings, structures, and equipment within the Retirement/Decommissioning Boundary (Figure 1-2) would remain in place. Retirement, decommissioning, and operations and maintenance activities associated with this alternative would include:

- Periodic roof and structural evaluations.
- Fire monitoring.
- Hazardous Materials Activities:
    - Initial decontamination including abatement of a) asbestos containing materials in poor to fair condition and b) loose and flaking lead-based paint, if any.
    - Periodic hazardous materials condition monitoring.
    - Periodic hazardous materials removal as materials deteriorate over time.
- Electrical Activities:
    - Maintenance of aircraft obstruction lighting required by Federal Aviation Administration (FAA) regulations at the three cooling towers.
    - Maintenance of select sump pumps to prevent below-grade spaces (basements) from becoming flooded.
    - Monitoring and maintenance of the power for the powerhouse electrical needs.

Leaving the structures in place with minimal decontamination could result in degradation of the facilities over time. As materials deteriorate, there is a potential for release of contaminated materials to the environment. Additionally, leaving the structures in place prevents the site from being utilized for other purposes. Therefore, for these economic and environmental considerations, TVA has eliminated this alternative from consideration.

2.1.3.2. Selective Demolition of Ancillary Structures and Equipment Exterior to the Main Powerhouse

The objective of this alternative was to decontaminate noted buildings, demolish the ancillary buildings and equipment/systems included within the Retirement/Decommissioning Boundary (Figure 1-2) and associated structures to a depth of three feet below grade,

backfill all below-grade building foundations as necessary to achieve final grade, and restore the site to grade that allows drainage away from the demolished building footprints. The powerhouse and several associated structures would remain in place.

Leaving the powerhouse in place with minimal decontamination could result in degradation of the facility over time. As materials deteriorate, there is a potential for release of contaminated materials to the environment. Additionally, the presence of the powerhouse would restrict possible future reuse of the site. Therefore, for these economic and environmental considerations, TVA has eliminated this alternative from consideration.

2.2. Comparison of Alternatives

Table 2-1 provides a comparison of alternatives with respect to environmental consequences.

Table 2-1. Summary and Comparison of Alternatives by Resource Area

Resource Area	Impacts[1] From Alternative A: Full Demolition	Impacts From Alternative B: No Action Alternative[2]
Land Use and Prime Farmland	Short-term, minor impacts due to the use of laydown areas during deconstruction activities. No alteration of future land use. No impacts to prime farmland.	No impacts.
Geology and Groundwater	Short-term, minor impacts during decontamination and deconstruction activities. Long-term, beneficial impacts associated with the removal of potential environmental contamination sources relative to Alternative B.	Long-term, minor impacts due to potential contamination from degradation of structures remaining onsite.
Surface Water	Short-term, minor impacts due to potential stormwater runoff during decontamination and deconstruction activities.	Long-term, minor impacts due to potential contamination from degradation of structures remaining onsite.
Floodplains	Short-term, minor impacts during deconstruction activities. Long-term, minor beneficial impacts due to increased flood storage capacity on the Green River.	No impacts.
Wetlands	Long-term, minor impacts to Wetland 3, located near the cooling towers. Impacts to this feature will require mitigation and coordination with the USACE.	No impacts.
Aquatic Ecology	Long-term, minor beneficial impacts could occur due to gradual revegetation of the site.	Long-term, minor impacts due to potential contamination from degradation of structures remaining onsite.
Wildlife	Short-term, minor impacts during deconstruction activities. Coordination with USDA-Wildlife Services may be required to ensure compliance with federal migratory bird protections regarding osprey nests. Long-term, minor beneficial impacts due to site restoration.	Long-term, minor impacts to wildlife due to potential soil and groundwater contamination as a result of degradation of structures remaining onsite.
Vegetation	Short-term, minor impacts to common plant communities in laydown areas during deconstruction activities. Long-term, minor beneficial impacts due to site restoration.	No impacts.

Resource Area	Impacts[1] From Alternative A: Full Demolition	Impacts From Alternative B: No Action Alternative[2]
Threatened and Endangered Species	With implementation of conservation measures as described in section 3.9.2.2, no significant impacts would occur to federally listed bats.	Long-term, minor impacts to threatened and endangered aquatic species due to potential soil and groundwater contamination as a result of degradation of structures remaining onsite.
Air Quality and Climate Change	Short-term, minor impacts would result from fugitive dust and emissions from equipment and vehicles during decontamination and deconstruction activities and transport of debris on public roadways. Increased CO_2 emissions associated with deconstruction and trucking operations would not increase regional GHG levels and; therefore, would not contribute to climate change.	Long-term, minor impacts to air quality due to potential degradation of structures remaining onsite. No impacts on regional climate.
Hazardous Materials and Solid and Hazardous Waste	Short-term, minor impacts due to the limited potential for hazardous waste to be discharged and/or released into the environment and its associated management in accordance with all applicable state and federal regulations.	Long-term, moderate impacts due to potential degradation of structures remaining onsite.
Transportation	Short-term, minor impacts would result from increased traffic during decontamination, demolition, and site restoration activities. Similar impacts from potential closure of navigation on Green River during demolition.	No impacts.
Noise	Short-term, minor impacts would result from decontamination and demolition activities, including the drop removal of the stacks and cooling towers. Short-term, minor indirect impacts to noise receptors along haul routes for transport of debris.	No impacts.
Visual Resources	Short-term, minor impacts during deconstruction activities. Long-term, beneficial impacts would result from the removal of the stacks, cooling towers, and powerhouse.	Long-term, minor impacts due to potential degradation of structures remaining onsite.
Natural Areas, Parks, and Recreation	Short-term, minor indirect impacts to natural areas, parks, and recreational facilities located along haul routes for debris. Short-term, minor impacts to recreational boating and fishing during decontamination and deconstruction activities.	No impacts.
Cultural Resources	No impacts.	No impacts.
Utilities and Service Systems	Short-term, minor localized impacts.	No impacts.
Safety	Short-term, minor impacts would result from blasting activities to remove the stacks and cooling towers. Long-term beneficial impacts from removal of potentially unsafe facilities.	Long-term, minor impacts would result from the site remaining in an “as-is” condition.
Socioeconomics and Environmental Justice	Short-term, minor beneficial economic impacts would result from a temporary increase in employment, income, and population during deconstruction activities. Short-term, minor impacts to nearby communities if routes to haul construction debris utilize surrounding local roadways.	No impacts.

Resource Area	Impacts[1] From Alternative A: Full Demolition	Impacts From Alternative B: No Action Alternative[2]
Cumulative	Moderate impacts to transportation and environmental justice communities due to potential for CCR removal and combustion turbine construction activities to occur concurrently.	No impacts.

[1] Unless otherwise stated, impacts listed in the table are adverse effects.
[2] Impacts under the No Action Alternative are described based on leaving the facility in the "as-is" condition.

2.3. Identification of Mitigation Measures

This section provides a summary of best management practices (BMPs) and mitigation measures that TVA would employ to avoid or reduce adverse impacts from the alternatives analyzed. TVA's analysis of potential impacts includes consideration of BMPs and mitigation measures implemented as required to reduce or avoid adverse effects. BMPs and mitigation measures are discussed in Chapter 3 and summarized below.

2.3.1. Mitigation Measures

The following mitigation measures have been identified to reduce potential environmental impacts:

- TVA will notify Muhlenberg and Ohio Counties prior to any demolition activities that have the potential to mobilize dust offsite.
- TVA would conduct presence/absence surveys at least one month prior to demolition of the structures to determine if migratory birds or listed bat species are utilizing these buildings. If active nests of migratory birds are present and demolition activities must occur within the active nesting season, TVA would coordinate with U.S. Department of Agriculture (USDA) Wildlife Services, who assists with managing any potential impacts to birds, to determine best options for carrying out demolition activities.
- TVA would ensure that noise would be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.
- TVA does not anticipate obtaining borrow material offsite. If there is a need for borrow material from an offsite location, borrow would be obtained from one or more previously developed or permitted commercial borrow site(s) within 30 miles of PAF, the selection of the borrow site would be left up to the contractor. However, TVA would perform all necessary due diligence and consultation as required under Section 106 of the National Historic Preservation Act (NHPA) related to any offsite borrow areas.
- To mitigate the potential for impacts to public safety, TVA would restrict or close roads in the vicinity should blasting be used to demolish the stacks, cooling towers, or other structures. Boat traffic could be restricted in the area during the demolition activities for safety, if necessary, and TVA would coordinate with relevant agencies as appropriate. TVA would work with the demolition contractor to create a detailed site-specific plan for any public road closures that would be distributed to affected parties, including emergency personnel.
- If determined necessary, TVA would mitigate traffic impacts by implementing measures such as timing of entry and exit to the facility, establishing alternate ingress/egress routes and possible busing of workers.

- TVA would require the demolition contractor to develop and implement a demolition plan to minimize vibration effects at PAF and in the vicinity.
- Explosives would be managed under the direction of a licensed blaster; 24-hour security would be provided to monitor the explosives.
- Detailed security plans related to the transport and storage of explosives and site security would be developed.
- Notifications to the public would be issued prior to the use of explosives for demolition. Prior to the demolition, the area would be prepared, and the explosives contractors would establish a fall exclusion zone. During the blast event, no personnel would be allowed in the fall exclusion zone.
- Though not anticipated, if deconstruction activities have the potential to emit pollutants greater than acceptable thresholds in PAF's existing Title V permit, mitigation could include a request to modify the permit.
- To minimize adverse impacts on natural and beneficial floodplain values, demolition and deconstruction material would be disposed of outside of the 100-year floodplain, and concrete and masonry used as backfill in the floodplain would be placed at-grade or below.

2.3.2. Best Management Practices

The following BMPs have been identified to reduce potential environmental impacts:

- TVA would minimize one-time emissions of fugitive dust from facilities expected to produce large volumes (such as demolition of the stacks and cooling towers) by working with the demolition contractor on a site-specific plan. The demolition contractor would be required as practicable, to remove ash and coal and limestone dust from the facilities proposed for deconstruction and demolition, prior to removal of that facility and implement dust control measures during demolition to prevent the spread of dust, dirt, and debris. These methods may include wetting equipment and demolition areas, covering waste or debris piles, using covered containers to haul waste and debris, and wetting unpaved vehicle access routes during hauling. TVA also requires onsite contractors to maintain engines and equipment in good working order. TVA would continue to follow dust control BMPs in accordance with its Title V permit and SWPPP.
- TVA would take precautions to avoid attracting migratory birds, bats, and other wildlife to the area by securing inactive structures that could potentially be used as nesting areas. Any openings in structures would be closed to the extent possible and deterrents may be used. At the time of publication of the Draft EA, no threatened or endangered species were identified within inactive structures. As described in Section 2.3.1 above, TVA would conduct presence/absence surveys prior to demolition of the structures to determine if migratory birds or listed bat species are utilizing these buildings.
- Any temporary or permanent outdoor lighting would be angled downward and away from suitable bat habitat to minimize light pollution impacts to listed bats.
- Surface water quality impacts resulting from disturbance during demolition would be minimized by the use of stormwater pollution prevention BMPs to reduce the extent of disturbance and erosion.

- Potential surface water impacts to any jurisdictional waters during demolition would be minimized or avoided by designing demolition activities to minimize any impacts to adjacent waters. Surface water impacts would be minor with the implementation of BMPs, as well as compliance with the requirements of the USACE permitting process. The installation of bulkheads in the tunnels would be conducted in accordance with BMPs intended to avoid release of sediments or contaminants to surface water. BMPs and wastewater treatment would be employed, as needed, to mitigate any pollutant discharge. The implementation of BMPs, protocols to respond to onsite spills prior to discharge, and site clean-up would help to reduce the potential for any releases to surface waters.
- The use of BMPs, including safety procedures and security measures, would minimize potential safety impacts.
- TVA would ensure the proper management of all solid waste and hazardous wastes generated from construction activities in accordance with applicable federal, state, and local requirements. Additionally, any spills would be managed in accordance with site specific procedures for spill prevention and cleanup.
- Construction debris and wastes would be managed in accordance with federal, state, and local requirements. Prior to demolition activities, hazardous materials will require special removal, handling, and disposal by appropriately trained and licensed personnel and contractors. Dust suppression and environmental control BMPs would be employed to minimize or prevent releases of hazardous materials.

2.4. Preferred Alternative

TVA's preferred alternative for fulfilling its purpose and need is Alternative A – Full Demolition of All Structures and Closure of the Coal and Limestone Yards. This alternative includes the proposed decontamination and demolition of all buildings and structures within the proposed demolition boundary to three feet below grade. Implementation of this alternative would meet the purpose and need of the project to appropriately manage the disposition of the PAF site to provide necessary structures and facilities for ongoing site activities while considering capital cost, long-term operations and maintenance costs, environmental risks, safety and security at the plant site, and making the land available for future economic development.

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CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment (existing conditions) for environmental resources in the project area and the anticipated environmental consequences that would occur from adoption of the alternatives described in Chapter 2. Chapter 3 considers the environmental consequences associated with the full demolition of all structures and closure of the coal and limestone yards (Alternative A) or leaving the facility in the "as-is" condition (Alternative B). The affected environment descriptions below are based on surveys conducted by TVA, published and unpublished reports, and personnel communications with resource experts.

3.1. Land Use and Prime Farmland

3.1.1. Affected Environment

3.1.1.1. Land Use

The PAF facility is located in Muhlenberg County, Kentucky along the western bank of the Green River. The plant property occupies approximately 3,400 acres of land that supports industrial development for the facility and supporting infrastructure.

Surrounding land use is dominated by open land consisting of reclaimed mine lands passively managed for wildlife habitat and forestry. Land used for agriculture (cropland) is located in the bottomland along the Green River. No residential or commercial land uses occur in the immediate vicinity of PAF.

The nearest residential areas are located on the west side of the Green River about 2.5 miles from the southern edge of the PAF property. The nearest community is the town of Drakesboro, about three miles to the southwest. The nearest residences east of the Green River are about two miles from PAF. No residences exist along State Route (SR) 176, which connects the plant to U.S. Highway (US) 431 west of PAF at Drakesboro.

The area for this evaluation consists of approximately 464.5 acres on which decontamination and deconstruction activities may take place shown on Figure 1-2 (the 407.5-acre decontamination and deconstruction project area and four laydown areas). The project area and laydown areas are located within the PAF property boundary and are characterized by industrial development. This is a rural site with no zoning.

3.1.1.2. Prime Farmland

Prime farmland is land that is the most suitable for economically producing sustained high yields of food, feed, fiber, forage, and oilseed crops. Prime farmlands have the best combination of soil type, growing season, and moisture supply and are available for agricultural use (i.e., not water or urban built-up land). The Farmland Protection Policy Act ([FPPA]; 7 United States Code [USC] 4201 et seq.) requires federal agencies to consider the adverse effects of their actions on prime or unique farmlands. The purpose of the FPPA is "to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses." There are no prime farmland soils within the proposed decontamination and deconstruction project area.

3.1.2. Environmental Consequences

3.1.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or the top of the mooring cells, resulting in a brownfield site. All disturbed areas would be backfilled and re-seeded or otherwise stabilized. The land use would be changed from a developed, industrial use to a vacant vegetated area. It would become available for potential redevelopment, allowing for future industrial or other economically beneficial use. While the extent of the potential future development is unknown, it is assumed that any future development would comply with uses allowed under the zoning ordinances in effect at that time. No adverse impacts to land use within the proposed project area are anticipated under Alternative A.

Deconstruction activities would also result in short-term land use impacts associated with the temporary conversion of land for the purposes of laydown areas to support various demolition-related activities. These short-term impacts would include the utilization of new construction parking lots, laydown and stockpile areas, and temporary crew trailers and offices. Upon completion of deconstruction activities, it is anticipated that these areas would be restored to their previous state. Therefore, land use impacts in the laydown areas are anticipated to be short-term and minor.

Demolition debris removed from the decontamination and deconstruction project area would be transported to an existing offsite permitted landfill or to an offsite recycling facility. Additionally, fill material used during site restoration would be obtained from an onsite borrow area. Therefore, there would be no changes to existing land use at the disposal or borrow sites. The haul route to the offsite landfill would utilize previously constructed roads which are already subjected to vehicular traffic and no new roads would need to be constructed. Therefore, there would be no indirect impacts to land use associated with disposal of demolition debris.

There are no areas with prime farmland soils within the proposed decontamination and deconstruction project area; therefore, there would be no adverse impacts to prime farmland.

3.1.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. Therefore, there would be no changes in land use and no adverse impacts to prime farmland.

3.2. Geology and Groundwater

3.2.1. Affected Environment

3.2.1.1. Geologic Setting

PAF is located within the Shawnee Hills section of the Interior Low Plateau Physiographic Province in northwestern Kentucky Fenneman 1938). PAF is underlain by the Sturgis (formerly Lisman) (Kehn 1973) and Carbondale Formations. The Sturgis Formation is described as interbedded sandstone, siltstone, shale, limestone and coal. This formation is largely concealed by loess, alluvium, and colluvium. In the area around the plant, this formation has been extensively altered by mining practices in order to reach the coal seams

within the Carbondale formation. The Carbondale consists of cyclic sequences of fine-grained sandstone, sandy shale, coal, and silty underclay. The most extensively mined coal seams within this formation include the No. 9 and No. 11 seams (Stantec 2011). The No. 9 coal seam, the most prevalent in the Western Kentucky Coal Region, underlay most the PAF reservation prior to mining at the site. After stripping the overlying rock to extract the coal, the remaining overburden was placed back in the area as spoils which covers a large area around the plant. Alluvial deposits from the Green River underlie eastern portions of the plant near the Green River. Alluvium deposits also underlie the areas across the river to the east of the plant (Kentucky Geological Survey [KGS] 2016).

3.2.1.2. Geologic Hazards

3.2.1.2.1. Karst Topography

Due to the presence of limestone ($CaCO_3$) there is a possibility for karst terrain to develop. Karst refers to a type of topography with high amounts of carbonate that are chemically weathered from interactions with precipitation and groundwater. The carbonate can dissolve during the weathering process and create sink holes. Muhlenberg County and the counties surrounding the project site are located in an area identified by the KGS as having no potential for karst (KGS 2016). Karst features such as sinkholes and springs are not known to occur within the PAF property or surrounding areas.

3.2.1.2.2. Seismic Events

The U.S. Geological Survey (USGS) information and geologic studies carried out by TVA indicate that the PAF site and surrounding area may be subject to minor seismic events. Seismic events affecting the central portion of western Kentucky, and thus the plant site, primarily emanate from two zones of earthquake activity – the New Madrid Seismic Zone of the central Mississippi Valley and the Wabash Valley Seismic Zone located along the border of Illinois and southwestern Indiana. Although the majority of the events emanating from these zones are too small to be felt at the surface, the Wabash Valley Seismic Zone has produced three earthquakes within the last 20 years with magnitudes of 5.0 or greater and the New Madrid Seismic Zone produced a series of four earthquakes between December 1811 and early February 1812, each exhibiting estimated magnitudes of 7.0 to 8.0 (Stantec 2009).

3.2.1.2.3. Faults

PAF is located between two subparallel, east-northeast trending fault systems: the Pennyrile fault system, located about three miles southeast of the plant site, and the Rough Creek fault system, situated approximately 17 miles northwest of the site. Based on a review of USGS information (USGS 2001), no Quaternary Period (i.e., the last 2.6 million years) faults and associated folds producing magnitude 6 or greater earthquakes are located within the vicinity of PAF. Despite the presence of major fault systems in the region, no evidence of significant faulting has been observed at the plant site.

3.2.1.3. Regional Aquifer

Regional aquifers within five miles of PAF are represented by the bedrock carbonate aquifer and the alluvial aquifer associated with the Green River. Carbonate rocks are a class of aquifers that are represented in the Highland Rim physiographic region around PAF. Carbonate rocks, such as limestone and dolomite, contain a high percentage of carbonate minerals (e.g., calcite) in the rock matrix. Carbonate rocks in some parts of the region readily transmit groundwater through enlarged fractures (cracks) and cavities created by dissolution of carbonate minerals by acidic groundwater.

The alluvial aquifer consists of the water bearing sand and gravel deposits associated with streams and floodplains. The alluvium may yield as much as 100 gallons per minute (gpm) from sands and gravel along the Green River (Duvaul and Maxwell 1962). The alluvium yields enough water for a modern domestic supply (more than 500 gpm) to wells in valleys of the Green River and its larger tributaries (Starn et al. 1993). It yields practically no water to wells in small valleys where it is thin and fine grained. Water is hard or very hard and may contain objectionable amounts of iron (Carey and Stickney 2004).

The availability of groundwater from bedrock sandstone in the Western Kentucky Coal Region varies widely. Prior to mining, the area was underlain by the three identifiable aquifers: the Lisman aquifer located near the surface (in the Sturgis formation), the Carbondale aquifer at an intermediate depth, and the Caseyville aquifer located more than 600 feet below the surface. Elsewhere in the region, usable groundwater is also found in the Tradewater Formation. The Lisman is exposed in a part of the region but has been largely removed by coal mining and replaced by mining spoil in the upland areas. Where sandstone units of the Lisman or Carbondale aquifers are exposed at the surface, they receive direct infiltration and are susceptible to potential contamination. In undisturbed areas where the sandstone units are overlain by shale and coal beds, the sandstone is protected from direct recharge and less susceptible to potential contamination (TVA 2013).

Groundwater derived from carbonate formations of the Highland Rim is generally slightly alkaline and high in dissolved solids and hardness. The quality of groundwater from shallow bedrock aquifers is generally soft to moderately hard but may contain undesirable amounts of iron. Most water from the alluvium along the Green River is generally harder and contains more iron than water from the bedrock aquifers. Iron and common salt (saline water) are the main naturally occurring constituents affecting the taste of the groundwater (Carey and Stickney 2004).

Horizontal groundwater gradients in the overburden generally follow surface topography with flow toward the Green River and Jacobs Creek. Groundwater movement in the underlying Carbondale formation occurs primarily through bedrock fractures and bedding planes (TVA 2017). The Carbondale receives recharge from the overburden and from lateral inflow along the western boundary of the reservation. Although horizontal groundwater gradients in the Carbondale formation are similar to those of the overburden, the groundwater potentiometric surface of the Carbondale averages about five feet lower than that of the overburden.

3.2.1.4. Groundwater Use

The groundwater in Muhlenberg County is used for residential, industrial, and agricultural purposes. According to the most recent data regarding public water use, Muhlenberg County had an estimated population of 30,622 in 2019 (USCB 2020). An estimated 94 percent of the population is served by surface water provided by a water utility. In areas not served by public water, about 70 percent of the households use wells and 30 percent use other sources (Carey and Stickney 2004).

The Carbondale yields enough water for a modern domestic supply to wells penetrating sandstone. It yields practically no water to wells penetrating only shale. Wells are known to produce as much as 30 gpm. Water is hard or very hard, but otherwise of good quality. It yields either no water or water containing iron sulfate in areas where the Kentucky No. 9 coal has been mined as it has been at the PAF facility. Previous studies identified four wells within 2 miles of the plant reservation. These include one domestic well completed in the

Sturgis formation. Three wells (two domestic and one industrial) were developed in the Carbondale. The two Carbondale domestic wells were reviewed in 2003 by TVA and found to no longer exist. The third Carbondale well is an industrial well upgradient of PAF. No new public drinking water sources have been located near the PAF (TVA 2013).

3.2.1.5. Groundwater Quality

The groundwater quality of the region mainly depends on the chemical composition of the aquifer in which the water is located. Precipitation infiltrating an aquifer is generally low in dissolved solids and slightly acidic. As various methods of chemical and physical erosion occur and the water reacts with the matrix it is in, the concentrations of dissolved solids increases. The Quaternary alluvium deposits contain high iron concentrations in some areas. The Pennsylvanian sandstones characteristically have high concentrations of iron, in some areas, high concentrations of dissolved solids, sulfides and sulfates can occur (TVA 2019a).

The Safe Drinking Water Act of 1974 established the sole source aquifer protection program which regulates certain activities in areas where the aquifer (water-bearing geologic formations) provides at least half of the drinking water consumed in the overlying area. No sole source aquifers exist in the vicinity of PAF (EPA 2015).

As required by the EPA Final Rule on Disposal of CCR from Electric Utilities (CCR Rule), TVA established monitoring well networks for the Gypsum Disposal Area, Stilling Pond 1 & 2; for the Slag Ponds Area; and for Peabody Ash Pond, consisting of “background” or upgradient wells in locations that were not expected to be affected by CCR and downgradient wells around the edge CCR units to monitor for releases to groundwater. These CCR Rule groundwater monitoring well networks are monitored in accordance with the CCR Rule during the baseline, Detection Monitoring, and Assessment Monitoring phases. During the 2019 sampling period, TVA reported statistically significant exceedances of the established site-specific Groundwater Protection Standard (GWPS) for arsenic in 2 wells – one in the well network for the Peabody Ash Pond and one in the well network for the Slag Ponds. As a result, TVA has completed assessment of corrective measures reports for the Peabody Ash Pond and the Slag Ponds Area CCR units to analyze the potential effectiveness of potential corrective measures. These reports were posted on the TVA CCR Rule website on August 14, 2019 (TVA 2019c). There were no statistical exceedances of groundwater protection standards established under the CCR Rule for the Gypsum Disposal Area during the 2019 sampling period.

3.2.2. Environmental Consequences

3.2.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells. Construction activities associated with the decontamination and deconstruction of PAF has the potential to release pollutants into the shallow alluvium groundwater. If these disturbance or impacts occur, they would have a minimal impact compared to the long-term implications of the No Action Alternative. BMPs will be used during the decontamination and deconstruction activities to limit potential impact to the groundwater. Once the activities are complete, there will be a beneficial effect on the groundwater systems in the area.

3.2.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. There would be no impacts to geology associated with Alternative B. As all structures would remain in place, there would be a higher potential for long-term impacts to groundwater quality because of the higher risk of contamination as the structures degrade. Overall, the potential impacts of this alternative on groundwater would be minor, but they would be greater than those under Alternative A.

3.3. Surface Water

3.3.1. Affected Environment

3.3.1.1. Surface Water

PAF is drained by permitted stormwater outfalls, wet weather conveyances, red water ditches (which ultimately flow to either the Slag Ponds (also known as the bottom ash ponds) or the Peabody Ash Pond (also known as the fly ash pond)), the condenser cooling water discharge (Outfall 005), and process and stormwater discharges from the Peabody (Outfall 001) and Slag impoundment systems (Outfall 002). The plant intake for Units 1 and 2 is located at Green River Mile (GRM) 100.6 and the intake for Unit 3 is located at GRM 100.3. The plant intakes water for cooling and process purposes (USACE 2011).

The Green River basin contains approximately one-fourth of Kentucky's land area and is the largest drainage basin in the state with a total of 18,858 acres (Kentucky EEC 2015). Reservoirs have been constructed by the USACE on the Rough, Nolin, and Barren Rivers, as well as on the main stem of the Green River in the upper basin. Major sources of stream contamination in the upper basin are agriculture (sediment, nutrients, and pesticides); mining or drilling (chloride); onsite and municipal wastewater-treatment systems (decomposable organic matter, nutrients, and bacteria); and urban stormwater runoff (metals, nutrients, and sediment).

The CWA requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the EPA. The term "303(d) list" refers to the list of impaired and threatened streams and water bodies identified by the state.

The overall water quality is good in the Green River Basin. Two segments of the Green River and the entire 8,210-acre Green River Reservoir are listed on the state 303(d) report as impaired, only partially support their designated uses. However, the Green River sites are upstream of the project site (Kentucky EEC 2015). Jacobs Creek and the portion of the Green River adjacent to PAF are currently not assessed by Kentucky Division of Water for impairment.

The Nationwide Rivers Inventory is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more outstandingly remarkable natural or cultural values judged to be of more than local or regional significance. Designated Nationwide Rivers Inventory segments are thus potential candidates for inclusion in the federally recognized National Wild and Scenic River System. The Green River at GRM 189-290, approximately 90 miles upstream, is on the Nationwide Rivers

Inventory (Kentucky EEC 2018). However, no Nationwide Rivers Inventory streams or Wild and Scenic Rivers are near PAF.

3.3.1.2. Existing Wastewater Streams

The majority of the process flows (including any CCR discharges) ceased in February 2020, following the retirement of PAF Unit 3. However, all process water flows from PAF are not expected to cease completely until sometime in 2021. While there are no current CCR discharges, there are still discharges from station sumps, the water treatment plant flows, , minimal cooling water, fire protection water through the bottom ash sluice system, and other ancillary waste streams. Currently the remaining plant process waters are discharged to either the Slag Ponds (Outfall 002A), Peabody Ash Pond (Outfall 001 to Jacob's Creek), or through the condenser cooling water (Outfall 005). In addition to these flows, leachate (Outfall 018) and landfill stormwater driven flows (Outfalls 019 and 020) are also discharged from the newly constructed landfill; however, no CCR has been stored in this landfill so those flows are not required to be monitored under the below mentioned permit. To better facilitate the closure of both the Peabody Ash Pond and the Slag Pond Area a series of process water basins were constructed and are discharging through Outfall 002B.

The current KPDES permit KY0004201 (modified and effective September 1, 2020) requires monitoring of all above-mentioned Outfalls on a tiered basis based on current conditions. These tiers have different monitoring requirements and limits (KPDES 2020).

3.3.1.3. Other Surface Runoff

The existing plant site runoff is regulated under the KPDES Permit KY0004201. Existing facilities and BMPs are used to ensure compliance with the permit conditions. Some plant runoff is currently directed through the Peabody Ash and the Slag impoundment systems discussed above, whereas other runoff goes directly to the Green River or Jacobs Creek through permitted discharge points. To facilitate closure and compliance with CCR Rule requirements, the flows directed to the Peabody Ash Pond and Slag ponds will stop and be directed through the new process water basins by April 2021.

3.3.1.4. Sanitary Wastewater Treatment

Sanitary wastewater at PAF was previously treated on-site in a small, extended aeration package plant that discharges as Outfall 004 to Red Water Ditch #1. Red Water Ditch #1 then discharges to the Slag pond. The sanitary wastewater plant has now been decommissioned and a modification request has been sent to the Kentucky Division of Water to modify the permit to remove this waste stream from the current KPDES permit. Future discharges from this outfall would be expected to be primarily storm water driven discharges.

The Paradise NGCC plant began generating electricity in late 2016. The KPDES permit KY011902 for this facility was effective on September 1, 2016 (updated KPDES went into effect September of 2020) and includes discharges to the Green River of stormwater and Internal Outfall 002 (cooling tower blowdown) from Outfall 001 located at approximately GRM 99.4 and Raw Water Intake for cooling water from Outfall 003. The parameters monitored and/or limited from Outfall 001 are flow, temperature, total suspended solids, and potential hydrogen (pH). Outfall 002 requires monitoring of flow, pH, free available chlorine, total residual oxidants, oxidant discharge time, total chromium, total zinc, and priority pollutants. Outfall 003, the facility intake, monitoring requirements include flow, intake velocity, and intake inspection.

3.3.2. Environmental Consequences

3.3.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells, resulting in a brownfield site. The intake channel would be sealed off and all equipment removed. As described above, the majority of flows from the PAF facility, other than precipitation-driven surface runoff flows, would have ceased. Withdrawal rates for this facility would also decrease and eventually stop completely, except for those required flows listed above and the flows required for the Paradise NGCC site.

Thermal discharges have decreased now that all unit production has ceased. Raw and potable waters and stormwater flows associated with this project would remain at ambient temperatures; therefore, no additional thermal impacts would be anticipated.

Initially, sumps and stormwater systems would still be operated and utilized, but eventually these flows would be altered and the current modified permit has flexibility to manage altered discharges. Eventually, the sumps would be demolished and any flows would be managed with portable pumps.

3.3.2.1.1. Demolition/Construction Impacts
Wastewaters generated during demolition activities may include construction stormwater runoff, dewatering of work areas, domestic sewage, non-detergent equipment washings, dust control, and hydrostatic test discharges.

Surface Runoff: Demolition activities have the potential to temporarily affect surface water via stormwater runoff. TVA would comply with all appropriate state and federal permit requirements. Demolition and construction activities would be located on the plant property. Construction stormwater discharges would be covered under the current KPDES permit; however, a BMP plan for the project would be drafted to detail all BMPs and sediment, erosion controls, and housekeeping practices. Surface water impacts resulting from disturbances during demolition would be mitigated by the use of stormwater pollution prevention BMPs to minimize the extent of disturbance and erosion. Stormwater would be discharged via either KPDES permitted discharge points or the designated construction stormwater outfalls. BMPs would be installed, inspected, and maintained for the duration of demolition as needed to avoid contamination of surface water adjacent to the project area. Therefore, short-term, minor impacts would be expected due to surface water runoff from the demolition site. All proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollution materials to the receiving waters would be minimized.

Demolition activities, especially stack/cooling tower demolition have the potential to have direct impacts due to the potential for discharge of fill and residual ash to waters of the state or U.S. These demolition activities would be designed in a way to minimize any impacts to adjacent waters; however, mitigation measures, such as turbidity curtains in adjacent waters, would be considered to help mitigate any incidental discharge of fill to receiving streams. With mitigation measures and BMPs in place, incidental discharges to adjacent surface waters due to these activities should be minimized.

Work conducted in waters of the state may require USACE and Kentucky Energy and Environment Cabinet (EEC) permits depending on the project impacts and location.

Potential surface water impacts during demolition would be mitigated, and the impacts would be minor with the implementation of BMPs as well as compliance with the requirements of the USACE and Kentucky EEC permitting process. In the event a permit is required, any mitigation would be identified through the permitting process, providing for compensation for stream reaches.

All buried utilities would be cut and capped within the project boundary and abandoned in place if they do not interfere with other ongoing projects that overlap the project footprint. All hollow pipe utilities would be decommissioned and sealed with a mechanical cap or plug.

Cooling Water Intake Channel Sealing: The installation of bulkheads in the tunnels would occur entirely within the tunnels and would be conducted in accordance with BMPs intended to avoid release of sediments or contaminants to surface water. The installation process would not be expected to cause adverse impacts to surface water quality as long as the proper BMPs were utilized. The tunnels would be backfilled or bulkheaded and left in place.

Domestic Sewage: Portable toilets would be provided for the additional construction workforce as needed. These toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly-owned wastewater treatment works that accepts pump out. The septic system at the facility has been decommissioned as part of this project and a separate septic system has been installed.

Equipment Washing and Dust Control: Equipment washing and dust control discharges would be handled in accordance with BMPs described in the BMP Plan for water-only cleaning, and/or KPDES Permit KY0004201.

Hydrostatic Testing: These discharges would be handled, if required, in accordance with the KPDES permit.

With the implementation of appropriate BMPs, short-term, minor impacts to surrounding surface waters are expected from demolition activities.

3.3.2.1.2. Post-Demolition Impacts

With the coal-fired units no longer in operation, the only significant remaining flows should be surface runoff stormwater flows, process stormwater flows from the Paradise NGCC and water treatment plant, and possibly some sump or dewatering flows. The main change that would take place with the demolition of the facility would be the change in management of the onsite stormwater and process wastewater that have been treated in impoundments and discharged from the site. Since the units have all ceased operation, process streams would also eventually stop. Any remaining minor flows would be redirected to other treatment systems as necessary to comply with a modified KPDES permit and the CCR Rule. This re-routing would conceptually employ onsite non-CCR impoundments and new ditches or piping to enable the proper handling and treatment of the waste streams. BMPs and wastewater treatment would be employed, as needed, to mitigate any pollutant discharge.

This project may require the need for additional stormwater outfalls, which may require a modification of the KPDES permit. The specific characteristics of future discharges are unknown at this time. However, the total loadings to the Green River should decrease significantly.

3.3.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. Under this alternative, it is assumed that TVA would be required to continue operating some sumps and stormwater systems at the retired facility. Leaving the facility in place greatly increases the potential for direct discharges of chemicals, hazardous waste, and even solid waste, including but not limited to friable asbestos releases to receiving streams through sump discharges, stormwater releases, and directly to adjacent surface waters. Without maintenance, the intake and discharge tunnels and all stacks/cooling towers would be at risk of integrity issues, which would likely have direct and indirect impacts on surface water quality through unpermitted releases of sediment, chemicals, and solid waste.

Permits would continue to be renewed with applicable monitoring requirements included. Permits and associated BMPs would be modified to indicate the changes from current conditions. The future discharges of the sumps and stormwater are addressed in the KPDES permit, but may need to be reevaluated to ensure these discharges are still appropriately handled through the permit program.

3.4. Floodplains

3.4.1. Affected Environment

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. The area subject to a one percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2 percent chance of flooding in any given year is normally called the 500-year floodplain. It is necessary to evaluate development in the floodplain to ensure that the project is consistent with the requirements of Executive Order (EO) 11988 – Floodplain Management.

Portions of the proposed decontamination and deconstruction project area are within the 100-year floodplain of the Green River from GRMs 99.7 to 100.9, left descending bank. The following facilities are located partially or completely within the 100-year floodplain: barge unloading facility, plant intake, coal conveyors, and the two northernmost laydown areas (Figure 3-1). Although depicted within the 100-year floodplain, based on TVA 2016 lidar, the two northernmost laydown areas would be located outside 100-year floodplain.

Based on Profile 05P of the 2013 Muhlenberg County, Kentucky, Flood Insurance Study, the Green River 100-year flood elevations range from 401.9 to 402.0 feet above mean sea level (MSL), and the 500-year flood elevations range from 404.2 to 404.8 feet MSL.

Figure 3-1. 100-Year Floodplain in the Project Area

3.4.2. Environmental Consequences

As a federal agency, TVA adheres to the requirements of EO 11988 – Floodplain Management. The objective of EO 11988 is "…to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative" (EO 11988 1977). The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances (U.S. Water Resources Council 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

3.4.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells. Of the facilities proposed for demolition and the proposed laydown areas, only the barge unloader and intake are located within the 100-year floodplain. Although depicted within the 100-year floodplain, based on TVA 2016 lidar, the two northernmost laydown areas would be located outside 100-year floodplain, which would be consistent with EO 11988.

Removal of the barge unloader and the intake would increase the Green River's capacity to carry water and thus result in minor beneficial impacts to floodplains, which would be consistent with EO 11988. To minimize adverse impacts, demolition material would be spoiled at a location outside 100-year floodplains, and concrete and masonry used as backfill in the floodplain would be placed at-grade or below. By adhering to the mitigation measures above, the proposed decontamination and demolition of the facilities at PAF would have no significant impact on floodplains and their natural and beneficial values.

3.4.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. Therefore, there would be no changes to the current conditions found within the local floodplains.

3.5. Wetlands

3.5.1. Affected Environment

The USACE regulates the discharge of dredged or fill material into waters of the U.S., including wetlands, under the CWA Section 404 [33 USC § 1344]. Additionally, EO 11990 – Protection of Wetlands requires federal agencies to avoid long- and short-term impacts to wetlands and minimize their impact in order to preserve and enhance their natural and beneficial values.

As defined in Section 404 of the CWA, wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Types of wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands and wetland fringe areas can also be found along the edges of many watercourses and impounded waters (both natural and man-made). Wetland habitat provides valuable public benefits including flood storage, erosion control, water quality improvement, wildlife habitat,

and recreation opportunities [33 CFR 328.39(b)]. TVA is subject to EO 11990 – Protection for Wetlands. EO 11990 requires all federal agencies to minimize the destruction, loss or degradation of streams and wetlands, and to preserve and enhance the natural and beneficial values of streams and wetlands in carrying out the agency's responsibilities.

The proposed decontamination and deconstruction project area is located near the Green River in the Green River-Southern Wabash Lowlands Level IV Ecoregion (72c), a subdivision of the Interior River Valleys and Hills Level III Ecoregion (72) where the land use and land cover are dominated by agriculture and coal mining (Woods et al. 2002). Drainage conditions and terrain strongly affect land use. Bottomland deciduous forests were prominent in the region before they were cleared for agricultural use. Within the project area these forests are limited to the PAF property boundaries due to associated development in the area.

Field surveys of the project area and laydown areas were conducted August 3-6, 2020 to determine the presence of potential jurisdictional wetlands and streams. Wetlands on the project site were identified in accordance with methodologies described in the 1987 *Corps of Engineers Wetlands Delineation Manual* (1987 Manual) (USACE 1987) and the Eastern Mountains and Piedmont regional supplement to the 1987 Manual (USACE 2012). Streams were classified utilizing the methodology and guidance provided in the North Carolina Division of Water Quality Identification Methods for the Origins of Intermittent and Perennial Streams (NC DWQ Stream Identification) (NC DWQ 2005). A total of seven wetlands (4.5 acres) and two jurisdictional stream channels (4,188 linear feet) were identified within the project area and laydown areas (Figure 3-2).

Table 3-1. Wetlands within the vicinity of PAF

Spatial ID	Cowardin Classification[1]	Delineated Acreage	Acreage within the Project Area/Laydown Areas
Wetland 1	PSS1	0.12	--
Wetland 2	PEM1	0.47	0.47
Wetland 3	PEM1	0.55	0.55
Wetland 4	PEM1/PSS6	0.84	0.84
Wetland 5	PEM1/PSS6	1.74	1.74
Wetland 6	PSS1	0.04	--
Wetland 7	PEM1/PFO6	1.60	0.79
Wetland 8	PEM1/PSS6	0.71	--
Wetland 9	PSS1	0.17	--
Wetland 10	PSS1	0.03	0.02
Wetland 11	PSS1/PFO6	0.76	0.12
Totals		**7.0**	**4.5**

[1] Classification codes as defined in Cowardin et al. (1979): PEM1 = Palustrine, Emergent, Persistent; PSS1 = Palustrine, Scrub-Shrub, Broad-leaved Deciduous; PEM1/PSS6 = Palustrine, Emergent, Persistent and Palustrine, Scrub-Shrub, Deciduous; PEM1/PFO6 = Palustrine, Emergent, Persistent and Palustrine, Scrub-Shrub, Deciduous

Wetlands on the project site were classified by hydrologic regime and vegetation cover type in accordance with the Cowardin Classification System (Cowardin et al. 1979). Two wetland types were identified onsite: palustrine emergent (PEM) and palustrine forested (PFO), for a total of 4.5 acres of potentially jurisdictional wetlands. PEM wetlands were typically found in agricultural settings and were highly disturbed by agricultural activities, resulting in

vegetation dominated by emergent vegetation, such as common reed (*Phragmites australis*), broom sedge (*Andropogon virginicus*), wild teasel (*Dipsacus fullonum*), broadleaf cattail (*Typha latifolia*), and various sedges (*Carex spp.*). PFO wetlands were typically dominated by various hardwood tree species such as black willow (*Salix nigra*), American sycamore (*Platanus occidentalis*), loblolly pine (*Pinus taeda*), and American elm (*Ulmus americana*).

3.5.2. Environmental Consequences

3.5.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells. Implementation of this alternative could result in impacts to Wetland 3, located near the cooling towers. Impacts to this feature would require mitigation and coordination with the USACE. Mitigation is typically a 2:1 ratio, involving purchase of mitigation credits at a mitigation bank within the service area as required by USACE. This level of mitigation is sufficient to offset wetland impacts associated with the proposed action. Overall direct, indirect, and cumulative wetland impacts are expected to be insignificant. All other streams and wetlands will be avoided. Complete avoidance of water features is preferred; however, that is not always feasible.

3.5.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. The No Action Alternative would not result in impacts to wetlands as the decontamination or deconstruction project area and associated laydown areas would remain in their current conditions.

Figure 3-2. Wetlands and Streams in the Project Area

3.6. Aquatic Ecology

3.6.1. Affected Environment

PAF is located adjacent to the Green River in Muhlenberg County, Kentucky, which occurs in the Green River-Southern Wabash Lowlands ecoregion. The proposed PAF project site occurs near GRM 100.5 (left bank) within the Jacobs Creek-Green River watershed. The Green River is a tributary of the Ohio River with a series of USACE lock and dams to create a navigable river channel. It is considered the most biologically diverse branch of the Ohio River system with the greatest aquatic diversity occurring in a 100-mile section of river that flows from the Green River reservoir dam through Mammoth Cave National Park (Kentucky Division of Conservation 2012). This section of the river is about ninety miles upstream of PAF.

TVA commissioned a survey in 1961 of the Green River in the vicinity of the PAF for the purpose describing the biological, chemical, and physical conditions of the Green River before plant operations began. Results from the survey indicated that the river's primary production (i.e., algal growth) was not as great as found in similar size rivers. Plankton species richness was high but diversity scores were low at the PAF site. Invertebrates (other than protozoa and insects) collected indicated that all sample stations downstream of PAF did not support a balanced invertebrate fauna. Insect fauna was sparse and scattered, presumably due to unfavorable habitat conditions from barge traffic and dredging activities. Fish sampling spaced over a 14-day period was regarded as insufficient for valid conclusions. Chemistry and bacteriology results indicated that all characteristics or qualities measured were favorable to support aquatic life (Academy of Natural Sciences 1962). A 1965 follow-up study determined that overall conditions at the sampling stations were somewhat poorer than in 1961, which was believed to be the result of high water temperatures and low dissolved oxygen in the summer months together with coal dust and heavy barge traffic (Academy of Natural Sciences 1966).

TVA collected 43 species of fish during impingement studies at PAF in 1974-1975. Threadfin shad comprised 52 percent and gizzard shad 44 percent of the total impinged fish assemblage. Channel catfish and white crappie were the two next most abundant species impinged. Recent (2006-2008) impingement studies at PAF found gizzard shad was the dominate species, followed by threadfin shad and freshwater drum. All other species comprised one percent or less of the total fish assemblage impinged at the plant (TVA 2009). TVA also conducted a fish survey near PAF (GRMs 98.4 to 105 in 2010 and 2011; Jeffery Simmons, personal communication, December 11, 2012; TVA 2012). The 2010 survey collected 596 individuals representing 36 species with gizzard shad (56 percent), bluegill (five percent), and spotted gar (four percent) making up the three most abundant species. In 2011, 1,952 individuals representing 51 species were collected with Mississippi silvery minnow (16 percent), bullhead minnow (13 percent), and bluegill (13 percent) dominating the assemblage collected.

In 1985, a barge-unloading facility was constructed at PAF. A 2008 mussel survey adjacent to PAF near the coal unloader for a planned dredge found no live or dead federally listed threatened or endangered species and low densities of a small number of common species (TVA 2008).

A TVA bioassessment study was conducted on Jacobs Creek, a tributary to the Green River adjacent to PAF, in 1998. This study reported Index of Biotic Integrity scores of all sampling sites on Jacobs Creek as either “poor” or “fair” (TVA 1998).

3.6.2. Environmental Consequences

3.6.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells. Although watercourses have been documented within the project area, ground disturbance would be minimized and all work done in accordance to state and local BMPs. With proper implementation of BMPs, no direct impacts to the aquatic communities that may be present in watercourses within the project area would be anticipated. Should the need to conduct work within watercourses within the project area arise, applicable KPDES and CWA Section 404 permits would be obtained for any stream alterations located within the project area and the terms and conditions of these permits would require mitigation from these proposed activities. No measurable impacts to aquatic ecology in the Green River or its tributaries would occur under Alternative A. Long-term, beneficial impacts could occur due to gradual revegetation of the site.

3.6.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. If the facility is left in the “as-is” condition, it likely would present a higher risk than Alternative A for the potential to contaminate soil and groundwater as systems and structures degrade. The potential groundwater contamination could reach nearby watercourses and the adjacent Green River resulting in direct impacts to aquatic communities. If severe enough, this could lead to fish kills and a total loss of biological function within smaller watercourses.

3.7. Wildlife

3.7.1. Affected Environment

The decontamination and deconstruction area and laydown areas for the proposed action at PAF have been heavily disturbed and altered for many years due to the construction and operation of PAF. Only small areas of herbaceous vegetation currently exist in these project areas, most of which occurs in the laydown areas.

Some wildlife use man-made structures opportunistically. Common mammals, birds, and reptiles have been observed using parts of buildings abandoned or used infrequently by humans. Several species of bats commonly found in this region such as big brown bats and eastern red bats may roost in abandoned, dark or quiet areas of these buildings (Harvey 1992). Birds that have been observed nesting or roosting in TVA fossil plant buildings and structures include American robin, barn swallow, Carolina wren, mourning dove, northern mockingbird, osprey, and rock pigeon. Other mammals and reptiles that may opportunistically utilize human structures include black rat, black rat snake, deer mouse, eastern gray squirrel, house mouse, northern raccoon, and Virginia possum.

Laydown areas are proposed in herbaceous fields with some open scrub-shrub habitats that have been heavily disturbed by activities associated with PAF and transmission lines offer little suitable habitat for rare wildlife species, but can be used by common species.

Birds that utilize these areas include chipping sparrow, field sparrow, grasshopper sparrow, red-tailed hawk, red-winged blackbird, and white-throated sparrow (National Geographic 2002). Mammals that can be found in these areas are common mole, coyote, ground hog, least shrew, white-footed mouse, and white-tailed deer (Whitaker 1996). Reptiles that may use these habitats in this region include black racer, black rat snake, corn snake, eastern kingsnake, and eastern milksnake (Gibbons and Dorcas 2005).

Review of the TVA Regional Natural Heritage database in August 2020 indicate that no caves are known within three miles of the project area. Review of the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) indicate several migratory bird species of concern have the potential to occur in the project area. These include bald eagle, Bell's vireo, blue-winged warbler, cerulean warbler, chuck-will's-widow, dickcissel, fox sparrow, Henslow's sparrow, Kentucky warbler, least bittern, loggerhead shrike, prairie warbler, prothonotary warbler, red-headed woodpecker, rusty blackbird, sedge wren, short-eared owl, willow flycatcher, wood thrush, and worm eating warbler. Early successional habitats, primarily those in or adjacent to transmission line rights-of-way (ROWs) on the east side of the plant, could provide a limited amount of potentially suitable habitat for a few of these species including Bell’s vireo, blue-winged warbler, dickcissel, Henslow’s sparrow, loggerhead shrike, prairie warbler, as well as foraging habitat for short-eared owls. However, the heavy industrialized and disturbed land uses in the immediate project vicinity likely limit the use of these areas by these species.

3.7.2. Environmental Consequences

3.7.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells. This alternative would result in disturbance and displacement of wildlife in the project footprint due to the permanent removal of some structures and pavement demolition. Displaced wildlife may move into adjacent areas with similarly disturbed habitat common around the project site. Direct effects of building demolition may occur to some individuals that may be immobile during the time of construction (i.e., juvenile animals or eggs). This could be the case if deconstruction activities took place during breeding/nesting seasons.

All buildings with the potential to be demolished under this alternative were surveyed in August 2020. Barns swallows and/or their nests were found in 11 buildings. A nest of an unknown songbird was found in another building. While no evidence of use by bats was observed, nineteen buildings may offer potentially suitable habitat for bats or other wildlife species after buildings are vacated. An extensive survey of these buildings would be performed at least one month prior to deconstruction to determine if they are being used by migratory birds or other protected wildlife.

Some migratory birds of conservation concern identified by the USFWS may be impacted by the proposed action. Early successional habitats, primarily those in or adjacent to transmission line ROWs on the east side of the plant, could provide a limited amount of potentially suitable habitat for a few of these species including Bell’s vireo, blue-winged warbler, dickcissel, Henslow’s sparrow, loggerhead shrike, prairie warbler, as well as foraging habitat for short-eared owls. However, the heavy industrialized and disturbed land uses in the immediate project vicinity likely limit the use of these areas by these species.

Potential impacts to bald eagle, Bell's vireo, and Henslow's sparrow are addressed in Section 3.9.

3.7.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. Under this alternative, common mammals, and resident and migratory birds would continue to opportunistically use the buildings within the coal facility for shelter or foraging. Some would occasionally enter buildings in an attempt to find food, while swallows and other birds that nest on man-made structures would continue to use rafters, support beams, lighting fixtures, poles, and building corners as nesting sites. It is likely that under this alternative, use of buildings by nesting birds and mammals would increase due to reduced human disturbance in the area. Terrestrial animals may benefit from the removal of human disturbance from the project site.

If the facility is left in the "as-is" condition, it likely would present a higher risk than Alternative A for the potential to contaminate soil and groundwater as systems and structures degrade. The potential groundwater contamination could reach nearby watercourses and the adjacent Green River. Wildlife reliant upon groundwater or soil could be negatively impacted by this contamination.

3.8. Vegetation

3.8.1. Affected Environment

PAF is located in Muhlenberg County, Kentucky, which is located in the Eastern Broadleaf Forest (Continental) Province (Bailey 1995). The providence consists of low rolling hills and dissected plateaus made up of alfisols and ultisols. Historically the vegetation of this providence has been dominated by broadleaf deciduous forest with an abundance of white oak, red oak, black oak, bitternut hickory, and shagbark hickory, as well as flowering dogwood, sassafras, and hophornbeam. Wetter sites typically exhibit American elm, tuliptree, and sweetgum (Bailey 1995).

As summarized in Table 3-2, land use/land cover within the project area and laydown areas are dominated by developed land and barren land (project area: 51 percent; laydown areas: 79 percent), as well as undeveloped land with vegetative cover types including: hay/pastures (project area: 14 percent; laydown areas: 9 percent), open water (project area: 24 percent; laydown areas: 9 percent), and cultivated crops (project area: 8 percent; laydown areas: 2 percent). Developed and barren lands in the project area and laydown areas are associated with the industrial uses and driveways of the PAF facilities (Table 3-2Table 3-2). Many impervious road surfaces are found throughout the project area and laydown areas. The laydown areas are a combination of medium and high intensity developed areas and mowed herbaceous fields.

Based on a desktop review and previous site reconnaissance of the project area, no unique plant communities are present within these areas. Vegetation within these disturbed areas has been managed to maintain its open condition and, as a result, it is dominated by mowed turf grasses and ruderal/early successional non-native and weedy herbaceous species.

Table 3-2. Land Use/Land Cover within the Project Area and Laydown Areas

Land Use Type	Project Area (ac.)	Laydown Areas (ac.)
Evergreen Forest	1.6	--
Mixed Forest	3.7	--
Herbaceous	2.4	0.2
Barren Land	103.6	0.9
Emergent Herbaceous Wetlands	0.5	--
Hay/Pasture	55.9	5.2
Shrub/Scrub	--	--
Developed, High Intensity	33.5	19.3
Developed, Medium Intensity	48.0	18.0
Developed, Low Intensity	21.7	4.0
Developed, Open Space	2.6	2.6
Deciduous Forest	4.0	--
Open Water	98.1	5.4
Woody Wetlands	--	--
Cultivated Crops	31.9	1.4

Source: Homer et al. 2015

3.8.2. Environmental Consequences

3.8.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells. Implementation of this alternative would result in direct impacts to vegetation. Impacts to vegetation within the proposed decontamination and deconstruction project area and laydown areas would be permanent, but the vegetation found in these areas is composed of common, non-native weeds and early successional species that have little conservation value. Overall, potential impacts are negligible relative to the abundance of similar cover types within the vicinity.

The laydown areas would be impacted mostly by storage of equipment and materials during construction. Direct impacts from storage and movement of materials would likely result in disturbance of soil and destruction of plants growing in traffic paths or directly under stored materials. Post-construction, these areas would revert to their original use; therefore, the impact to any vegetation present would be short-term and minor.

Project-related construction would result in localized disturbances of surface areas that have the potential to increase establishment of invasive plants. However, these sites are all currently disturbed and are characterized by weedy, early successional species. Impacts would be minimized as the site would be revegetated using native or non-invasive species.

Potential indirect impacts on vegetation adjacent to the haul roads would include deposition of fugitive dust during transportation. BMPs such as covered loads and equipment maintenance would be implemented as appropriate to minimize impacts. Therefore, direct and indirect adverse impacts to vegetation would be short-term and minor.

Following completion of the deconstruction, disturbed areas would be reseeded with native or non-invasive vegetation or otherwise permanently stabilized. This would constitute a minor beneficial impact to vegetation.

3.8.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. As a result, no new work would be conducted that would result in the loss or disturbance of vegetation, and therefore no project-related environmental impacts to vegetation would occur under this alternative.

3.9. Threatened and Endangered Species

3.9.1. Affected Environment

3.9.1.1. Terrestrial Wildlife

Review of the TVA Natural Heritage Project Database in August 2020 indicated that there are eight records of Kentucky state-listed terrestrial animal species within three miles of the project footprint on the PAF plant site. Three federally listed terrestrial animal species (gray bat, Indiana bat, and northern long-eared bat) and one federally protected terrestrial animal species (bald eagle) have also been reported from Muhlenberg County, Kentucky (Table 3-3Table 3-3).

Table 3-3. Federally and state listed terrestrial species within the vicinity of PAF

Common Name	Scientific Name	Federal Status[1]	State Status[1]	State Rank[2]
Amphibians				
Bird-voiced treefrog	*Hyla avivoca*		N	S3S4
Birds				
Henslow's sparrow	*Ammodramus henslowii*		S	S3B
Sedge wren	*Cistothorus platensis*		S	S3B
Common gallinule	*Gallinula galeata*		THR	S1S2B
Bald eagle	*Haliaeetus leucocephalus*	DM	S	S3B,S3S4N
Hooded merganser	*Lophodytes cucullatus*		THR	S2B,S3S4N
Osprey	*Pandion haliaetus*		S	S3S4B
Bank swallow	*Riparia*		S	S3B
Bell's vireo	*Vireo bellii*		S	S2S3B
Mammals				
Gray bat[3]	*Myotis grisescens*	LE	THR	S2
Indiana bat[3]	*Myotis sodalis*	LE	END	S1S2
Northern long-eared bat[3]	*Myotis septentrionalis*	LT	END	S1

Source: TVA 2020b; USFWS 2020

[1] Status Codes: DM = Delisted, recovered, and still being monitored; END = Endangered; LE = Listed Endangered; LT = Listed Threatened; S = Species of Special Concern; THR = Threatened.

[2] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; S#B = Rank of Breeding Population; S#N = Rank of Non-breeding population.

[3] Federally listed species known from Muhlenberg County, Kentucky, but not within three miles of the project footprint.

Bird-voiced treefrogs primarily inhabit swampy areas including large floodplain ponds, manmade ponds, and lakes that are near rivers or streams and in close proximity to forest (Powell et al. 2016; NatureServe 2020). The closest record of bird-voiced treefrog is approximately 1.3 miles away. Suitable habitat for this species occurs at ponds and

wetlands adjacent to the PAF including those within the Peabody Wildlife Management Area (WMA), but does not occur on the plant site or within action areas.

Henslow's sparrows utilize pastures and native grasslands, with a preference for areas with tall grass species with a residual layer of dead vegetation (Reinking et al. 2000). This bird is a locally distributed summer resident across Kentucky and is known to occupy the Peabody WMA. Records of this species occur approximately 1.8 miles away. Small patches of marginally suitable habitat for this species may occur on the edges of the project area under transmission line ROWs.

Sedge wrens nest throughout Kentucky and reside in wet grasslands and savanna as well as moist areas where scattered bushes and shrubs are present. This species is highly sensitive to habitat conditions and will leave a potential breeding site if the site is too dry, wet, or overgrown (NatureServe 2020). Due to their sensitivity, habitat for the sedge wren is not likely to occur in the highly disturbed project area. The closest record of this species is approximately 1.9 miles away on the Peabody WMA.

Common gallinules reside in wetland or riparian habitats including both freshwater and brackish marshes as well as the edges of lakes or ponds. They typically require areas with a mix of aquatic vegetation: submerged, floating, and emergent (Cornell Lab of Ornithology 2019). Common gallinules have been recorded approximately 1.2 miles away within the Peabody WMA. No habitat for this species exists in the project area.

The hooded merganser requires bodies of water such as streams, rivers, and lakes, and utilizes both deep and shallow water habitats. Tree cavities or nest boxes are required for nesting and are often in close proximity to water (Cornell Lab of Ornithology 2019; NatureServe 2020). The closest known record of this species is approximately 2.6 miles away. Suitable nesting habitat for this species does not occur within PAF; however, ample habitat is available along the Green River and within the waterfowl refuge portion of the Peabody WMA.

Osprey occupy riparian habitats alongside bodies of water such as rivers, lakes, and reservoirs. They build nests of sticks in trees and on a variety of man-made structures (e.g., transmission line structures, utility poles) near water (NatureServe 2020). Two active osprey nests were documented at PAF during field review in August 2020. One is on a light pole between the Project Trailers and the Train Unloading Building. The other is across the street from the Rock Silo and the Gypsum Dewatering (GEW).

Bank swallows nest in colonies where the birds burrow into steep sand and gravel banks creating cavity nests during the breeding season. The species utilizes open and partially open areas near flowing bodies of water (NatureServe 2020). A colony exceeding 100 nest burrows existed for multiple years in a coal refuse pile in the southeast portion of the PAF reservation. This coal pile is no longer present and the area has been reseeded and left to forest regeneration. Suitable nesting habitat occurs along the banks of the Green River.

Bell's vireo requires shrub/scrub, dense brush, willow thickets, or narrow early successional wooded areas with dense understories such as those often found along small stream corridors, typically in an open grassland or agricultural landscape (NatureServe 2020). It has been observed on reclaimed surface mines that lie adjacent to PAF and within the South Spoil Area of PAF. A small amount of suitable habitat for the Bell's vireo may still occur in this area.

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2013). This species is associated with larger mature trees capable of supporting its massive nests. These are usually found near larger waterways where the eagles forage (USFWS 2007). Records document the occurrence of two bald eagle nests in Muhlenberg County, Kentucky. The closest of these is approximately 1.2 miles away. No bald eagle nests were observed during field reviews across the PAF plant site in August 2020.

Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Brady et al. 1982; Tuttle 1976a). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Tuttle 1976b). Although they prefer caves, gray bats have been documented roosting in large numbers in buildings (Gunier and Elder 1971). Gray bats have been captured during mist net surveys approximately 14 miles away.

Indiana bats hibernate in caves in winter and use areas around them for swarming (mating) in the fall and staging in the spring, prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead snags and living trees in mature forests with an open understory and a nearby source of water (Pruitt and TeWinkel 2007; Kurta et al. 2002). Although less common, Indiana bats have also been documented roosting in buildings (Butchkoski and Hassinger 2002). Indiana bats are known to change roost trees frequently throughout the season, while still maintaining site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007). One acoustic recording, presumably from an Indiana bat was documented approximately five miles from the project area in Muhlenberg County. No Indiana bat hibernacula are known within 10 miles of PAF.

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees (typically greater than 3 inches in diameter). Roost selection by northern long-eared bat is similar to that of Indiana bat, however northern long-eared bats are thought to be more opportunistic in roost site selection. This species also roosts in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). The closet record of northern long-eared bat is from a mist net survey approximately five miles away. There are no known northern long-eared bat hibernacula in Muhlenberg County.

No caves are known to occur within the project area and the nearest recorded cave is greater than three miles away. Suitable summer roosting habitat exists in two small isolated locations on the periphery of the action area as well as along the Green River. Suitable foraging habitat for all three bat species occurs over the Green River. Lower quality foraging habitat also occurs over ash ponds and settling basins on PAF.

Buildings were surveyed for evidence of use by wildlife or terrestrial threatened and endangered species. No evidence of use of onsite buildings by listed species was observed during the site survey. Nineteen buildings offer potential habitat for bats based on construction, light exposure, ingress/egress points, and temperature. No bats or evidence of bats was observed during initial building surveys (Appendix A).

3.9.1.2. Aquatic Species

A review of the TVA Natural Heritage Database (June 2020) indicated records of 13 federally and/or state listed aquatic species (two fish, nine mussels, one aquatic snail, and one crustacean) within 10 miles of PAF. Although three of the nine mussel species' records are historical, records of the federally endangered fanshell and purple cat's paw occur within ten miles of the project. A 2008 mussel survey adjacent PAF in 2008 found no state- or federally listed mussel species (including those listed in Table 3-4), and found low numbers of commonly occurring species (TVA 2008). TVA (2008) indicated that habitat of the Green River adjacent PAF did not support any federally listed mussels. Records of the state-listed chestnut lamprey are from near Lock and Dam No. 3 many miles upstream of the project. However, this species was documented at the PAF during 2006-2008 impingement studies. Review of the USFWS IPaC website identified six additional federally listed aquatic species.

Table 3-4. Federally and state listed aquatic species within 10 miles of PAF and with potential to occur near PAF

Common Name	Scientific Name	Element Rank[1]	Federal Status[2]	State Status[2]	State Rank[3]
	Fish				
Chestnut Lamprey	*Ichthyomyzon castaneus*	E	S	S	S2
Redspotted sunfish	*Lepomis miniatus*	H	--	THR	S2
	Mussels				
Clubshell	*Pleurobema clava*	--	END	END	S1
Fanshell	*Cyprogenia stegaria*	E	END	END	S1
Little spectaclecase	*Villosa lienosa*	E	--	S	S3S4
Longsolid	*Fusconaia subrotuda*	E	--	S	S3
Northern riffleshell	*Epioblasma torulosa rangiana*	--	END	END	S1
Pink mucket	*Lampsilis abrupta*	E	END	END	S1
Pocketbook	*Lampsilis ovata*	H	--	END	S1
Purple cat's paw	*Epioblasma obliquata obliquata*	H	END	END	S1
Purple lilliput	*Toxolasma lividus*	H	--	END	S1
Pyramid pigtoe	*Pleurobema rubrum*	E	--	END	S1
Rabbitsfoot	*Quadrula cylindrical cylindrical*	--	END	THR	S2
Ring pink	*Obuvaria retusa*	--	END	END	S1
Rough pigtoe	*Pleurobema plenum*	E	END	END	S1
Sheepnose	*Plethobasus cyphyus*	--	END	END	S1
Spectaclecase	*Cumberlandia monodonta*	--	END	END	S1
	Aquatic Snails				
Rugged hornsnail	*Pleurocera alveare*	H	--	S	S3S4
	Crustaceans				
Mud River crayfish	*Orconectes ronaldi*	E	--	--	S2S3

Source: TVA 2020b and USFWS 2020

[1] Heritage Element Occurrence Rank; E = extant record ≤25 years old; H = historical record >25 years old

[2] Status Codes: END = Endangered; THR = Threatened; S = Listed Species of Special Concern

[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure

A 2008 mussel survey (TVA 2008) on the Green River near the PAF coal unloading facility found very low densities of a small number of common mussel species. Another mussel

study on the Green River, seven river miles upstream of PAF, documented the presence of 23 mussel species (TVA 2004). Suitable habitat for state- or federally listed aquatic species does not occur within the project area.

3.9.2. Environmental Consequences

3.9.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells. Under this alternative, osprey, gray bat, Indiana bat, and northern long-eared bat have the potential to utilize the project area. No suitable habitat for bank swallow, bird-voiced treefrog, common gallinule, hooded merganser, or sedge wren would be impacted by the project area. Therefore, these species would not be impacted. One bald eagle nest exists over one mile away from the project area. This nest was last known to be active in 2010. The proposed actions are in compliance with the National Bald Eagle Management Guidelines. Bald eagles would not be significantly impacted by decontamination and deconstruction activities.

Two osprey nests are located at PAF. They are within 660 feet of the GEW, project trailers and the train unloading building, garages, and Breaker 3 buildings. If the timing of deconstruction/demolition of these structures cannot be modified to avoid nesting seasons, coordination with USDA-Wildlife Services would be required for guidance to ensure compliance under the EO 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds and to avoid impacts. Any unavoidable disturbance to these birds would captured under existing permits held by USDA-Wildlife Services.

No caves for gray bat, Indiana bat, or northern long-eared bat exist in the project area or would be impacted by decontamination and deconstruction activities. No tree removal is anticipated in association with decontamination and deconstruction activities. Therefore, no forested summer roosting or foraging habitat for Indiana bat or northern long-eared bat would be impacted. Aquatic foraging habitat exists for all three species over the Green River and marginally over ash ponds. Nineteen buildings proposed for demolition offer potential habitat roosting for these bats based on construction, light exposure, ingress/egress points, and temperature. No bats or evidence of bats was observed during initial building surveys. TVA would conduct presence/absence surveys at least one month prior to demolition of these structures to determine if listed bat species are utilizing these buildings. A number of activities associated with the proposed project, including building demolition, were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with Endangered Species Act (ESA) Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix B) and need to be reviewed/implemented as part of the proposed project. With the implementation of identified conservation measures, no significant impacts would occur to gray bat, Indiana bat, or northern long-eared bat.

3.9.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. Buildings, soil, and vegetation would either remain in their current state or be continued to be maintained

as it is currently and tree clearing and earth moving would not occur in association with this project. Threatened and endangered terrestrial animals and their habitats would not be affected under this alternative.

If the facility is left in the “as-is” condition, it likely would present a higher risk than Alternative A for the potential to contaminate soil and groundwater as systems and structures degrade. The potential groundwater contamination could reach nearby watercourses and the adjacent Green River. Although no federally or state listed aquatic species are believed to be within the Green River directly adjacent PAF, groundwater contamination that reaches the Green River could be carried downstream and come into contact with listed aquatic species. This interaction would likely result in negative impacts and rise to the level of “take” as defined by the ESA.

3.10. Air Quality and Climate Change

3.10.1. Affected Environment

This section describes the existing air quality and climate conditions in the study area and the potential air quality impacts of the proposed project. The study area for air quality is defined as Muhlenberg County, Kentucky. However, given that air emissions cross county lines, the assessment here can be considered to apply to air quality effects over larger areas downwind of the facility. For purposes of climate assessment, the study area is also Muhlenberg County with respect to local climate conditions, and with respect to greenhouse gas (GHG) emissions, the study area is the global environment.

3.10.1.1. Air Quality

Air quality is measured primarily by the concentrations of six criteria pollutants within a region. These criteria pollutants are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), lead (Pb), sulfur dioxide (SO_2), and particulate matter (PM), which includes two subcategories: particles less than 10 microns in diameter (PM_{10}) and particles less than 2.5 microns in diameter ($PM_{2.5}$). Criteria air pollutants are subject to National Ambient Air Quality Standards (NAAQS) that were developed by the EPA Office of Air Quality Planning and Standards, and were chosen because they are the predominant air pollutants of concern for the environment and public health. The NAAQS are summarized in Table 3-5.

EPA designates compliance status for the NAAQS through a formal rulemaking process involving publication of proposed and final rules in the Federal Register. For each pollutant for which there is a NAAQS, EPA designates an area as attainment, nonattainment, or maintenance. A maintenance area, sometime referred to as maintenance/attainment, is one that was designated as nonattainment within the prior 20 years, and has come into attainment with the NAAQS. Part of the redesignation process requires that the state or local agency with responsibility for managing air quality in the area must submit for EPA approval a plan to maintain compliance with the NAAQS for which the area was in nonattainment status.

Table 3-5. National Ambient Air Quality Standards

Pollutant	Averaging Times	Primary NAAQS	Secondary NAAQS
CO	8-hour[(a)]	9 ppm (10 mg/m^3)	None
	1-hour [(a)]	35 ppm (40 mg/m^3)	None
Pb	Rolling 3-Month Average	0.15 µg/ m^3	Same as Primary

NO_2	Annual (Arithmetic Mean)	0.053 ppm (100 µg/m^3)	Same as Primary
	1-hour [f]	0.100 ppm (188 ug/m^3)	Same as Primary
PM_{10}	24-hour [b]	150 µg/m^3	Same as Primary
$PM_{2.5}$	Annual [c] (Arithmetic Mean)	12.0 µg/m^3	Same as Primary
	24-hour [d]	35 µg/m^3	Same as Primary
O_3	8-hour [e]	0.075 ppm (2008 std.)	Same as Primary
	8-hour [e]	0.070 ppm (2015 std.)	Same as Primary
SO_2	3-hour [a]	none	0.5 ppm (1300 µg/m^3)
	1-hour [g]	0.075 ppm (196 ug/m^3)	Same as Primary

Source: 40 CFR 50, EPA 2016

[a] Not to be exceeded more than once per year.

[b] Not to be exceeded more than once per year on average over 3 years.

[c] To attain this standard, the 3-year average at any monitor must not exceed 12.0 micrograms/cubic meter (µg/m^3).

[d] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3.

[e] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average O_3 concentrations measured at each monitor within an area over each year must not exceed the standard. While both the 2008 and 2015 standards are still in place, the 2015 standard is the controlling one, given its greater stringency.

[f] Standard is attained when the 3-year average of the eighth-highest daily maximum 1-hour average NO_2 concentration does not exceed 0.100 parts per million (ppm) (100 parts per billion [ppb])

[g] Standard is attained when the 3-year average of the fourth-highest daily maximum 1-hour average NO_2 concentration does not exceed 0.100 ppm (100 ppb).

Muhlenberg County is an attainment or maintenance area for all criteria pollutants (EPA 2018). The county has been in maintenance status for the 1971 3-hour SO_2 NAAQS since October 19, 1998, when EPA redesignated Muhlenberg County from nonattainment status to maintenance/attainment status for this SO_2 NAAQS. Table 3-2 from the Potential Paradise Fossil Plant Retirement Final Environmental Assessment (TVA 2019b) summarizes local monitoring data for $PM_{2.5}$ and O_3, the only two pollutants for which monitoring data are available for recent years within 50 kilometers of PAF.

Previously, there were three coal-fired generating units in operation at PAF. As of February 1, 2020, TVA has permanently shut down and retired all of these units. Other permitted air emissions sources, such as the 1,100-MW NGCC plant, remain on the PAF reservation and will remain operational under either alternative.

The primary mechanisms for causing potential effects to local air quality considered in this assessment are associated with the demolition of buildings and structures and transportation-related activities. Both activities generate fugitive dust, which includes PM_{10} and $PM_{2.5}$. In addition, exhaust from internal combustion engines used to power trucks and demolition equipment result in emissions that can affect local air quality, particularly if the engines are not properly maintained.

Any proposed demolition activities would not be subject to air emission permitting under the Kentucky Air Quality Regulations (Kentucky Administrative Regulation [KAR]) Chapter 52, because the demolition-related emissions would be limited to mobile sources and fugitive dust (i.e., no stationary sources would be installed/operated). However, the fugitive dust emissions from demolition activities would be subject to control requirements per 401 KAR 63:010. These rules limit the duration of any visible emissions beyond lot lines, and include general duty requirements to minimize fugitive dust.

In addition, as a federal action, the demolition activities must meet General Conformity requirements under 40 CFR 93, Subpart B, and as referenced in 401 KAR 50:065. General

Conformity requirements apply to any NAAQS-regulated pollutants for which an area is in either nonattainment or maintenance status. The only pollutant subject to General Conformity requirements in Muhlenberg County is SO_2, due to the county's maintenance status. However, any demolition-related emissions of SO_2 are expected to be trivial in comparison to the 100 tons/year de minimis threshold for applicability of General Conformity. Therefore, the proposed demolition would not trigger General Conformity requirements.

3.10.1.2. Climate Change

Climate trends and data in the region of PAF are described in detail in the Potential Paradise Fossil Plant Retirement Final Environmental Assessment (TVA 2019b).

CO_2 is the primary GHG emitted through human activities. Activities associated with the proposed action that produce CO_2 are primarily related to emissions from fossil fuel-powered equipment (e.g., bulldozers, loaders, haulers, trucks, generators) used during the proposed activities. Forested areas that absorb and store CO_2 from the atmosphere via a process known as carbon sequestration help to reduce levels of CO_2 in the atmosphere. No forested areas will be directly or indirectly impacted under either alternative.

Additional greenhouse gases that contribute to climate change include hydrofluorocarbons used in refrigeration equipment; sulfur hexafluoride used as a gaseous dielectric medium for high-voltage (1-kV and above) circuit breakers, switchgears, and other electrical equipment; and methane. These gases can be released to the atmosphere through seal leaks, especially from older equipment, as well as during equipment manufacturing, installation, servicing, and disposal (U.S. Department of Energy 2006).

3.10.2. Environmental Consequences

3.10.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells. Under this alternative, short-term, direct contaminant and greenhouse gas emissions would occur due to the generation of fugitive dust and use of vehicles and equipment in the demolition process and transport of demolition debris and borrow material.

Based on the EPA analysis, fugitive particulate emissions from demolition activities typically produce particles that are primarily deposited on the property where the structures being demolished are located. Theoretical drift distance, as a function of particle diameter and mean wind speed, has been computed for fugitive dust emissions. Small particles such as PM_{10} and $PM_{2.5}$ have slow gravitational settling velocities and are likely to have their settling rate retarded by atmospheric turbulence, and thus be transported offsite (EPA 1995). The closest residence or inhabited structure to the decontamination and deconstruction project area is located approximately 2.2 miles southeast of the project area. Given the distance from the plant, this location and more distant receptors would not be impacted by fugitive dust emissions. Under this alternative, there would also be the potential for an intense, short-term release of fugitive dust associated with the removal of the stacks, cooling towers, or other structures by dropping with explosives. Fugitive dust would be released in an uncontrolled manner and would likely be released within a span of minutes, after which these emissions would cease. Dropping the cooling towers or structures via explosives

would likely produce the most particulate matter of any site activity, with the highest potential to travel off the demolition site.

To minimize potential fugitive dust mobilization associated with explosive demolition of stacks, cooling towers, or other structures, the demolition contractor would be required, to the extent practical, to remove ash from the facilities proposed for deconstruction and demolition, prior to removal of that facility and implement dust control measures during demolition to prevent the spread of dust, dirt, and debris. These methods may include wetting equipment and demolition areas, covering waste or debris piles, using covered containers to haul waste and debris, and wetting unpaved vehicle access routes during hauling. TVA also requires onsite contractors to maintain engines and equipment in good working order.

Site preparation and vehicular traffic over paved and unpaved roads at the site would result in the emission of fugitive dust during active deconstruction, demolition debris removal, and restoration activities. The largest fraction of fugitive dust emissions would be deposited onsite within the demolition site boundaries. If necessary, emissions from open demolition areas and paved/unpaved roads could be mitigated by spraying water on the roadways to reduce fugitive dust emissions.

Combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, demolition equipment, etc.) would generate local emissions of particulate matter, CO, NO_2, SO_2, volatile organic compounds (VOCs), and CO_2, during the site preparation, demolition, and restoration periods. However, new emission control technologies and fuel mixtures have significantly reduced vehicle and equipment emissions. Additionally, it is expected that all vehicles would be properly maintained, which would also reduce emissions.

Demolition debris and any scrap metal would be transported to an offsite vendor, landfill, or recycling facility by truck. Transport of these materials would occur along existing roadways in the vicinity of PAF and would result in increased emissions for the duration of the deconstruction process. In addition, the need for borrow material for site restoration would require the transport of borrow via heavy-duty trucks from an onsite location. The borrow material would be intermittently transported along existing onsite roadways during the site restoration period. The total amount of air emissions associated with this vehicular traffic would be temporary and minor in comparison to traffic in the region and would not adversely affect local air quality. Mitigation measures, including implementing BMPs for controlling fugitive dust and proper maintenance of vehicles for controlling emissions, would further reduce impacts.

The use of vehicles and demolition equipment in the activities associated with this alternative, including offsite vehicle operations (such as debris disposal and workforce transportation) would result in a minor temporary increase in CO_2 emissions.

There would also be a small risk of a release of pollutants and/or GHGs associated with handling and removal of refrigeration and electrical equipment during decontamination and deconstruction activities. As long as routine capture and recycling procedures are followed for these gaseous materials, the vast majority of these pollutants would not be released to the atmosphere. Additionally, such emission levels are expected to be de minimis in comparison to the regional and world-wide volumes of GHGs. Therefore, local and regional

GHG levels would not be adversely impacted by emissions from decontamination and deconstruction activities.

Overall, this alternative is expected to have short-term, minor impacts on air quality and no direct or indirect impact on regional climate change.

3.10.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. There would be no impacts to air quality or climate change associated with decontamination and deconstruction activities or transport of demolition debris and borrow material. The only active source of emissions that would remain at PAF would be the NGCC facility and the activities associated with its continued operation.

Over the long-term, indirect adverse impacts to air quality could occur due to the release of petroleum fuels, VOCs, hydrofluorocarbons, or other contaminants from leftover equipment within the PAF site. Sulfur hexafluoride could be released from electrical equipment. If such releases occur, they would be limited to the amount of gas in a specific container and would be expected to be negligible. The deterioration of hazardous materials not removed from the facility such as asbestos, lead paint, and dust could also result in the release of contaminants to the air. These would be limited to the amount of hazardous material remaining at the facility, would likely occur slowly over time due to degradation, and would be expected to be negligible.

Overall, impacts to air quality under the No Action Alternative would be minor. The No Action Alternative would have no impact on regional climate.

3.11. Hazardous Materials and Solid and Hazardous Waste

3.11.1. Affected Environment

3.11.1.1. Solid Waste

In Kentucky, requirements for management of solid wastes are focused on solid waste processing and disposal under Kentucky Revised Statutes (KRS) 224. Solid wastes are defined in the rule as garbage, trash, refuse, abandoned material, spent material, byproducts, scrap, ash, sludge and all discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial mining and agricultural operations, and from community activities (KRS 224.1-010(31)a). The solid waste currently generated at PAF is managed in accordance with federal and state requirements.

Under KRS 224.50-760, special wastes include high volume and low hazard such as mining wastes, utility wastes (fly ash, bottom ash, and scrubber sludge), sludges from water and wastewater treatment facilities, gas and oil drilling muds, and other wastes not regulated as hazardous waste.

On April 17, 2015, the CCR Rule was published in the Federal Register. Under the final rule, CCR is not regulated as hazardous waste. The primary solid wastes that result from the operation of PAF are collectively known as CCR. The primary CCR waste streams are fly and bottom ash, gypsum, and boiler slag. TVA has historically managed storage of CCR materials generated at PAF in a combination of onsite dry stacks and impoundments.

Fly ash and boiler slag are comprised of the noncombustible particles or components in coal. Both fly ash and bottom ash are composed primarily of silica, aluminum oxide and iron oxide. These waste streams also contain a variety of heavy metals at limited concentrations including arsenic, cadmium, chromium, copper, lead, mercury, and selenium. Under KRS 224.50-760, CCR is regulated as special waste that requires special waste approval for the waste to be disposed of at a specified landfill.

3.11.1.2. Hazardous Waste

Hazardous materials are regulated under a variety of federal laws including the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), Occupational Safety and Health Administration (OSHA) standards, Emergency Planning and Community Right to Know Act (EPCRA), and the Toxic Substances Control Act.

Regulations implementing the requirements of EPCRA are codified in 40 Code of Federal Regulations (CFR) 355, 40 CFR 370 and 40 CFR 372. Under 40 CFR 355, facilities that have any extremely hazardous substances present in quantities above the threshold planning quantity are required to provide reporting information to the State Emergency Response Commission, Local Emergency Planning Committee and local fire department. Inventory reporting to the indicated emergency response parties is required under 40 CFR 370 for facilities with greater than the threshold planning quantity of any extremely hazardous substances or greater than 10,000 pounds of any OSHA regulated hazardous material. EPCRA also requires inventory reporting for all releases and discharges of certain toxic chemicals under 40 CFR 372. TVA applies these requirements as a matter of policy.

The federal law regulating hazardous wastes is RCRA and its implementing regulations codified in 40 CFR 260-280. The regulations define what constitutes a hazardous waste and establishes a “cradle to grave” system for management and disposal of hazardous wastes.

Subtitle C of RCRA also includes separate, less stringent regulations for certain potential hazardous wastes. Used oil, for example, is regulated as hazardous waste if it is disposed of, but is separately regulated if it is recycled. Specific requirements are provided under RCRA for generators, transporters, processors and burners of used oil that are recycled.

PAF is considered a large quantity generator of hazardous waste by the Kentucky Division of Waste Management. The primary hazardous wastes currently generated include small quantities of waste paint, waste paint solvents, paper insulated lead cable, debris from sandblasting and scraping, paint chips, solvent rags due to cleaning electric generating equipment, and liquid-filled fuses.

3.11.1.3. Universal Waste

Universal wastes are a subset of hazardous wastes that are widely generated. Universal wastes include batteries, lamps and high intensity lights and mercury thermostats. Universal wastes may be managed in accordance with the RCRA requirements for hazardous wastes or by special, less stringent provisions.

3.11.2. Environmental Consequences

3.11.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells. Based on results of hazardous material surveys at similar TVA plants, solid and hazardous wastes that can reasonably be expected to be generated during demolition include:

- ACMs
- Mercury in equipment switches and gauges
- Lead-containing materials including paint, coatings, roof vents, circuit boards, batteries, and cathode ray tubes
- PCBs in replacement bushings and light ballasts
- Materials such as glaze, caulk, building siding, roofing materials, electrical cable, cable trays.
- Other construction waste (e.g., concrete, scrap metal)
- Universal waste (fluorescent light bulbs, batteries, etc.)
- Aboveground storage tanks
- Containerized petroleum products or chemicals
- Refrigerants and ozone depleting substances
- Tritium exit signs
- Radioactive sources from equipment
- Various oils and fuels
- Antifreeze
- Batteries in bulk and associated fixtures including deep cycle series uninterruptible power supply batteries and lead batteries from emergency lighting
- Street lighting
- Heavy metals
- Batteries
- Creosote (in railroad ties)
- Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM)

Implementation of this alternative would result in removal and disposal of potential contaminant sources, as defined above, in accordance with local, state, and federal regulations. A hazardous materials survey would be completed prior to demolition to estimate the specific types and quantities of wastes generated during demolition. Hazardous materials and special waste that would be addressed prior to demolition would likely include ACMs, lead-containing materials, aboveground storage tanks, TENORM, and other hazardous materials identified during the hazardous materials survey. Specific oil stains or areas that may contain materials of concern would be addressed prior to demolition as well.

Along with TVA BMPs, materials determined to be waste would be evaluated (e.g., waste determinations) and managed (e.g. inspections, container requirements, permitted

transport) in accordance with applicable federal and state rules including the KRS Chapter 224 and KAR Title 401, Chapters 30, 45, 46, 47, and 48. Prior to demolition activities, hazardous waste, PCB, ACM, lead paint, and universal waste would require special removal, handling, labeling, and disposal by appropriately trained and licensed personnel and contractors. These materials would be disposed of at a facility designed and permitted to receive hazardous materials. Brick, block, and concrete demolition debris not contaminated by ACM or other hazardous materials could be used as clean fill in the basements and lower levels of the facility. Removed materials would be transported to a landfill or other approved disposal facility. Thus, direct impacts would be minor due to the limited potential for hazardous waste to be discharged and/or released into the environment under this alternative.

Demolition activities would create demolition debris and scrap metal that would be hauled to a permitted landfill or recycling facility. Although a specific landfill has not been identified, given that material would be disposed in a permitted landfill that has the capacity to receive waste materials, and the potential that scrap metal would be recycled, it is expected that disposal of demolition debris would have a negligible effect on the long-term ability to meet disposal needs of the region.

3.11.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities. Peeling lead-based paint, failing concrete, buckling floor tiles, and deteriorating asbestos and ACM could pose a hazard risk, may result in potential releases to the environment (e.g., through leaching to soils, surface water, or groundwater), and would be likely to have long-term, moderate impacts.

Concerns regarding trespassing and vandalism under this alternative would also be higher than with Alternative A. The presumed presence of materials that could be salvageable might attract trespassers who could be exposed to potential contaminants or physical injury.

3.12. Transportation

3.12.1. Affected Environment

The transportation network surrounding PAF contains roads and bridges, a railroad, and barge transport on the Green River. This analysis focuses on roadway and railroad traffic. PAF is served by one CSX rail line to the west of the site. Rail access originates from the CSX Transportation mainline at Central City, follows US 431 south for 6.5 miles to Drakesboro, then turns eastward for an additional 5.3 miles to PAF, generally paralleling Kentucky Route (KY) 176.

Nearby major highways include the Wendell H. Ford Western Kentucky Parkway and US 62 (to the north); US 431 (to the west); and the William H. Natcher Parkway (to the east). The Western Kentucky Parkway is a four-lane divided highway approximately 5.5 miles north of PAF. Traffic generated by operations at PAF is composed of a mix of cars and light duty trucks (two-axle delivery trucks), medium duty trucks (larger two-axle and three-axle trucks) and heavy duty trucks (three- to five-axle trucks and tractor trailers).

The primary roadway providing access to PAF is KY 176 which extends from US 431 in Drakesboro approximately six miles east to PAF. KY 70 (Rochester Road) is located approximately 4.5 miles south of PAF. All of these routes are two-lane highways. Public

road access is available through the PAF boundary via KY 176, County Road (CR) 1066, CR 1008, and Riverside Road. The Rockport Paradise Road (CR 1011) runs north along the Green River from its connection point with KY 176 northwest of the plant at PAF to the Western Kentucky Parkway.

Existing traffic volumes on the roadways in the immediate vicinity of PAF were determined using 2016-2019 Annual Average Daily Traffic (AADT) counts, measured in vehicles per day, at existing Kentucky Transportation Cabinet (KYTC) stations (KYTC 2020; Table 3-6).

Table 3-6. Average Daily Traffic Volume on Roadways in Proximity to PAF

Station	Roadway	Distance from PAF	AADT	Year
43	KY 176 between CR 1011 and P and M Haul Rd	1.5 miles west	1,605	2017
253	KY 176 between US 431 and P and M Haul Rd	4.3 miles southwest	1,345	2019
036	CR 1011 between KY 176 and Western Kentucky Pkwy	5.5 miles north	290	2016
257	US 431 between KY 176 and Western Kentucky Pkwy	6 miles southwest	7,354	2017
256	US 431 between KY 176 and KY 70	7.7 miles southwest	5,440	2019
251	KY 70 between US 431 and KY 2270	9.5 miles south	1,446	2019
P40	Western Kentucky Pkwy between KY 181 and US 431	10.5 miles northwest	9,935	2019
11	US 62 between KY 189 and Western Kentucky Pkwy	12 miles west	13,746	2016

Source: KYTC 2020

The above data includes traffic resulting from operation of PAF Unit 3 and the 2016 and 2017 data also include the traffic from operations of PAF Units 1 and 2. 2020 AADT data for roads in the vicinity of the plant would be lower following PAF unit 3 retirement, with the greatest proportionate decrease on KY 176 and CR 1011.

3.12.2. Environmental Consequences

3.12.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells. This alternative would involve removal of potential contaminant sources and removal of structures within the project site. Traffic generated by these activities would consist of the shipment of goods and equipment, the construction workforce, transport of demolition debris from the facility to an offsite landfill or recycling operation, and transport of borrow material from an onsite location.

The construction workforce travelling to and from PAF would contribute to the traffic on the local transportation network. TVA estimates that the workforce needed for decontamination would range from 50 to 120 personnel over an 18 to 36-month period. The workforce needed for deconstruction would range from 20 to 40 personnel over a 36 to 48-month period, which could overlap the decontamination phase. Assuming one person per commuting vehicle, there would be a daily morning inbound traffic volume of up to 160 vehicles and a daily outbound traffic volume of up to 160 vehicles per day. The traffic volume generated by construction workforce would be temporary and relatively minor.

Construction-related vehicles (dozers, cranes, backhoes, graders, loaders, etc.) would be delivered to the decontamination and deconstruction area on flatbed trailers during both the mobilization and demobilization stages of the project, causing an increase in truck traffic in

the vicinity. However, as this increase would primarily occur during the mobilization and demobilization phases, impacts to the surrounding transportation network are not anticipated. Barges are not anticipated to be used for hauling construction equipment and/or debris.

Alternative A could result in approximately 8,000 cubic yards of demolition debris, 20,000 cubic yards of ACM, and 309,000 cubic yards of scrap metal, that would need to be hauled from PAF and disposed in accordance with all federal, state, and local regulations (TVA 2020a). Scrap metal could also be sold to a local or regional vendor and hauled offsite. Masonry debris would be used for fill material for the basements at the site with any excess hauled to an offsite landfill or recycling facility by truck to one or more previously permitted commercial landfills. Material could also be hauled to an offsite hazardous waste landfill. These trucks, estimated at six/day, would utilize local roads and arterial and interstate highways to transport demolition debris to a permitted landfill within 30 miles of PAF (reasonable trucking distance from PAF) during the decontamination and deconstruction phase, resulting in a temporary, minor increase in traffic in the vicinity of PAF.

The transport of borrow material to support site restoration activities would occur after decontamination and deconstruction is complete. Borrow would be hauled by truck from one or more previously permitted onsite locations; therefore, the transport of borrow would not contribute to the traffic in the vicinity of PAF.

Under this alternative, the stacks, cooling towers, and certain structures would be demolished via explosives, the use of which would necessitate increased security measures that would affect transportation in the immediate vicinity of the project site. During blasting events, select public roadways could be closed for public safety and to facilitate site security. Green River traffic could be restricted as well due to the potential for demolition debris to fall into the river. Traffic closures would vary from approximately three hours before and up to three hours after the blast. The closures would affect few local residents due to the sparse population in the area. The demolition contractor would create a detailed plan for road closures that would be coordinated with affected parties, including emergency personnel.

Therefore, given the localized impact associated with increased traffic in the vicinity of PAF and temporary nature of construction, the impact of this alternative on transportation would be short-term and minor.

3.12.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities. As the PAF plant would be left in place in its current condition, there would be no impacts on traffic and transportation in the vicinity of the site.

3.13. Noise

3.13.1. Affected Environment

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance

between source and receptor, receptor sensitivity, and time of day. Affected receptors are specific (e.g. schools, churches, or hospitals) or broad (e.g. nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

3.13.1.1. Noise Metrics

Sound varies by both intensity and frequency. Sound pressure levels (SPLs), described in decibels (dB), are used to quantify sound intensity. The dB is a logarithmic unit that expressed the ratio of an SPL to a standard reference level. The cycles from high to low pressure each second, also called Hertz, are used to quantify sound frequency. The human ear responds differently to different frequencies. A-weighted decibels (dBA) are used to characterize sound levels that can be sensed by the human ear. “A-weighted” denotes the adjustment of the frequency content of a sound-producing event to represent the way in which the average human ear responds to the audible event. Sound levels discussed in this EA are A-weighted.

3.13.1.2. Federal Guidelines

Some agencies within the federal government have established noise guidelines for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. According to U.S. Army, FAA, and the U.S. Department of Housing and Urban Development (HUD) criteria, residential units and other noise-sensitive land uses are “clearly unacceptable” in areas where the day-night average sound level (DNL) exposure exceeds 75 dBA, “normally unacceptable” in regions exposed to noise between 65 and 75 dBA, and “normally acceptable” in areas exposed to noise of 65 dBA or less. For outdoor activities, EPA recommends a DNL of 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise (EPA 1974).

3.13.1.3. Ambient Sound Levels

Noise levels vary depending on the housing density and proximity to parks and open space, major traffic areas, or airports. The noise level in a normal suburban area is typically less than 55 dBA DNL, which increases to 60 dBA for an urban residential area, and to 80 dBA in the downtown section of a city (EPA 1974; Table 3-7). Most people are exposed to sound levels of 50 to 55 dBA or higher on a daily basis.

Table 3-7. Common Sounds and Their Levels

Outdoor	Sound Level (dBA)	Indoor
Motorcycle	100	Rock band
Gas lawnmower at 3 feet	90	Food blender at 3 feet
Downtown (large city)	80	Garbage disposal
Heavy traffic at 150 feet	70	Vacuum cleaner at 10 feet
Normal conversation	60	Normal speech at 3 feet
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room

Source: EPA 1974

3.13.1.4. Sources of Noise

Noise sources common to activities evaluated in this EA include noise from construction and demolition activities and transportation noise. Should explosive demolition be used to remove the stacks, cooling towers, and other structures, noise would be generated both from the explosion and from the collapse of the stack onto the ground. The fact that this noise generation from demolition would be a one-time event removes it from the continuous, background, and intermittent noise category that defines equivalent sound level, DNL, and corresponding levels of sensitivity within the community. For example, a jet flyover at 1,000 feet has a high sound pressure level of approximately 103 dB (Purdue University 2000), but in most environments, is not a recurring event that would contribute to typical noise levels. Similarly, a single explosive blast event may be equivalent to a thunderclap (120 dB) at the source whereas ongoing noise generated by heavy equipment used during deconstruction activities would fall under the standard continuous, background, and intermittent noise category that determines DNL and associated community sensitivity.

Transportation noise encompasses noise from road traffic and rail traffic, though the majority of transportation noise results from road traffic. An increase in the volume, speed, and number of trucks will generally generate increased highway noise, but does not severely impact residential areas more than 500 feet from heavily used roadways or more than 100 to 200 feet from lightly used roadways. Railway noise is generated by the speed of the train and the type of engine, wagons, and rails (Berglund and Lindvall 1995). The speed of rail operations at PAF is low enough that the noise generated is likely to be low.

The Green River borders PAF on the east, while wooded ridges border PAF to the north and south and a partially wooded valley borders it to the west. No residential areas or other sensitive noise receptors adjoin the plant location. The nearest sensitive receptors are Weir Cemetery, Ennis Cemetery, and Drakesboro United Methodist Church, located approximately 1.7 miles northwest, 3.5 miles southwest, and 4.8 miles southwest of the powerhouse, respectively. Along wooded hills about four miles to the southwest of the powerhouse is the Sinclair Unit of the Peabody WMA, which is used for recreational purposes.

3.13.1.5. Vibration

Construction and demolition activities, including the operation of heavy machinery, construction-related vehicles, and blasting, can create ground vibration. There are three primary types of receivers that can be adversely affected by ground vibration: people, structures, and equipment. Ground vibrations and ground noise can cause annoyance to people who live or work near sources of vibration. Additionally, if the vibration amplitudes are high enough, there is the possibility of physical and cosmetic damage to structures, and the possibility of interference with the functioning of sensitive machinery. The length of time and strength of vibration varies with the equipment used. For example, the vibration from blasting has a high amplitude and short duration, whereas vibration from grading or highway traffic is lower in amplitude but longer in duration (Caltrans 2020).

The Federal Transit Administration (FTA) developed a noise and vibration impact assessment manual for estimating vibrations generated by common transportation and construction sources, possible damage levels, and dampening distances. Figure 3-3 presents typical levels of ground-borne vibration at 50 feet for a variety of common transportation and construction equipment. At 50 feet from the source, community annoyance begins at a velocity level of 70 vibration decibels (VdB) for frequent events.

Damage to structures occurs at 100 VdB for one-time activities such as blasting operations (FTA 2006). There are no residences or privately-owned structures located within 50 feet of any of the proposed actions at the PAF project area.

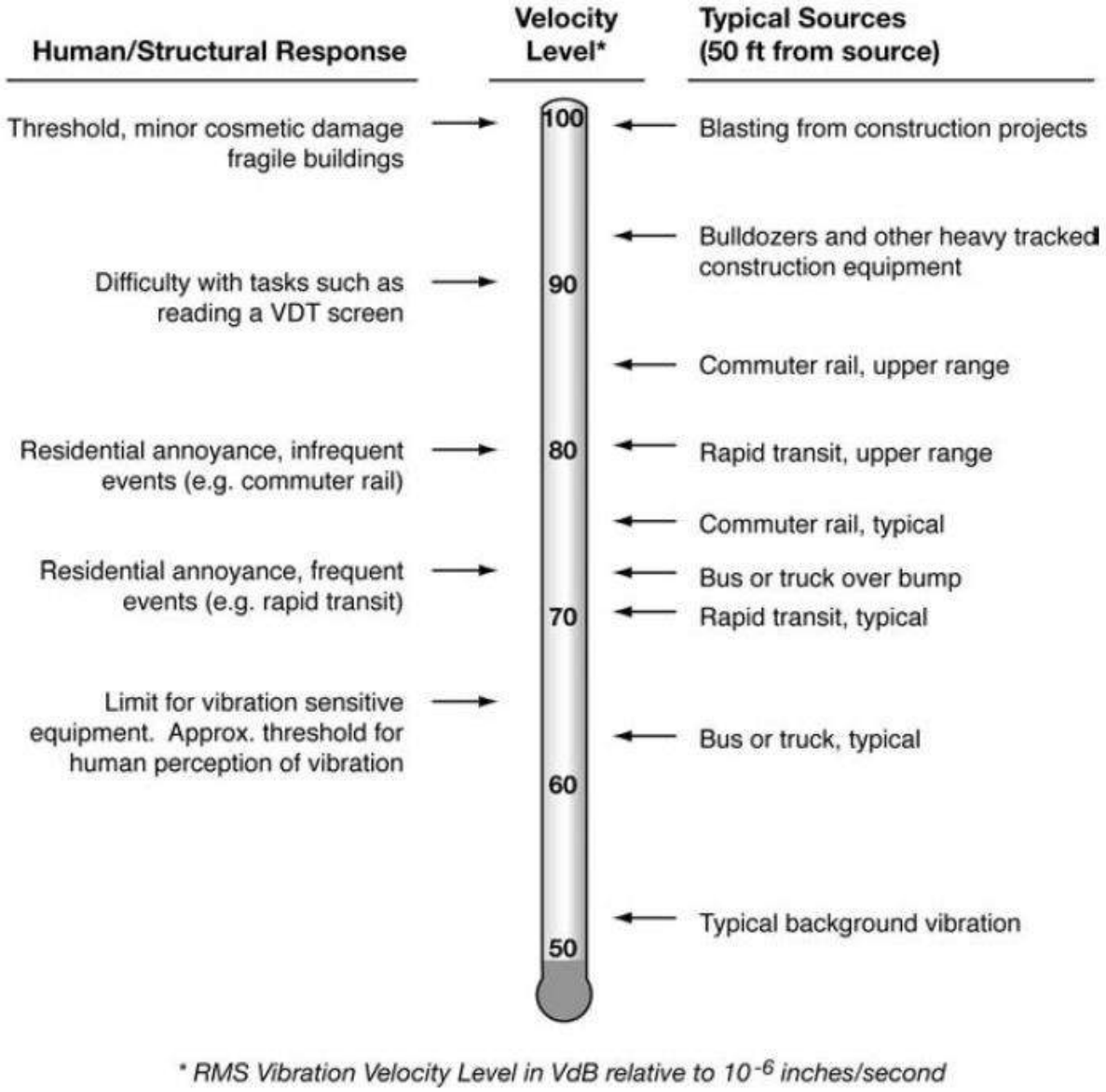

Figure 3-3. Typical Levels of Ground-Borne Vibration

3.13.2. Environmental Consequences

3.13.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade. Decontamination activities would last approximately 12 to 18 months and deconstruction would last approximately 24 to 30 months and may overlap with the decontamination phase. This would be followed by a restoration period of approximately 12 months during which borrow material would be transported within the site. Work would occur during daytime hours,

between 6:00 am and 6:00 pm, up to seven days a week. Noise impacts under this alternative would be associated with the site decontamination and deconstruction, drop removal of the stacks, cooling towers, and other structures, workforce vehicle traffic, transport of deconstruction debris offsite, and transport of borrow material within PAF.

During the decontamination and deconstruction phases, noise would be generated by a variety of construction equipment and vehicles including front-end loaders, dozers, excavators, graders and dump/haul trucks. Typical noise levels from this equipment is expected to be 85 dBA or less at a distance of 50 feet from the construction equipment (FHWA 2017). Based on straight line noise attenuation, it is estimated that noise levels from these sources would attenuate to approximately 40 dBA at Weir Cemetery, 33.6 dBA at Ennis Cemetery, 31.5 dBA at the nearest residential area, and 30.9 dBA at Drakesboro United Methodist Church. These noise levels are below both the EPA DNL guideline of 55 dBA and the HUD DNL guideline of 65 dBA.

The noise associated with the explosive drop removal of the stacks, cooling towers, and other structures would be temporary, short-term events and would each be the equivalent of a thunderclap at the source. The noise associated with the collapse of the structures would follow closely behind and would be perceived as a single boom. Due to the distance (4.5 miles) to the nearest residential area and the lack of sensitive receptors within 0.5 mile, this single noise occurrence would be considerably muted for members of the general public. In addition, notifications to the public, including area emergency services, would be issued prior to the use of explosives for demolition. With warning to the public prior to blasting activities, residents would be prepared for a single loud noise. Therefore, direct impacts to noise levels in the area associated with blasting would be temporary and minor.

There is a potential for indirect noise impacts associated with a temporary increase in traffic related to the workforce vehicle traffic, transport of deconstruction debris offsite, and transport of borrow material within PAF. TVA estimates that the workforce needed for decontamination would range from 50 to 120 personnel over an 18 to 36-month period. The workforce needed for deconstruction would range from 20 to 40 personnel over a 36 to 48-month period, which could overlap the decontamination phase. Assuming one person per commuting vehicle, there would be a daily morning inbound traffic volume of up to 160 vehicles and a daily outbound traffic volume of up to 160 vehicles per day. Workforce traffic noise would only occur twice per day as workers are entering and leaving the project site and would be dispersed among the surrounding roadways. This is comparable to the workforce traffic prior to the plant retirement, which included commuting by approximately 155 employees.

Under this alternative, during deconstruction and demolition activities, demolition debris other than concrete and masonry, ACM, and scrap metal would be hauled to an offsite permitted landfill or recycling facility by truck. Following deconstruction and demolition, borrow material would be transported within PAF when needed to support site restoration. The exact haul routes that would be used to transport demolition debris are not known. While haul routes would use arterial or interstate roadways whenever possible, it may be necessary for some routes to utilize local roads within the vicinity of PAF. Therefore, there is potential for indirect impacts to sensitive noise receptors along these routes. Routes that use interstate highways or major arterial roadways would not result in a noticeable increase in traffic volume and consequently, traffic noise in the vicinity of these major roadways. On the lower functioning roadways closest to PAF, increased traffic would be short-term and

dispersed among local roadways and; therefore, would have a minor impact on sensitive receptors in the vicinity of roadways.

Vibrations from heavy machinery use and most deconstruction activities would be minor, and due to the distance to the nearest receptors (over 0.5 mile), would not cause structural or cosmetic damage or be perceptible to members of the community. Vibrations from explosive demolition events; however, could potentially affect nearby structures. If deemed necessary during development of the demolition plan, TVA would evaluate the potential for vibration impacts. TVA would use site-specific data provided by the blasting contractor to prepare a vibration model simulating the effects of discharge of the explosives or vibrations due to the stacks and cooling towers hitting the ground. The model results would be compared to thresholds developed by the U.S. Bureau of Mines (USBM) for vibration damage (Siskind et al. 1980). The study would assess structures within a 0.5-mile radius of the stacks and cooling towers. The installation of imported fill, dirt binder, and geofabric could also serve as a form of noise/vibration control.

Seismologic analyses carried out at recent demolitions of other tall industrial chimneys in the U.S. strongly suggest that the vibrations would not result in measurable effects on nearby structures (Protec 2013). These seismological analyses were conducted to measure the effects from demolition-related vibrations on standing structures in the vicinity of the chimney demolitions. In each case, vibrations were below the recommended limits set by the USBM Report (Siskind et al. 1980). The report authors concluded the vibrations from the demolitions would not cause damage to structures as close as 526 feet from the blast area. Vibrations resulting from the demolition of PAF stacks, cooling towers, and other structures are anticipated to be of similar magnitude, as the two 600-foot high stacks and 800-foot high stack at PAF are similar in height to those discussed in the report. Therefore, no damage to surrounding structures is anticipated. In order to add further protection, TVA would require the demolition contractor to develop and implement a demolition plan in order to minimize vibration effects at PAF and in the vicinity. Due to the temporary nature of the operation, implementation of the demolition plan, the site's industrial location, and distance to nearest receptors (over 0.5 mile), noise and vibration effects on the environment are expected to be short-term and minor.

3.13.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. There would be no impacts to noise or vibration under this alternative.

3.14. Visual Resources

3.14.1. Affected Environment

This assessment provides a review and classification of the visual attributes of existing scenery, along with the anticipated changes resulting from the proposed action. The classification criteria used in this analysis are adapted from the scenic management system developed by the U.S. Forest Service (USFS) and integrated with planning methods used by TVA. The classification process is also based on fundamental methodology and descriptions adapted from Landscape Aesthetics, A Handbook for Scenery Management, Agriculture Handbook Number 701 (USFS 1995).

The visual landscape of an area is formed by physical, biological and man-made features that combine to influence the uniqueness of the landscape. Scenic resources within a landscape are evaluated based on a number of factors that include scenic attractiveness, integrity and visibility. Scenic attractiveness is a measure of scenic quality based on human perceptions of intrinsic beauty as expressed in the forms, colors, textures and visual composition of each landscape. Scenic integrity is a measure of scenic importance based on the degree of visual unity and wholeness of the natural landscape character. The varied combinations of natural features and human alterations both shape landscape character and help define their scenic importance. The subjective perceptions of a landscape's aesthetic quality and sense of place is dependent on where and how it is viewed.

Scenic visibility of a landscape may be described in terms of three distance contexts:

1. Foreground. An area within 0.5 mile of the observer, individual details of specific objects are important and easily distinguished.
2. Middleground. From 0.5 to four miles from the observer, object characteristics are distinguishable but their details are weak and they tend to merge into larger patterns.
3. Background. In the distant part of the landscape (from four to 10 miles from the observer), details and colors of objects are not normally discernible unless they are especially large, standing alone, or have a substantial color contrast.

Visual and aesthetic impacts associated with a particular action may occur as a result of the introduction of a feature that is not consistent with the existing viewshed. Consequently, the character of an existing site is an important factor in evaluating potential visual impacts.

For this analysis, the affected environment is considered to include the project area within the PAF reservation, as well as the physical and natural features of the surrounding landscape. Parts of the PAF property are devoid of vegetation and most of it has been heavily disturbed by previous industrial activities. The most dominant visual components of the PAF facility include two 600-foot high stacks, one 800-foot high stack, three cooling towers over 435 feet high, and connecting transmission lines. Other major visual components of the large-scale industrial site include the powerhouse buildings, emission control buildings and ducts, and the coal pile and coal handling facilities. The existing site features are shown on Figure 1-2.

There are no sensitive viewing receptors within the foreground of the project area. The nearest residential areas are located on the west side of the Green River about 2.5 miles from the southern edge of the PAF property. The PAF facility is located approximately four miles from the nearest town, and there are no nearby residences or other environmentally sensitive viewing receptors. The nearest off-site sensitive receptors are Weir Cemetery, Ennis Cemetery, and Drakesboro United Methodist Church, located approximately 1.7 miles northwest, 3.5 miles southwest, and 4.8 miles southwest of the powerhouse, respectively. Groups that have direct views of the project area include authorized employees, contractors, and visitors to the plant site. Views of the project areas are generally restricted to the foreground (i.e., within 0.5 mile) in all directions; however, that may be buffered by nearby vegetation and the local topography. The proposed project could also potentially be viewed by recreational boaters and other users along the Green River as well as visitors to the adjacent Peabody WMA.

Although mining operations have substantially altered the topography and appearance of much of the area surrounding the plant, the large-scale industrial PAF facility provides a sharp visual contrast to the surrounding rural landscape. Views of the project area include broadly horizontal buildings and industrial equipment. Predominant focal points include the existing smokestacks and cooling towers. Scenic attractiveness of the area is minimal and scenic integrity ranges from low to very low.

The forms, colors, and textures in the affected environment are normally seen through the characteristic landscape. Therefore, the surrounding landscapes are not considered to have distinctive quality. In the foreground, the scenic integrity has been lowered by human alteration such as PAF and residential and commercial development. However, in the middleground and background these alterations become less intrusive in the view of the landscape. Based on the criteria used for this analysis, the overall existing scenic value class for the affected environment is considered to be fair.

3.14.2. Environmental Consequences

3.14.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade. Minor visual impacts may occur during decontamination and deconstruction of the buildings and structures. During the decontamination and deconstruction phase, there would be additional visual discord due to an increase in personnel and equipment in the area. Impacts from additional vehicular traffic are expected to be negligible as the roads are already predominately used for industrial activity. This increase in visual discord would be temporary and only last until all activities have been completed by TVA.

Although only the stacks and cooling towers are visible from most vantage points in the area, cranes and other tall and colorful equipment may be visible at PAF during deconstruction activities. Observers from Green River would most likely be able to see the construction equipment operating at the stacks, cooling towers, barge unloader, and powerhouse as these are tall and/or near the river. As potential visual disturbances would only be visible to a few people and due to the temporary nature of the activities, visual impacts during demolition of the facilities would be considered minor.

Removal of the PAF stacks, cooling towers, and structures under Alternative A would enhance the visual environment of both the fore- and middleground distances. The stacks, cooling towers, and powerhouse are visible as a major visual intrusion from only a few locations, the industrial areas surrounding the facility, from the Green River, and Peabody WMA. The overall impacts of this alternative would be beneficial, but minor due to the limited number of observers in the area around PAF.

3.14.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. Therefore, there would be no impacts to visual resources. As TVA would only perform critical maintenance as needed, minor adverse impacts to visual resources would occur over time as the buildings at PAF begin to deteriorate.

3.15. Natural Areas, Parks, and Recreation

3.15.1. Affected Environment

3.15.1.1. Natural Areas

Natural areas include managed areas such as Wildlife Management Areas (WMAs), National Wildlife Refuges and Habitat Protection Areas, ecologically significant sites, and Nationwide Rivers Inventory streams. Managed areas include lands held in public ownership that are managed by an entity (e.g., TVA, National Park Service, USFS, state or county) to protect and maintain certain ecological and/or recreational features. Ecologically significant sites are tracts of privately-owned land that are recognized by resource biologists as having significant environmental resources or identified tracts on TVA lands that are ecologically significant, but not specifically managed by TVA's Natural Areas Program. The Nationwide Rivers Inventory is a listing of more than 3,200 free-flowing river segments in the U.S. that are believed to possess one or more outstandingly remarkable natural or cultural values judged to be of more than local or regional significance. Designated Nationwide Rivers Inventory segments are thus potential candidates for inclusion in the federally recognized National Wild and Scenic River System. This section addresses managed and natural areas that are on, immediately adjacent to (within a 0.5-mile radius), or within the region of the proposed decontamination and deconstruction project area and laydown areas (within a five-mile radius).

The Peabody WMA is located immediately adjacent to the PAF reservation (TVA 2020b). The WMA is broken up into eight individual units, two of which lie adjacent to the PAF reservation (Figure 3-4). The Sinclair Unit of the Peabody WMA adjoins the PAF reservation to the southwest and west and the main PAF access road, KY 176, passes through the Sinclair Unit. The Baker Bottoms Unit of the WMA lies adjacent to PAF to the south and southeast. The Ken Unit and Homestead Unit of the WMA are across the Green River from PAF, approximately 0.5 mile and 4.2 miles northeast of the plant, respectively (TVA 2013). Two western units of the Peabody WMA, the Vogue and River Queen Units can both be accessed from the portion of the Western Kentucky Parkway that would be used as the route to haul CCR from PAF to the Hopkins County Regional Landfill. Peabody WMA has rough terrain primarily comprised of reclaimed coal-mined land with swampland, numerous excavated ridges, and water-filled strip mine pits. Lands within the WMA are owned by both private landowners and the KDFWR. Private lands within the WMA are managed by KDFWR under lease agreements with the private landowners. The main public uses are fishing and hunting for deer, turkey, waterfowl, and small game (KDFWR 2020a).

3.15.1.2. Parks and Recreation

Parks and developed recreation facilities include open areas, boat ramps, community centers, swimming pools, and other public places. This section addresses parks and recreation facilities that are on, immediately adjacent to (within a 0.5-mile radius), or within the region of the proposed decontamination and deconstruction project area and laydown areas (within a five-mile radius).

As shown on Figure 3-4, there are two parks and three boat ramps within five miles of the proposed decontamination and deconstruction project area and laydown areas. The Rockport boat ramp is located approximately 4.4 miles north of the northernmost laydown area. This boat ramp is accessible from Main Street, approximately 0.5 mile south of its intersection with US 62. Simmons Street Park is a small community park located in Drakesboro, Kentucky, approximately 4.5 miles southwest of the southern boundary of the

project area. Rochester Dam Park is a popular camping and fishing spot along the Green River just below the Rochester Dam, located approximately five miles southeast of the southern boundary of the project area. The Rochester Dam boat ramp is accessible from KY 70 (Rochester Road). The Mud River boat ramp is located approximately 5.3 miles southeast of the southern boundary of the project area. This boat ramp is accessible from Russellville Street, approximately 500 feet east of its intersection with KY 70 (KDFWR 2020b).

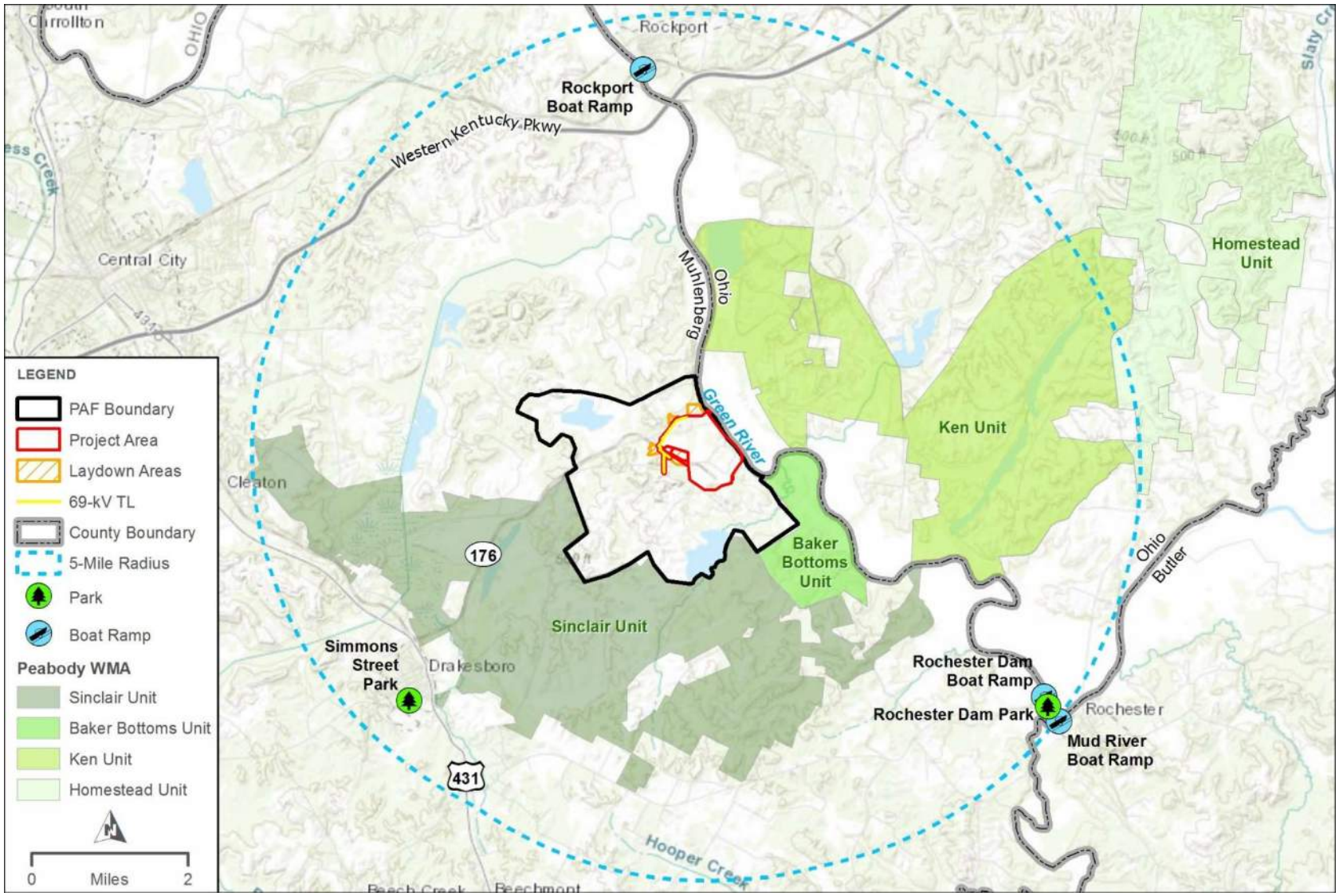

Figure 3-4. Natural Areas, Parks, and Recreational Facilities within the Vicinity of PAF

3.15.2. Environmental Consequences

3.15.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells. Under this alternative, there would be no direct or indirect impacts from onsite decontamination and deconstruction activities given the existing industrial setting of the project location and the distance between the natural areas, parks, and recreational facilities and the proposed project area.

Under this alternative, demolition debris and scrap metal would be hauled to an offsite landfill or recycling facility by truck. The exact haul routes for demolition debris are not known. While haul routes would use arterial or interstate roadways whenever possible, it may be necessary for some routes to utilize local roads within the vicinity of PAF. Therefore, there is potential for indirect impacts to natural areas, parks, and recreational facilities within the vicinity of PAF associated with increased traffic, noise, and potential fugitive dust from the transport vehicles during the deconstruction and site restoration phases. The impacts would be negligible to natural areas along arterial and interstate roadways where the additional truck traffic would not have a substantial impact on existing traffic volume, or consequently, traffic noise or fugitive dust emissions. On the lower functioning roadways closest to PAF, increased traffic would be temporary and would likely resemble traffic patterns that were present when the plant was operational. Due to the short-term nature of the transport of demolition debris offsite and borrow material onsite, indirect impacts to natural areas, parks, and recreational facilities under Alternative A would be short-term and minor.

Deconstruction activities could cause some temporary shifts in recreational boating and fishing in the waters immediately adjacent to the plant, but any impacts should be minor due to the short duration of demolition and limited recreational use of Green River.

3.15.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities at PAF and the project area and vicinity would remain in its current condition. Therefore, there would be no impacts to natural areas, parks, or recreation.

3.16. Cultural Resources

3.16.1. Affected Environment

3.16.1.1. Regulatory Framework for Cultural Resources

Cultural resources or historic properties include prehistoric and historic archaeological sites, districts, buildings, structures, and objects as well as locations of important historic events. Federal agencies, including TVA, are required by the National Historic Preservation Act (NHPA) (54 USC 300101 et seq.) and by NEPA to consider the possible effects of their undertakings on historic properties. “Undertaking” means any project, activity, or program, and any of its elements, which has the potential to have an effect on a historic property and is under the direct or indirect jurisdiction of a federal agency or is licensed or assisted by a federal agency. An agency may fulfill its statutory obligations under NEPA by following the process outlined in the regulations implementing Section 106 of NHPA at 36 CFR Part 800. Additional cultural resource laws that protect historic resources include the Archaeological and Historic Preservation Act (54 USC 300101 et seq.), Archaeological Resources

Protection Act (16 USC 470aa-470mm), and the Native American Graves Protection and Repatriation Act (25 USC 3001-3013).

Section 106 of the NHPA requires that federal agencies consider the potential effects of their actions on historic properties and allow the Advisory Council on Historic Preservation an opportunity to comment on the action. Section 106 involves four steps: (1) initiate the process, (2) identify historic properties, (3) assess adverse effects, and (4) resolve adverse effects. This process is carried out in consultation with the State Historic Preservation Officer (SHPO) and other interested consulting parties, including federally-recognized Indian tribes with an interest in the project area.

Cultural resources are considered historic properties if they are listed or eligible for listing in the National Register of Historic Places (NRHP). The NRHP eligibility of a resource is based on the Secretary of the Interior's criteria for evaluation (36 CFR 60.4), which state that significant cultural resources possess integrity of location, design, setting, materials, workmanship, feeling, association, and:

a. Are associated with events that have made a significant contribution to the broad patterns of our history; or
b. Are associated with the lives of persons significant in our past; or
c. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value; or
d. Have yielded, or may yield, information (data) important in prehistory or history.

A project may have effects on a historic property that are not adverse, if those effects do not diminish the qualities of the property that identify it as eligible for listing on the NRHP. However, if the agency determines (in consultation) that the undertaking's effect on a historic property within the area of potential effect (APE) would diminish any of the qualities that make the property eligible for the NRHP (based on the criteria for evaluation at 36 CFR Part 60.4 above), the effect is said to be adverse. Examples of adverse effects would be ground disturbing activity in an archaeological site or erecting structures within the viewshed of a historic building in such a way as to diminish the structure's integrity of feeling or setting.

Agencies are required to consult with SHPOs, tribes, and others throughout the Section 106 process and take their comments into consideration before deciding to initiate a project, and to document adverse effects to historic properties resulting from agency undertakings.

3.16.1.2. Area of Potential Effect (APE)

The APE is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE for cultural resources for this analysis includes the entire affected area for the decontamination and deconstruction project, which totals approximately 464.5 acres. Ground-disturbing activities associated with the proposed action will be confined to the APE. As the proposed action does not include the introduction of new visual elements, potential effects on above-ground properties would be limited to any such properties within the affected area.

3.16.1.3. Previous Cultural Resources Investigations in the APE

To date, TVA has conducted six reviews under Section 106 of the NHPA within parts of the APE, in connection with various prior undertakings between 2013 and 2017 (Figure 3-5). The purpose of each review was to identify archaeological sites and historic architectural properties that could be affected by the undertaking and evaluate potential project effects. All of the reviews began with a desktop review that included examination of historic and current topographic maps, reports of previous investigations, TVA's technical reports on the Paradise Steam Plant Project (TVA 1964 and 1979), and historic photographs. Three of the reviews included an archaeological survey, and one included a survey of historic architectural properties. The archaeological surveys involved systematic shovel testing and visual examinations of exposed ground surfaces. Approximately 246 acres, or 52%, of the APE was included within these prior reviews. Table 3-8 summarizes these prior reviews.

Table 3-8. Previous Cultural Resources Investigations in the APE

Survey Year	Project Name	Investigation	Findings
2013	Baghouse	Historic architectural survey and assessment of PAF	No historic properties affected; PAF ineligible
2013	Paradise Combustion Turbine Plant	Desktop review only	No properties
2014	Barge Rolloff Improvement	Archaeological survey	No sites
2014	Transmission line feed to Paradise CT	Archaeological survey	No sites
2015	Coal Wash Facility Demolition	Desktop review only	No sites
2016-2017	CCR Management	Archaeological survey	No sites

No archaeological sites were recorded as a result of these investigations. In each of the surveys, shovel testing provided evidence of past ground disturbance that has altered or removed the original soils and sediments, resulting in low probability for intact archaeological sites. A 2013 architectural survey of visible areas within a half-mile radius surrounding the then-proposed Paradise Combustion Turbine plant identified no historic architectural properties that would be affected by that project. That survey also included an architectural assessment of PAF. Based on the assessment, TVA determined that PAF is ineligible for inclusion in the NRHP, due to many physical changes (removal of original structures and addition of new ones) that have compromised the historic integrity of the plant.

During each of these past reviews, TVA consulted with the Kentucky SHPO and federally recognized Indian tribes pursuant to 36 CFR Part 800. In each case, the SHPO concurred with TVA's finding of no effect, and none of the consulted tribes objected or identified resources of concern.

3.16.1.4. Areas Not Subjected to Archaeological Investigation

Nearly half (approximately 223 acres) of the APE was not included within previous archaeological investigations. Of this area, approximately 41 acres (9% of the APE) lacks potential for undisturbed archaeological deposits due to ground disturbance from past coal mining. According to TVA (1964:19), the presence of coal was a major factor in the selection of this site for the Paradise steam plant:

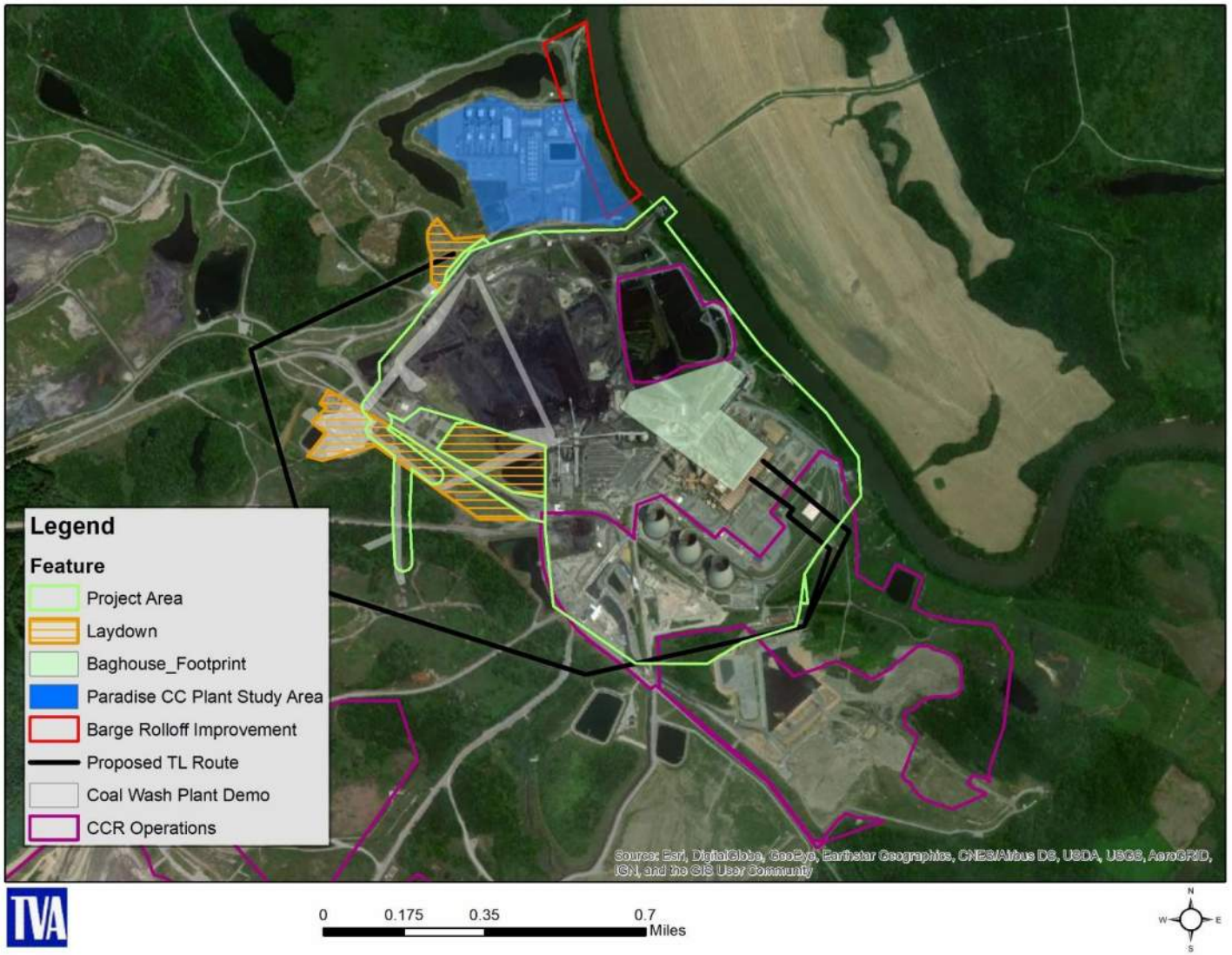

Figure 3-5. Previous cultural resource survey areas at PAF

As soon as the location of the steam plant at Paradise had been settled, a contract for furnishing coal to the plant was executed with the Peabody Coal Company of St. Louis, Missouri. The contract calls for an unprecedented 65 million tons of coal to be delivered to the tractor hopper over a period of approximately 17 years. All of the coal was to come from strip mines within a short distance of Paradise. Sinclair Mine was opened adjacent to the project to supply coal directly from the strip pits.

Figure 3-6 shows areas that were surface mined and sub-surface (auger) mined by the Peabody Coal Company, as well as historical surface mines, both within and outside the APE. With the exception of the PAF footprint, a very extensive portion of the PAF reservation has been affected by surface mining.

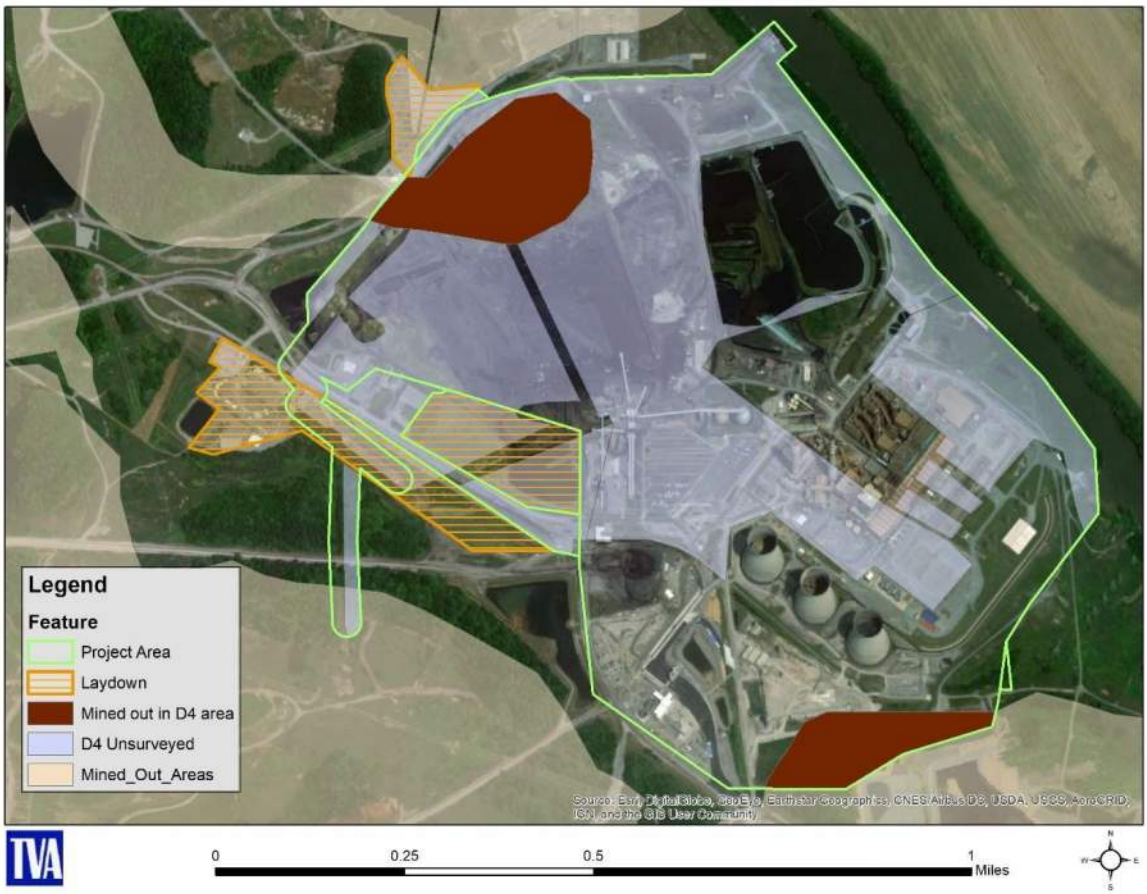

Figure 3-6. Areas at PAF previously mined for coal

The remaining areas within the APE that were not surveyed for archaeology and were not part of the Sinclair Coal Mine have been affected by the construction of PAF and ancillary facilities, including the powerhouse, the office building, the cooling water intake, ash storage areas, coal storage, conveyors, various other structures, and drives and parking areas. Construction of these features is documented to some extent by engineering drawings and historic photographs, and by current satellite images of the APE (as seen in Figure 1-2). Construction of these facilities would have included excavation and grading, which resulted in the destruction of any archaeological sites that may have been present prior to TVA's acquisition of the land in the APE. Based on the prior archaeological surveys

and documentation of prior disturbance, TVA finds that the APE contains no archaeological sites.

3.16.1.5. Current Historic Architectural Assessment

Although SHPO agreed with TVA's 2013 determination that PAF is ineligible for inclusion in the NRHP, SHPO recommended that TVA re-evaluate this facility in 2020. The purpose of this evaluation would be to identify any facilities part of PAF constructed between the plant's initial construction and 1970 that could potentially have gained their own historic significance with the passing of 50 years. TVA agreed with this recommendation, and in September 2020 conducted a re-assessment of the potential NRHP eligibility of PAF. The assessment included additional background research and a visit to the site by an architectural historian. This investigation documented a modest number of modifications that TVA has made to PAF since 2013. These include, for example, demolition of a 2.35-mile elevated ash disposal conveyor belt system that TVA constructed in connection with Unit 3. Based on the architectural assessment, TVA has re-evaluated the potential NRHP eligibility of PAF. None of the facilities constructed between the plant's initial construction and 1970 have historic significance; and the additional modifications made to PAF since 2013 have served to further reduce any historic integrity that remained. Thus, TVA has determined that PAF remains ineligible for inclusion in the NRHP. TVA also finds that the APE contains no historic architectural properties that are listed in, or eligible for listing in, the NRHP. TVA is consulting with the Kentucky SHPO regarding this determination and TVA's finding that no historic properties are located within the APE of the demolition and deconstruction project.

3.16.2. Environmental Consequences

3.16.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade. As TVA has found there are no archaeological sites or NRHP-listed or –eligible architectural properties in the APE, Alternative A would not result in any impacts to historic properties.

3.16.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. As the No Action alternative would include no ground-disturbing activities, TVA does not consider it a type of action with potential to affect archaeological sites. This alternative could result in impacts to various facilities and structures at PAF due to the cumulative effects of neglect. However, as TVA has determined that PAF is ineligible and there are no NRHP-listed or –eligible historic architectural properties in the APE, Alternative B would not result in any impacts to historic properties.

3.17. Utilities and Service Systems

3.17.1. Affected Environment

Current utilities and service systems at PAF include drinking water, process wastewater and cooling water, septic, electrical, fiber optics, and compressed air.

3.17.2. Environmental Consequences

3.17.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade. Implementation of Alternative A would require that all aboveground utilities and service systems be removed. All buried utilities, with the exception of the 22-inch gas main and the 12-inch domestic water loop, would be cut and properly abandoned in place. Only safety-necessitated utilities, including lighting, security, and fire protection, would be active. Utilities constructed of hollow pipe would be decommissioned by placing a mechanical cap or plug and/or concrete in an open end. Sanitary sewer lines and lift stations would be cleaned as deemed necessary and closed in place. Utilities would be abandoned in place. Manholes and catch basins would be demolished to three feet below grade. The firewater loop, including hydrants around the switchyard would be maintained during deconstruction and may require cutting/capping to maintain system integrity while isolating from the domestic loop where connected.

Overall, the impacts of Alternative A on utilities and service systems are expected to be minor. No impacts would be anticipated beyond the proposed decontamination and deconstruction area.

3.17.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, the facility would remain in place to degrade from its current condition. With the exception of active utilities, only utilities necessitated by safety, such as lighting, security, and fire protection, would be active on the PAF site.

If the facility remains in the “as-is” condition, it would likely present a higher risk than Alternative A, as utilities would not be maintained and would degrade over time, resulting in the potential to contaminate soil and groundwater. Impacts related to the No Action Alternative would occur over the long-term and are expected to be minor.

3.18. Safety

3.18.1. Affected Environment

Workplace health and safety regulations are designed to eliminate personal injuries and illnesses from occurring in the workplace. These laws are defined in both federal and state statutes. The OSHA standards protect the health and safety of workers in the workplaces. OSHA regulations are presented in Title 29 CFR Part 1910 (29 CFR 1919), Occupational Safety and Health Standards. A related statute, 29 CFR 1926, contains health and safety regulations specific to the construction industry. The Kentucky-specific regulations adopted by the Kentucky Occupational Safety and Health (OSH) Standards Board or the Kentucky Labor Cabinet supersede federal OSHA standards. The Kentucky OSH Program, under the statutory authority of KRS Chapter 338 (338.011 to 338.991) and through a state plan approved by the U.S. Department of Labor, OSHA, maintains authority for enforcement, standards promulgation, onsite consultation, and training services related to job safety and health. The official regulations (803 KAR 2:015 through 2:505 (containing both general industry and construction industry) are maintained by the Legislative Research Commission.

TVA's Safety Standard Programs and Processes would be strictly adhered to during the proposed actions. The safety programs and processes are designed to identify actions required for the control of hazards in all activities, operations, and programs. It also establishes responsibilities for implementing OSHA and state requirements.

The routine operations and maintenance activities at PAF reflect a safety-conscious culture, and activities are performed consistent with OSHA and KRS standards and requirements and specific TVA guidance. Personnel at PAF are conscientious about health and safety, having addressed and managed operations to reduce or eliminate occupational hazards through implementation of safety practices, training, and control measures.

PAF has safety programs and BMPs in place to minimize the potential of safety incidences. These would include but are not limited to such programs as the following:

- Operations and Maintenance Plans
- Hazard Communication
- Housekeeping
- Emergency Spill / Release Plans
- Contractor Evaluation and Acceptance
- Competent Person
- Standard Operating Procedures
- Emergency Response Plan
- Project Safety Plans
- Ground Disturbance
- Lifting Operations
- Hazard Analysis
- Energy Isolation (Lockout/Tag out)
- Cutting, Burning, Welding and other "Hot Work"
- Incident Reporting and Investigations
- Management of Change
- Personal Protective Equipment
- Hearing Conservation
- Health and Safety Training
- Safety Reviews and Compliance Audits

It is TVA's policy that contractors have a site-specific health and safety plan in place prior to conducting construction activities at TVA properties. The contractor site-specific health and safety plans address the hazards and controls as well as contractor coordination for various construction tasks. A health and safety plan would also be required for workers responsible for operations after construction is complete.

The potential offsite consequences and emergency response plan are discussed with local emergency management agencies. These programs are audited by TVA no less than once every three years and by EPA periodically.

Health hazards are also associated with emissions and discharges from the facility as well as accidental spills/releases at the plant and/or along the pipelines. Mitigative measures are used to ensure protection of human health which includes the workplace, public, and the environment. Applicable regulations and attending administrative codes that prescribe monitoring requirements may include those associated with emergency management, environmental health, drinking water, water and sewage, pollution discharge, air pollution, hazardous waste management, and remedial action.

3.18.2. Environmental Consequences

TVA would maintain security at the facility under both alternatives, but at a greater level with the No Action Alternative—Alternative B than the Proposed Action—Alternative A, as Alternative A would have fewer facilities and structures to monitor. TVA would also periodically assess the condition of remaining site facilities as they deteriorate.

3.18.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells, resulting in a brownfield site. Under Alternative A, all hazardous materials associated with buildings and structures would be removed and disposed of, and PAF and additional structures and facilities shown in Figure 1-2 would be demolished. Contamination of soil and groundwater would be unlikely. This action would result in the lowest risk to soil and groundwater, as contaminants would be removed from the site. Decontamination activities would last approximately 12 to 18 months and deconstruction would last approximately 24-30 months and may overlap with the decontamination phase. This would be followed by a restoration period of approximately 12 months during which borrow material would be transported within the site. As part of the structure removal, the stacks, cooling towers, and certain structures would be demolished via explosives. Safety precautions would be employed to prevent the general public from accessing explosives and detonators, minimizing increases in public risk due to the use of explosives. Minor increases in risk to worker safety would occur under this alternative due to the use of explosives. However, these risks would be minimized through implementation of safety measures such as those described below.

Prior to demolition of the stacks, cooling towers, and structures, the area would be prepared, and a fall exclusion zone would be established. During the blast event, no personnel would be allowed in the fall exclusion zone. A targeted fall zone would be established. A fall exclusion zone area would also provide a sufficient safety buffer for debris and dust control around the area as well as a control zone for any unlikely change in the intended fall direction. All worker activity would comply with federal and state safety regulations, including donning appropriate personal protective equipment, maintaining equipment in good working order, and adequate training for work performed, which minimizes safety risks.

Explosives would be managed under the direction of a licensed blaster. Security would be a very important component of this event to eliminate any threats to public health or safety as much as possible. Once explosives arrive onsite, 24-hour security would be provided to monitor the explosives. Detailed security plans would be developed and provided to area emergency response agencies. Security details, including any information about the transport and storage of explosives, would be limited to authorized personnel only. Site security on the day of the event would be strictly enforced, and trespassing would not be

tolerated. Notifications to the public would be issued prior to the use of explosives for demolition.

Public health and safety concerns related to hazardous materials would be low under this alternative. The potential for contaminants from the facility to reach soil and groundwater would be almost nonexistent. Potential contaminants removed prior to structure deconstruction would be hauled to an offsite landfill. Brick, block, and concrete demolition debris not contaminated by asbestos or other hazardous materials would be used as clean fill onsite. Other demolition debris would be hauled by truck to an offsite landfill within 30 miles of PAF or to an offsite recycling facility. The materials would be transported along existing roadways in the vicinity of PAF for a period of approximately 18 months. These hauling activities would cause an increase in truck traffic to and from the facility intermittently during the construction and restoration periods.

Increased traffic could lead to a slightly higher risk of traffic accidents in the PAF vicinity during decontamination, demolition, and restoration phases of the project due to the increase in the number of vehicle miles traveled on surrounding roadways. This increase in vehicle miles is a factor in injury and fatal traffic crash rates. Therefore, there would be a temporary, minor impact related to increased traffic and driver safety. Trespassing and vandalism would not be a notable issue under this alternative because there would be little to attract unauthorized persons.

Deconstruction activities within the Green River, including removal of barge facilities, could pose risks to construction workers in the water and recreational river traffic in the area. However, any impacts should be negligible due to the short duration of demolition and limited recreational use of Green River. It is TVA policy that all contractors have in place a site-specific health and safety plan prior to conducting construction activities at TVA properties. With the high level of safety awareness and preparation during demolition and removal of facilities, safety and security plans and safety awareness would reduce potentially large safety risk (felling of stacks, cooling towers, and demolition of buildings and water structures) down to a temporary and minor impact.

Use of BMPs, safety procedures, and security measures along with ongoing environmental maintenance activities would minimize possible safety effects. Therefore, impacts to public health and safety under Alternative A are expected to be short-term and minor.

3.18.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities at PAF. If the facility remains in “as-is” condition, it likely would present a higher potential safety risk than Alternative A to contaminate soil and groundwater as systems and structures degrade. In addition, the risk of trespassing and injury to trespassers would likely increase due to a perception that salvageable materials are present on the site as well as the increased level of environmental contaminants. TVA would maintain security at a higher level at the facility due to remaining structures. Fencing and security personnel would remain, and TVA would also periodically assess the condition of remaining site facilities as they deteriorate. Due to the site location and distance to the nearest residential area (approximately 2.5 miles), effects on safety to the general public would be minor.

3.19. Socioeconomics and Environmental Justice

3.19.1. Affected Environment

Socioeconomic and environmental justice data provided for the study area, a five-mile radius of the PAF facility within Muhlenberg County, are presented in terms of census tract (CT) level data. Specifically, the study area is comprised of three CTs: CT 9601, CT 9607, and CT 9608. Demographic and economic characteristics of potentially affected populations are assessed in this section using the U.S. Census Bureau (USCB) 2010 decennial census (2010 Census) and the 2014-2018 American Community Survey (ACS) five-year estimates (2018 ACS). State-level USCB data are included for comparison purposes. These data were obtained utilizing USCB Explore Census Data (USCB 2020). Where appropriate, additional data from USCB and other federal and state agencies are employed.

Muhlenberg County, where the PAF facility is located, is a predominantly rural county characterized by rural land uses interspersed with several small municipalities. The PAF facility is located along the western bank of the Green River. Green River serves as a border between Muhlenberg County and Ohio County to the east. No major urban areas are located in the county.

For this analysis, the study area is considered a five-mile radius of the PAF facility within Muhlenberg County. Other geographic areas included for comparison purposes are the cities of Drakesboro, Greenville, and Central City along with Muhlenberg County and Kentucky. While a small city, Drakesboro was included due to its proximity to PAF, i.e., closest municipality and located along KY 176. Greenville and Central City are included due to their relatively comparable population numbers (both around 5,000) and proximity to PAF (both approximately 13 to 14 miles from PAF by road). Greenville is also the county seat. Due to its separation by roadway and waterway and its land use east of the Green River, Ohio County was excluded from the study area. The Western Kentucky Parkway crosses the Green River into Ohio County approximately 20 miles from PAF, and land use in Ohio County is by far dominated by reclaimed mine lands for several miles from PAF.

3.19.1.1. Demographics and Housing

As indicated in previous sections, land use surrounding the PAF facility is dominated by open land consisting of passively managed reclaimed mine lands. No residential or commercial land uses occur in the immediate vicinity of PAF, with the nearest residential areas being approximately 2.5 miles from the facility. The closest municipalities to the PAF facility are Drakesboro, Central City, and the county seat Greenville. All are small cities with populations ranging from around 500 (Drakesboro) to 5,000 (Central City and Greenville). Of the cities, only Drakesboro is located within the study area.

As shown in Table 3-9, while Kentucky shows a growth in population since the 2010 decennial census, Muhlenberg County and its municipalities demonstrate a decline in population or nearly stagnate population growth. Nearby Drakesboro shows the most decline at -8.0 percent, although with its small population, changes in numbers of residents impact these population statistics substantively. Census tracts comprising the study area, likewise, show a decline in population (-3.1 percent). Perhaps correspondingly, too, the study area has a higher percentage of persons aged 65 years and over and smaller percentage of persons under age 18, as compared to other geographic areas.

Table 3-9. Population Characteristics and Population Change

Geography	2010 Census	2018 ACS Estimate	% Change (2010-2018)	% Pop. Under Age 18	% Pop. Age 65+
5-Mile Radius (Muhlenberg County)	6,898	6,685	-3.1	19.8	19.3
Drakesboro	515	474	-8.0	20.5	11.2
Greenville	4,312	4,323	0.3	19.3	18.4
Central City	5,978	5,822	-2.6	21.2	18.2
Muhlenberg County	31,499	31,081	-1.3	20.5	18.2
Kentucky	4,339,367	4,440,204	2.3	22.8	15.6

Source: USCB 2020

As shown in Table 3-10, the average median household income of the census tracts comprising the study area is $44,832. This number is the highest of all geographic areas within the county or the county itself. This median household income is somewhat lower than that of the state, as may be expected for a more rural area of the state, however. Persons within the study area are more likely to be below the poverty level as compared to persons within the state and county, although the difference varies by only 1.0 to 1.5 percent.

Table 3-10. Housing and Income Characteristics

Geography	Housing Units (2018)	Median Household Income (2014-2018)	% Pop. Below Poverty Level (2014-2018)
5-Mile Radius (Muhlenberg County)	3,034	$44,832	18.9
Drakesboro	185	$43,750	23.5
Greenville	1,909	$30,439	20.0
Central City	2,736	$40,590	23.6
Muhlenberg County	13,769	$43,110	17.4
Kentucky	1,974,406	$48,392	17.9

Source: USCB 2020

As shown in Table 3-11, minority populations within Muhlenberg County, Drakesboro, Greenville, and the study area represent smaller percentages of the total population as compared to the state. Central City's minority populations is much more in line with that of the state, however. The study area's percent of minority population is higher than that of Muhlenberg County by 2.0 percent, with Black or African American populations representing the highest percentage of minorities at 3.4 percent.

Table 3-11. Racial Characteristics

Geography	% White	% Black / African American	% Am. Indian / AK Native	% Asian	% Native Hawaiian / Pacific Islander	% Some Other Race	% Two or More Races	% Hispanic / Latino
5-Mile Radius (Muhlenberg County)	94.1	3.4	0.5	0.6	0.1	0.2	1.0	0.1
Drakesboro	90.5	8.9	0	0	0	0	0	0.6

Geography	% White	% Black / African American	% Am. Indian / AK Native	% Asian	% Native Hawaiian / Pacific Islander	% Some Other Race	% Two or More Races	% Hispanic / Latino
Greenville	89.6	8.3	0.1	0.3	0	0	1.1	0.6
Central City	83.5	12.6	0	0.4	0	0	0.9	2.5
Muhlenberg County	92.1	4.6	0.2	0.6	0	0	0.9	1.5
Kentucky	84.8	7.9	0.2	1.4	0.1	0.1	2.0	3.6

Source: USCB 2020

3.19.1.2. Employment and Income

As shown in Table 3-12, the top three employers by industry within the county are Educational Services, and Health Care and Social Assistance (22.9 percent); Manufacturing (17.0 percent); and Retail Trade (11.9 percent). Together, these three industry types make up over 50 percent of the number of employees in the county.

Table 3-12. Employers (Industry) by Sector within Muhlenberg County

Sector	Number of Employees	Percent
Agriculture, Forestry, Fishing and Hunting, and Mining	766	6.5
Construction	693	5.9
Manufacturing	2,006	17.0
Wholesale Trade	266	2.3
Retail Trade	1,397	11.9
Transportation and Warehousing and Utilities	833	7.1
Information	69	0.6
Finance and Insurance, and Real Estate and Rental and Leasing	382	3.2
Professional, Scientific, and Management, and Administrative and Waste Management Services	625	5.3
Educational Services, and Health Care and Social Assistance	2,695	22.9
Arts, Entertainment, and Recreation, and Accommodation and Food Services	940	8.0
Other Services except Public Administration	714	6.1
Public Administration	384	3.3
Total Employed Population	**11,770**	**100.0**

Source: USCB 2020

As shown in Table 3-13, within the study area, the percent of the civilian labor force that is unemployed is notably higher than the other geographic areas represented (12.9 percent compared to 9.0 percent for Muhlenberg County and 6.1 percent for Kentucky). Only Greenville demonstrates percentages of unemployed labor force similar to those of the study area.

Table 3-13. Employment Characteristics of the Resident Labor Force

Geography	Pop. Age 16+	Pop. Civ. Labor Force			Unemployment	
		Employed	Unemployed	Total	% Total Pop. Age 16+	% Civ. Labor Force
5-Mile Radius (Muhlenberg County)	5,529	2,277	337	2,614	6.1	12.9
Drakesboro	398	191	21	212	5.3	9.9
Greenville	3,599	1,576	222	1,798	6.2	12.3
Central City	4,711	1,982	197	2,179	4.2	9.0
Muhlenberg County	25,564	11,770	1,171	12,921	4.5	9.0
Kentucky	3,542,792	1,959,442	128,358	2,087,800	3.6	6.1

Source: USCB 2020

3.19.1.3. Environmental Justice

EO 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, seeks to ensure that minority and low-income populations do not bear a disproportionate share of high and adverse human health or environmental impacts by identifying and addressing the impacts a project may have on these communities. Although TVA is not one of the agencies subject to this order, TVA routinely considers environmental justice impacts as part of the project decision-making process. Council of Environmental Quality (CEQ) guidance (CEQ 1997) for applying this EO under NEPA provides the following guidance on terms used in the EO.

Low-income population: Low-income populations in the study area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect.

Minority: Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

Minority population: Minority populations should be identified where either: (a) the minority population of the study area exceeds 50 percent or (b) the minority population percentage of the study area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. In identifying minority communities, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native American), where either type of group experiences common conditions of environmental exposure or effect.

Using CEQ guidance, low-income populations were identified as an area with poverty rates above the Kentucky statewide poverty rate of 17.9 percent. The low-income population of

the study area is an average of 18.9 percent. Notably, two of the three census tracts comprising the study area (CT 9601 and CT 9607) have higher percentages of low-income populations as compared to the state. CT 9601 has 21.6 percent population below the poverty level, and CT 9607 has 23.1 percent. CT 9608 has a very low percentage below the poverty level as just 9.3 percent. These percentages were identified using 2018 ACS estimates. Based on these data, persons below the poverty level in the study area, and specifically CT 9601 and CT 9607, exceed that of the state and would present an environmental justice population in terms of poverty levels. Census tract boundaries are shown in Figure 3-7.

Again, using CEQ guidance, minority populations within the study area that exceed the minority percentage of Kentucky as a whole are considered the areas where the chance for disproportional environmental and human health effects may be of potential concern. Minority populations were identified using 2018 ACS estimates for the study area. Kentucky's minority populations represent 15.2 percent of the total population. The study area's percent of minority population is significantly less at just 5.9 percent, and all three census tracts comprising the study area have similar percentages of minority population. Consequently, the study area does not present an environmental justice concern as it relates to minority populations.

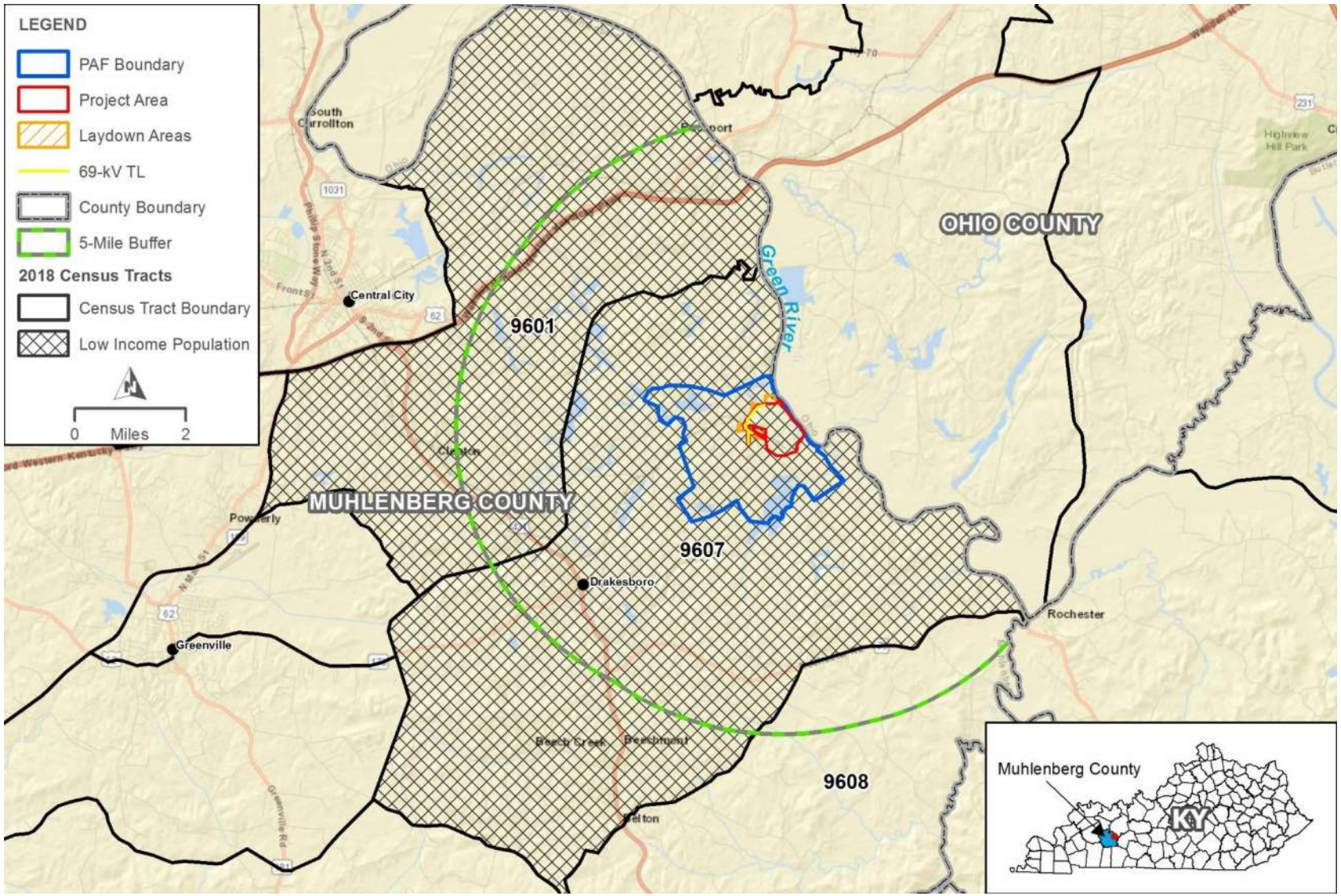

Figure 3-7. Census Tracts within the Vicinity of PAF

3.19.2. Environmental Consequences

3.19.2.1. Alternative A: Full Demolition

Under Alternative A, all buildings and structures within the proposed demolition boundary would be decontaminated and demolished to three feet below grade or to the top of the mooring cells.

3.19.2.1.1. Socioeconomics

An anticipated influx of a temporary construction workforce will create a short-term change in the demographic characteristics of the study area. The workforce necessary for the demolition of PAF is expected to be a combination of TVA workforce and local workforce. Specialized workforce laborers may be required to relocate temporarily to the affected or nearby areas while general laborers are anticipated to come from the local workforce. Primary responsibility for the workforce composition determination will be determined by the demolition contractor. TVA estimates that the workforce needed for decontamination would range from 50 to 120 personnel over an 18 to 36-month period. The workforce needed for deconstruction would range from 20 to 40 personnel over a 36 to 48-month period, which could overlap the decontamination phase.

Demolition activities and the associated influx in the workforce is also expected to result in short-term increased economic opportunity. Economic benefits may occur as a result of increased spending particularly at service industries such as local convenience stores, restaurants, and hotels. Payroll taxes will also increase with increased employment, and materials and supplies will also be purchased during demolition activities.

Future use of the PAF facility site is undetermined; restoration to grade is the extent of the plans for the site at present. Consequently, associated impacts, including beneficial and/or negative impacts, related to such redevelopment are unknown as well. Overall, the demographic and economic impacts of the demolition of the PAF facility are anticipated to be beneficial albeit short-term in duration and incrementally minor.

3.19.2.1.2. Environmental Justice

As previously discussed, portions of the affected environment meet the criteria to be considered environmental justice populations under EO 12898, particularly as it relates to low-income populations and specifically for persons in Census Tracts 9601 and 9607. The nearest residences are located approximately 2.5 miles from the PAF facility. Consequently, no direct impacts will occur to the surrounding communities or environmental justice populations as result of the demolition of PAF.

The transport of demolition debris offsite will lead to traffic increases and associated increases in air pollution and traffic noise levels along the roads travelled. However, these activities would likely result in traffic patterns that were present when the plant was operational and would also be short-term and intermittent in nature.

TVA does not anticipate obtaining borrow material offsite. No specific site has been identified at this time and ultimate site selection would be left up to the contractor. Likewise, the demolition contractor has responsibility for determining which permitted landfill and/or recycling facility will be utilized. The nearest landfill facilities are located in Graham in Muhlenberg County and in Beaver Dam in Ohio County. Both are approximately 30 minutes from PAF in opposite directions. Routes to these landfills require transport along KY 176 and US 431 (to Graham) or along CR 1101 and US 62 (to Beaver Dam).

Haul routes will use arterial routes and the Western Kentucky Parkway when possible, but it may be necessary to use local roads, particularly if the landfill in Beaver Dam is utilized. Mitigation measures including implementing BMPs for controlling fugitive dust and proper maintenance of vehicles for controlling emissions would further reduce impacts to these communities.

Demolition activities will create impacts to the surrounding communities and environmental justice populations. However, transport activities will be along existing roadways and similar to those present when PAF was operational. Impacts will be mitigated through the use of BMPs. Overall, impacts to the communities and environmental justice populations resulting from demolition activities will be short-term and minor.

3.19.2.2. Alternative B: No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. The No Action Alternative would not alter demographic or economic conditions in the study area, nor pose considerations for impacts to be disproportionately borne by environmental justice populations.

3.20. Cumulative Impacts

The CEQ regulations (40 CFR §§ 1500-1508) implementing the procedural provisions of the NEPA of 1969, as amended (42 USC § 321 et seq.) define cumulative impact 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 (RFFAs) regardless of what agency (federal or nonfederal) or person undertakes such other actions." (40 CFR § 1508.7).

A cumulative impact analysis must consider the potential impact on the environment that may result from the incremental impact of a project when added to other past, present and RFFAs (40 CFR § 1508.7). Baseline conditions reflect the impacts of past and present actions. The impact analyses summarized in preceding sections are based on baseline conditions and; therefore, incorporate the cumulative impacts of past and present actions.

3.20.1. Scoping for Cumulative Impacts Analysis

TVA evaluated a full range of environmental resource issues associated with Alternative A for inclusion in the cumulative impacts analysis. The proposed actions and their connected actions identified under Alternative A would occur mostly on land that was previously disturbed and is used for industrial purposes. The landscape surrounding the existing PAF facility is already subject to environmental stressors associated with industrial operations and previous disturbance of the site. Consequently, as has been described in prior subsections of this EA, the existing quality of environmental resources potentially directly or indirectly affected by project activities is generally low.

This analysis is limited to those resource issues potentially adversely affected by project activities. Accordingly, land use and prime farmland; geology; aquatic ecology; wildlife; vegetation; threatened and endangered species; climate change; visual resources; natural areas, parks, and recreation; cultural resources; utilities and service systems; safety; and socioeconomics are not included in this analysis as these resources are either not adversely affected, or the effects are considered to be negligible or beneficial. Primary resource categories specifically considered in this cumulative impacts assessment include

groundwater, surface water, floodplains, wetlands, air quality, hazardous materials and solid and hazardous waste, transportation, noise, and environmental justice.

3.20.2. Geographic Area of Analysis

The appropriate geographic area over which past, present, and future actions could reasonably contribute to cumulative impacts is variable and dependent on the resource evaluated. The cumulative impact analysis is based on the resources of potential concern and the geographic area in which potential adverse impacts from site-specific activities have the potential to alter (degrade) the quality of the regional environmental resources. For air quality, the geographic area is the county. Based upon the defined list of resources potentially affected by cumulative impacts, the following geographic areas were considered appropriate for consideration in this analysis:

1. Lands within Muhlenberg and Ohio counties in the vicinity of PAF. This geographic area provides an appropriate framework for the consideration of potential cumulative impacts to terrestrial vegetation. This geographic area includes the 10-mile radius within Muhlenberg and Ohio counties and encompasses lands on the PAF decontamination and deconstruction project area and near offsite areas proposed for use as laydown during construction.

2. Lands and associated resources within two miles surrounding PAF. This geographic area contains water resources (surface water and groundwater) and aquatic resources potentially impacted by runoff from decontamination and deconstruction activities at PAF.

3. Regional landfills. This geographic area encompasses regional landfills that may accept solid and/or hazardous wastes associated with potential future actions. This geographic area extends for a distance of 30 miles (reasonable trucking distance) and includes established permitted landfills.

4. Surrounding environmental justice communities. This geographic area encompasses identified low-income and minority populations within a five-mile radius of PAF that may be subject to effects from multiple actions. Such actions may include the transport of demolition debris through environmental justice communities.

3.20.3. Identification of "Other Actions"

3.20.3.1. Construction of the Paradise NGCC Plant

TVA constructed and is operating the Paradise NGCC plant located on the PAF reservation just north of the coal units. The NGCC facility became operational in April 2017 and is comprised of three combustion turbines, three triple-pressure heat recovery steam generators with supplemental duct-firing, and a steam turbine (TVA 2020c). The plant has a generating capacity of 1,100 MW. Construction of this facility also included construction of a new gas pipeline lateral connecting the plant to an existing gas interstate pipeline that has adequate transportation capacity to supply the plant (TVA 2013).

3.20.3.2. Retirement of PAF

TVA retired Units 1 and 2 in April 2017 and replaced their generation with the Paradise NGCC plant mentioned above. Unit 3 ceased operation in February 2020. Virtually all coal

unit operational measures were discontinued, and the coal plant is currently subject to basic care and maintenance measures. Primary operational measures that were discontinued include daily coal barge operations, coal pile management, pumping and use of water from the Green River for condenser cooling, and thermal discharges to the Green River. The plant has discontinued the discharge of fly ash and bottom ash to designated wet impoundment areas. Routine plant deliveries have also been discontinued. Employment at the plant has been reduced.

3.20.3.3. Other Actions

Past, present, and reasonably foreseeable future actions (RFFAs) that are appropriate for consideration in this cumulative analysis are listed in Table 3-14. These actions were identified within the geographic area of analysis as having the potential to, in aggregate, result in larger and potentially adverse impacts to the resources of concern.

Table 3-14. Summary of Other Past, Present, or Reasonably Foreseeable Future Actions in the Vicinity of the Proposed Action

Action	Description	Project Type
Closure of Units 1 and 2	TVA closed Units 1 and 2 in April 2017.	Past
Paradise NGCC Plant	NGCC plant located on the PAF reservation that became operational in April 2017 with a generating capacity of 1,100 MW.	Past
Closure of Unit 3	TVA closed Unit 3 in February 2020.	Past
Closure of Ash Disposal Areas	Described in PAF CCR Management Operations EA (TVA 2017).	Present
Wendell H. Ford Western Kentucky Pkwy Improvements at Exit 58	Proposed construction of a diamond interchange at Exit 58, approximately 10 miles northwest of PAF (Central City 2020).	RFFA
Exit 58 Business Park	Proposed 3,500-acre business park with rail accessibility located immediately off Exit 58, approximately 10 miles northwest of PAF (Central City 2020).	RFFA
Future Redevelopment of the PAF Site	Potential redevelopment of the PAF Site, allowing for future industrial or other economically beneficial use.	RFFA
Paradise Combustion Turbine	Potential construction of three Frame Combustion Turbines (250 MW each) and associated transmission infrastructure.	RFFA

Actions that are listed as having a timing that is “past” or “present” inherently have environmental impacts that are integrated into the base condition for each of the resources analyzed in this chapter. However, these actions are included in this discussion to provide for a more complete description of their characteristics. Actions that are not reasonably foreseeable are those that are based on mere speculation or conjecture, or those that have only been discussed on a conceptual basis.

3.20.4. Analysis of Cumulative Effects

To address cumulative impacts, the existing affected environment surrounding the project area was considered in conjunction with the environmental impacts presented in Chapter 3. These combined impacts are defined by the CEQ as “cumulative” in 40 CFR Section 1508.7 and may include individually minor, but collectively significant actions taking place over a period of time. The potential for cumulative effects to the identified environmental resources of concern are analyzed below for Alternative A.

3.20.4.1. Groundwater

As described in Section 3.2, groundwater quality within the vicinity of PAF is generally of good quality with selected areas of localized exceedances of the GWPS for arsenic. Activities associated with the RFFAs listed in Table 3-14 also have the potential to affect groundwater. However, for many of these potential actions, implementation of the proper BMPs would minimize the impacts to groundwater. Therefore, the cumulative impacts of the proposed action on groundwater would be minor.

3.20.4.2. Surface Water

The closure of the impoundment systems and outfalls have been addressed in past NEPA and regulatory communications; however, anything that has yet to be addressed would be addressed in future subsequent NEPA documents. Surface water runoff associated with demolition and construction activities could occur under the proposed action. Similar impacts could be anticipated from construction activities associated with the RFFAs listed in Table 3-14. If proper BMPs are implemented and stormwater discharges comply with KPDES permit limits, cumulative impacts of the proposed action on surface water via runoff would be negligible. There is a potential for cumulative impacts to surface water quality if the facility is not properly maintained which could allow hazardous waste and other potential pollutants from the facility to enter surface waters if the structures deteriorated. The intake and discharge tunnels have the potential to impact surface water quality if not properly maintained or removed. Mitigation measures would be implemented as needed to ensure the discharges from the site would have no significant impacts on the receiving stream water quality.

3.20.4.3. Floodplains

Potential cumulative impacts could include light industrial or commercial development of various parcels comprising the PAF property. Development of parcels that contain floodplains and floodplains resources would be subject to environmental review under NEPA. At that time, TVA would consider potential impacts to floodplains and floodplain resources on the affected parcels.

3.20.4.4. Wetlands

As described in Section 3.5, implementation of the proposed action would result in impacts to the 0.55-acre Wetland 3, located near the cooling towers. Activities associated with the RFFAs listed in Table 3-14 also have the potential to affect wetlands. However, for many of these potential actions, implementation of the proper BMPs would minimize the impacts to wetlands. Wetland impacts would be minimal when viewed in the context of wetland resources within the surrounding five miles, impacting less than 0.1 percent of wetlands within the region.

3.20.4.5. Air Quality

The geographic reference area for air quality is Muhlenberg County, Kentucky. It is expected that emissions would continue from local vehicles. By comparison, the recent shutdown of PAF has resulted in significant reductions in air emissions that represents a benefit to regional air quality conditions.

Air emissions associated with demolition activities under the proposed action would also result in an increase in local emissions and fugitive dust. As described in Section 3.10, emissions from equipment and vehicle use is expected to be short-term and minor. In

addition, fugitive dust emissions associated with demolition activities would be mitigated through the use of BMPs, such as water suppression for dust control and regular inspections and maintenance of construction vehicles. The cumulative impact of the demolition activity emissions, when combined with the ongoing emissions from local vehicles, would incrementally increase emissions local to PAF under the proposed action, but such increases would not be notable on a regional scale. If the RFFAs occur at the same time as the proposed project, there would be potential for short-term and minor impacts to air quality. However, exceedances of applicable ambient air quality standards are not expected. Therefore, the cumulative impacts of the proposed action on air quality would not adversely affect regional air quality.

3.20.4.6. Hazardous Materials and Solid and Hazardous Waste

Under the proposed action, demolition debris and hazardous wastes would be hauled by truck to a landfill designed to receive such wastes. Due to the temporary nature of the operations and the use of permitted disposal facilities, along with trained and experienced contractors and personnel, environmental impacts from waste handling and disposal are not anticipated. RFFA construction activities in the immediate vicinity, identified in Table 3-14 would also have the potential to contribute waste to permitted disposal facilities in the region. Because there are permitted landfills in the vicinity of PAF that have sufficient capacity for large volumes of solid waste, and because large volumes of materials are expected to be recycled, the cumulative impact from the proposed project on local or regional landfill capacity is anticipated to be negligible.

3.20.4.7. Transportation

The RFFAs such as the closure of ash disposal areas, Wendell H. Ford Western Kentucky Parkway improvements at Exit 58, and Exit 58 Business Park would contribute to additional traffic volumes on the local transportation network. The number of trucks associated with the transport of debris from PAF deconstruction, added to the number of trucks required to remove CCR from impoundments at PAF, as well as any construction vehicles associated with the RFFAs identified in Table 3-14, could result in a large number of trucks entering and exiting the facility on a daily basis. This could lead to cumulative impacts associated with congestion along adjacent arterial roadways and possibly on KY 176, US 431, and Wendell H. Ford Western Kentucky Parkway. TVA would mitigate congestion in the vicinity of PAF with a traffic plan, as needed. Possibilities include staging of trucks, spacing logistics, or timing truck traffic to occur during lighter traffic hours (such as not in the morning or afternoon commute hours). With implementation of these mitigation measures, cumulative impacts of the proposed action to transportation would be moderate.

Future development at the proposed Exit 58 Business Park would add additional traffic volume to surrounding roadways. However, it is anticipated that the traffic volumes generated by future industrial development would be similar to current operations and would not impact level-of-service of the surrounding roadways. Therefore, there would be no cumulative impact to transportation associated with future development.

3.20.4.8. Noise

Implementation of the RFFAs have the potential to contribute to additional noise impacts associated with construction activities. It is likely that some of the low-income population communities would be along the routes taken during these construction activities. If these activities occur concurrently with the transport of demolition debris, the cumulative impacts

of the proposed action on noise emissions have the potential to moderately affect sensitive noise receptors.

3.20.4.9. Environmental Justice

Two of the three census tracts comprising the study area (CT 9601 and CT 9607) have higher percentages of low-income populations as compared to the state. Given the distance of these communities from PAF, there is a potential that these communities would be indirectly impacted due to an increase in traffic, noise, exposure to fugitive dust, and exhaust emissions from the trucks used to transport demolition debris. It is also likely that some of these communities would be along the routes taken during construction activities for other planned construction projects within the vicinity of PAF.

Because these short-term actions are potentially coincident, potential cumulative impacts may be expected to occur on a local basis. Therefore, the cumulative impacts of the proposed action on noise and dust emissions within low-income and minority communities have the potential to represent a moderate increase in impacts to environmental justice populations, if these activities occur concurrently with other construction activities in the geographic area. Such physical impacts associated with the transport of demolition debris (i.e., noise, dust) would be mitigated through BMPs identified in Section 2.3.2. These impacts would also be temporary occurring during the construction periods of these projects.

3.21. Unavoidable Adverse Environmental Impacts

Unavoidable adverse impacts are the effects of the proposed action on natural and human resources that would remain after mitigation measures or BMPs have been applied. Mitigation measures and BMPs are typically implemented to reduce a potential impact to a level that would be below the threshold of significance as defined by the CEQ and the courts. The proposed action would not cause any unavoidable adverse environmental impacts.

3.22. Relationship of Short-Term Uses and Long-Term Productivity

All buildings and structures within the proposed demolition boundary would be decontaminated and demolished to grade or to the top of the mooring cells. In the long-term, the site could become productive if commercial or industrial facilities were to be established, thereby producing employment opportunities and tax revenue and enhancing long-term productivity of the site.

3.23. Irreversible and Irretrievable Commitments of Resources

An irreversible or irretrievable commitment of resources would occur when resources would be consumed, committed, or lost because of the project. The commitment of resources would be irreversible if the project started a process (chemical, biological, or physical) that could not be stopped. Similarly, commitment of a resource would be considered irretrievable when the project would directly eliminate the resource, its productivity, or its utility for the life of the project and possibly beyond. Resources required by decontamination and deconstruction activities, including labor and fossil fuels, would be irretrievably lost. Nonrenewable fossil fuels would be irretrievably lost through the use of gasoline and diesel-powered equipment during construction. However, it is unlikely that their limited use in these projects would adversely affect the overall future availability of these resources.

CHAPTER 4 – LIST OF PREPARERS

4.1. NEPA Project Management

Carol Freeman, PG (TVA)
Education: M.S., Geological Sciences; B.S., Geology
Experience: 11 years in NEPA compliance
Project Role: NEPA Specialist

Charles P. Nicholson, PhD (HDR)
Education: Ph.D., Ecology and Evolutionary Biology; M.S., Wildlife Management; B.S., Wildlife and Fisheries Science
Experience: 24 years in NEPA Compliance, 17 years in wildlife and endangered species management
Project Role: NEPA Compliance, Technical Advisor, QA/QC

Ashley Pilakowski (TVA)
Education: B.S., Environmental Management
Experience: 8 years in environmental planning and policy and NEPA compliance
Project Role: TVA Project Manager, TVA NEPA Coordinator, NEPA Compliance

Erica Wadl (HDR)
Education: M.S., Forestry; B.S., Biology
Experience: 13 years in environmental permitting, land management, and NEPA compliance
Project Role: HDR Project Manager

4.2. Other Contributors

Steve Cole (TVA)
Education: Ph.D., M.A., and B.A., Anthropology
Experience: 32 years in Archaeology and Cultural Resources Management
Project Role: Cultural Resources

Rebecca Colvin (HDR)
Education: M.A., and B.A., English
Experience: 23 years in NEPA compliance and socioeconomic analysis
Project Role: Socioeconomics and Environmental Justice

Mark P. Filardi, P.G. (HDR)
Education: M.S., and B.S., Geology
Experience: 20 years in hydrogeology and contaminated site assessment & remediation
Project Role: Geology/Groundwater and Hazardous Materials/Solid and Hazardous Waste

Elizabeth B. Hamrick (TVA)
Education: M.S., Wildlife and B.S. Biology
Experience: 17 years conducting field biology, 12 years technical writing, 8 years compliance with NEPA and ESA
Project Role: Terrestrial Ecology (Animals), Terrestrial Threatened and Endangered Species

Hallie Hearnes (TVA)
Education: M.A. in Public History, B.S. in Historic Preservation
Experience: 7 years of experience in cultural resource management as an architectural historian 1 year in cultural compliance (Section 106/110 of the NHPA); 4 years in research
Project Role: Cultural Resources

Connor Mikre (HDR)
Education: B.S., Sustainable Systems Management
Experience: 2 years in air dispersion analysis and air quality permitting
Project Role: Air Quality and Climate Change

Robert Mull (HDR)
Education: B.S., Geology
Experience: 4 years in environmental geology, including Phase I Environmental Site Assessments, contaminated site investigations, and geologic/hydrogeologic site characterization
Project Role: Geology/Groundwater and Hazardous Materials/Solid and Hazardous Waste

Al Myers (HDR)
Education: Completed credits toward B.S., Business Administration
Experience: 23 years in administration
Project Role: Formatting/editing of EA

Craig L. Phillips (TVA)
Education: M.S., and B.S., Wildlife and Fisheries Science
Experience: 11 years sampling and hydrologic determination for streams and wet-weather conveyances, 9 years in environmental reviews
Project Role: Aquatic Ecology, Threatened and Endangered Species

Kim Pilarski-Hall (TVA)
Education: M.S., Geography, Minor Ecology
Experience: 26 years in wetlands assessment, delineation, and mitigation
Project Role: Wetlands

Karsen Schottleutner (HDR)
Education: M.S., Coastal, Marine, and Wetland Studies; B.S., Environmental Science
Experience: 3 years in Stream and Wetland Delineation and Threatened and Endangered Species
Project Role: Wetlands and Vegetation

Miles Spenrath (HDR)

Education:	B.S., Environment and Natural Resources
Experience:	8 years in NEPA compliance
Project Role:	NEPA Lead, Land Use/Prime Farmland, Transportation, Noise, Visual Resources, Natural Areas/Parks/Recreation, Utilities/Service Systems, Safety, Document Preparation, GIS Mapping

Blair Wade (HDR)

Education:	M.E.M., Environmental Management; B.S., Integrated Sciences and Technology (Environmental Science and GIS)
Experience:	15 years in regulatory compliance, NEPA documentation, and mitigation planning species management
Project Role:	Technical Advisor, QA/QC

A. Chevales Williams (TVA)

Education:	B.S., Environmental Engineering
Experience:	15 years of experience in water quality monitoring and compliance; 14 years in NEPA planning and environmental services
Project Role:	Surface Water

Carrie Williamson, P.E., CFM (TVA)

Education:	M.S., and B.S., Civil Engineering
Experience:	7 years of experience in floodplains, 3 years in river forecasting, and 7 years in compliance monitoring
Project Role:	Floodplains

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CHAPTER 5 – ENVIRONMENTAL ASSESSMENT RECIPIENTS

5.1. Federal Agencies

- U.S. Army Corps of Engineers, Louisville District
- U.S. Fish and Wildlife Service

5.2. State Agencies

- Kentucky Department for Environmental Protection
- Kentucky Department for Energy Development and Independence
- Kentucky Department of Natural Resources
- Kentucky Energy and Environment Cabinet
- Kentucky Heritage Council
- Kentucky Fish and Wildlife
- Kentucky State Clearinghouse
- Kentucky State Historic Preservation Officer
- Natural Resources Conservation Service

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CHAPTER 6 – LITERATURE CITED

Academy of Natural Sciences of Philadelphia. 1962. Green River Survey 1961 River Survey Report for the Tennessee Valley Authority. Prepared for The Tennessee Valley Authority. 44pp + appendices.

_____. 1966. Green River Survey 1965 River Survey Report for the Tennessee Valley Authority. Prepared for The Tennessee Valley Authority. 58pp + appendix.

Bailey, R. G. 1995. Description of the Ecoregions of the United States. United States Department of Agriculture, Forest Service, Miscellaneous Publication 1391.

Berglund, B., and T. Lindvall. 1995. Community Noise. Available at http://www.nonoise.org/library/whonoise/whonoise.htm#4.2.2.2.

Brady, J., T. H. Kunz, M.D. Tuttle and D. Wilson. 1982. Gray bat recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado. 143 pp.

Butchkoski, C. M., and J. D. Hassinger. 2002. Ecology of a maternity colony roosting in a building. In Kurta, A. and J. Kennedy, eds. The Indiana Bat: Biology and Management of an Endangered Species. Bat Conservation International, Austin, Texas.

Caltrans. 2020. Transportation and Construction Vibration Guidance Manual. Available at https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf.

Carey, D. I., and J. F. Stickney. 2004. Groundwater Resources of Muhlenberg County, Kentucky. Kentucky Geological Survey. County Report 89, Series XII. Available at http://www.uky.edu/KGS/water/library/gwatlas/Muhlenberg/Muhlenberg.htm.

Center for Medicaid and CHIP Services. 2020. Medicaid and CHIP in Kentucky. Available at https://www.medicaid.gov/state-overviews/stateprofile.html?state=Kentucky.

Central City. 2020. Exit 58 Business Park Economic Booklet. Available at https://irp-cdn.multiscreensite.com/fd1a1504/files/uploaded/Exit%2058%20booklet%20Economic.pdf.

Cornell Lab of Ornithology. 2019. All About Birds. Cornell Lab of Ornithology, Ithaca, New York. Available at https://www.allaboutbirds.org.

Council of Environmental Quality (CEQ). 1997. Environmental Justice: Guidance under the National Environmental Policy Act. Council of Environmental Quality, Executive Office of the President. Available at https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf

Cowardin, L., Carter, V., Golet, F., and LaRoe, E. 1979. Classification of Wetland and Deepwater Habitats of the United States. Washington, D.C.: U.S. Fish and Wildlife Publication FWS/OBS-79/31.

Duvaul, R. W., and B. W. Maxwell. 1962. Availability of Ground Water in McLean and Muhlenberg Counties, Kentucky. U.S. Geological Survey Hydrologic Investigations Atlas HA-29. Available at http://www.uky.edu/KGS/water/library/gwatlas/Muhlenberg/GWavailability.htm.

Executive Order (EO) 11988, Floodplain Management, FR Vol. 42, No. 101 (1977). Wednesday, May 25, 1977. pp. 26951-26957.

Federal Highway Administration (FHWA). 2017. Construction Noise Handbook. Available at https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm.

Federal Transit Administration (FTA). 2006. Transit Noise and Vibration Impact Assessment. Available at https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf.

Fenneman, N. M. 1938. Physiography of the eastern United States. McGraw–Hill, New York.

Gibbons, W. and M. Dorcas. 2005. Snakes of the Southeast. University of Georgia Press, Athens, Georgia, 253 pp.

Greene, James N., Duane Simpson, and Richard J. Stallings. 2014. *Phase I Archaeological Survey, Paradise FP 161kV Transmission Line Feeds to New Combined Cycle Plant, Muhlenberg County, Kentucky*. Prepared by Amec Foster-Wheeler, Lexington, Kentucky. Prepared for Tennessee Valley Authority, Knoxville, Tennessee.

Gunier, W. J., and W. H. Elder. 1971. Experimental homing of gray bats to a maternity colony in a Missouri barn. American Midland Naturalist 86(2): 502-506.

Harvey, M. J. 1992. Bats of the eastern United States. Arkansas Game and Fish Commission, Little Rock, Arkansas. 46 pp.

Homer, C. G., Dewitz, J. A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N. D., Wickham, J. D., and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing 81(5): 345-354.

Hunter, John. 2016. *Phase I Archaeological Survey, TVA Paradise Fossil Plant, Sites 2, 3, and 5, Muhlenberg County, Kentucky*. Prepared by Amec Foster-Wheeler, Lexington, Kentucky. Prepared for Tennessee Valley Authority, Knoxville, Tennessee.

Karpynec, Ted. 2013. *Architectural Assessment of the Proposed Improvements to the TVA Paradise Fossil Plant*. Prepared by Tennessee Valley Archaeological Research, Huntsville, Alabama. Prepared for Tennessee Valley Authority, Knoxville, Tennessee.

Kehn, T. M. 1973. Sturgis Formation (Upper Pennsylvanian), A New Map Unit in the Western Kentucky Coal Field, Contributions to Stratigraphy. Geological Survey Bulletin 1394-B.

Kentucky Department of Fish and Wildlife Resources (KDFWR). 2020a. Peabody WMA Eastern Units. Available at http://fw.ky.gov/More/Documents/PeabodyAll.pdf.

_____. 2020b. Kentucky Fishing and Boating Access Sites. Green River – Lower. Available at https://app.fw.ky.gov/fisheries/waterbodydetail.aspx?wid=341.

Kentucky Division of Conservation. 2012. Green River CREP. Division of Conservation, Frankfort, Kentucky. Available at https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/State-Offices/Kentucky/pdfs/crep2012annualreport.pdf.

Kentucky Energy and Environment Cabinet (EEC). 2015. 2014 Integrated Report to Congress on the Condition of Water Resources in Kentucky. Volume I. 305(b) Assessment Results with Emphasis on the Green River – Tradewater River Basin Management Unit and Statewide Update. Available at https://eec.ky.gov/Environmental-Protection/Water/Monitor/Integrated%20Report%20Docs/2014%20IR%20Volume%20I.pdf.

_____. 2018. 2016 Integrated Report to Congress on the Condition of Water Resources in Kentucky. 303(d) List of Surface Waters. Available at https://eec.ky.gov/Environmental-Protection/Water/Monitor/Integrated%20Report%20Docs/2016%20Integrated%20Report.pdf.

Kentucky Geological Survey. 2016. Karst Occurrence in Kentucky. Kentucky Geological Survey. Retrieved from http://kgs.uky.edu/kgsweb/olops/pub/kgs/mc33_12.pdf.

Kentucky Pollutant Discharge Elimination System (KPDES). 2020. KPDES permit number KY0004201. September 1, 2020.

Kentucky Transportation Cabinet (KYTC). 2020. Traffic Counts. Available at https://maps.kytc.ky.gov/trafficcounts/.

Kurta, A, S. W. Murray, and D. H. Miller. 2002. Roost selection and movements across the summer landscape. In Kurta, A. and J. Kennedy, eds. The Indiana Bat: Biology and Management of an Endangered Species. Bat Conservation International, Austin, Texas.

National Geographic. 2002. Field Guide to the Birds of North America (Fourth Edition). National Geographic Society, Washington D.C. 480 pp.

NatureServe. 2020. NatureServe Explorer 2.0: An online encyclopedia of life [web application]. NatureServe, Arlington, Virginia. Available at https://explorer.natureserve.org/.

North Carolina Division of Water Quality (NC DWQ). 2005. Identification of Methods for the Origins of Intermittent and Perennial Streams, Version 3.1. North Carolina Department of Environment and Natural Resources, Division of Water Quality. Raleigh, NC.

Powell, R., R. Conant, and J. T. Collins. 2016. Field Guide to Reptiles and Amphibians of Eastern and Central North America (Fourth Edition). Peterson Field Guide, Houghton Mifflin Harcourt, Boston, Massachusetts. 494 pp.

Protec. 2013. Vibration Monitoring Plan and Impact Calculation Study: ASARCO Concrete Stack Demolition, El Paso, Texas. March 21, 2013. Prepared for Brandenburg Industrial Service Co., Chicago, Illinois.

Pruitt, L., and L. TeWinkel. 2007. Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, MN. 258 pp.

Purdue University. 2000. Noise Sources and Their Effects. Department of Chemistry, West Lafayette, Indiana. Available at https://www.chem.purdue.edu/chemsafety/Training/PPETrain/dblevels.htm.

Reinking, D. L., D. A. Weidenfeld, D. H. Wolfe, and R. W. Rohrbaugh. 2000. Distribution, Habitat Use, and Nesting Success of Henslow's Sparrow in Oklahoma. Prairie Naturalist, 32(4): 219-232.

Simpson, Duane. 2014. *Phase I Archaeological Survey of TVA's Paradise Combined Cycle Project Barge Roll-Off Improvement Site, Muhlenberg County, Kentucky*. Report prepared by Amec Foster Wheeler, Inc., Lexington, Kentucky. Prepared for Tennessee Valley Authority, Knoxville, Tennessee.

Siskind, D. E., Stagg, M. S., Kipp, J. W., and Dowding, C. H. 1980. Structure Response and Damage Produced by Ground Vibration from Surface Mine Blasting. Report of Investigations 8507, U.S. Bureau of Mines.

Stantec. 2009. Report of Phase 1 Facility Assessment, Coal Combustion Product Impoundments and Disposal Facilities, Various Locations, Kentucky.

_____. 2011. Report of Phase 1B Landfill Siting Study Scrubber Sludge Complex, Paradise Fossil Plant Muhlenberg County, Kentucky. October 2011.

Starn, J. J., R. W. Forbes, C. J. Taylor, and M. F. Rose. 1993. Geohydrology of Parts of Muhlenberg, Ohio, Butler, McLean, Todd, and Logan Counties, Kentucky. U.S. Geological Survey Water Resources Investigations Report 93-4077.

Tennessee Valley Authority (TVA). 1964. The *Paradise Steam Plant: A Report on the Planning, Design, Construction, Costs, and First Power Operations of the Initial Two-Unit Plant*. Technical Report No. 37. Tennessee Valley Authority, Knoxville, Tennessee.

_____. 1979. *The Paradise Steam Plant: A Report on the Planning, Design, Construction, Costs, and First Power Operations of the One-Unit Addition*. Technical Report No. 39. Tennessee Valley Authority, Knoxville, Tennessee.

_____. 1981. Class Review of Repetitive Actions in the 100-Year Floodplain, FR Vol. 46, No. 76—Tuesday, April 21, 1981. pp. 22845-22846.

_____. 1995. Energy Vision 2020, Volume Two, Technical Documents, Integrated Resource Plan Environmental Impact Statement, December 1995. Technical Document 1, Section 4: Water Resources.

_____. 1998. Jacobs Creek Bioassessment Report – Paradise Steam-Electric Plant. Resource Group, Water Management. Chattanooga, Tennessee. 47 pages.

_____. 2004. Paradise Fossil Plant Disposal of Coal Wash Fines Supplemental Environmental Assessment. Muhlenberg County, Kentucky. April 2004.

_____. 2008. Unionid Mussel and Habitat Survey of the Green River at a Proposed Dredge Site near the Paradise Fossil Plant. Muhlenberg County and Ohio County, Kentucky. Unpublished Report, CEC No. 18747.

_____. 2009. Entrainment and Impingement of Fish at Paradise Fossil Plant during 2006 through 2008. Biology and Water Resources, 39pp.

_____. 2012. Biological Monitoring of the Green River in the Vicinity of Paradise Fossil Plant during November 2011. Tennessee Valley Authority, Biological and Water Resources. Chattanooga, Tennessee. November 2012.

_____. 2013. Paradise Fossil Plant Units 1 and 2 Mercury and Air Toxics Standards Compliance Project Environmental Assessment. Muhlenberg County, Kentucky. November 2013. Available at https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/Paradise-Fossil-Plant-Units-1-and-2-Mercury-Air-Toxics-Standards-Compliance-Project.

_____. 2016. Ash Impoundment Closure Environmental Impact Statement. Anderson County, Tennessee. June 2016. Available at https://www.tva.com/Environment/Environmental-Stewardship/Environmental-Reviews/Closure-of-Coal-Combustion-Residual-Impoundments.

_____. 2017. Paradise CCR Management Operations Environmental Assessment. Muhlenberg County, Kentucky. June 2017. Available at https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/Management-of-Coal-Combustion-Residuals-from-the-Paradise-Fossil-Plant.

_____. 2019a. Final 2019 Integrated Resource Plan and Final Supplemental Environmental Impact Statement. Available at https://www.tva.gov/Environment/Environmental-Stewardship/Integrated-Resource-Plan.

_____. 2019b. Potential Paradise Fossil Plant Retirement Final Environmental Assessment. Available at https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/Potential-Retirement-of-Paradise-Fossil-Plant.

_____. 2019c. Assessment of Corrective Measures TVA Paradise Fossil Plant, Drakesboro, Kentucky. Available at https://ccr.tva.gov/Plants/PAF/Surface%20Impoundment%20-%20Peabody%20Ash%20Pond/Groundwater%20Monitoring/Corrective%20Measures/257-96(d)_Corrective%20Measures%20Assessment_PAF_Peabody%20Ash%20Pond.pdf.

_____. 2020a. Email from Stacey McCluskey (TVA) to Erica Wadl (HDR) regarding an information request for estimated cubic yards of demolition debris, ACM, and scrap metal. August 13, 2020.

_____. 2020b. TVA Natural Heritage Database. Data Received June 2020.

_____. 2020c. Paradise Combined Cycle Plant. Available at https://www.tva.com/energy/our-power-system/natural-gas/paradise-combined-cycle-plant.

Tuttle, M. D. 1976a. Population ecology of the gray bat (*Myotis grisescens*): philopatry, timing, and patterns of movement, weight loss during migration, and seasonal adaptive strategies. Occasional Papers of the Museum of Natural History, University of Kansas, 54:1-38.

_____. 1976b. Population ecology of the gray bat (*Myotis grisescens*): factors influencing growth and survival of newly volant young. Ecology 57: 587-595.

U.S. Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetlands Delineation Manual. Available at https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/4530.

_____. 2011. Louisville District – Green River Navigation Charts, Chart No. 43. Available at https://www.lrl.usace.army.mil/Portals/64/docs/Ops/Navigation/Charts/Green/GreenCharts41-46.pdf.

_____. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0), ed. J.F. Berkowitz, J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-12-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center. Available at https://usace.contentdm.oclc.org/utils/getfile/collection/p266001coll1/id/7607.

U.S. Census Bureau (USCB). 2018. State & County QuickFacts – Muhlenberg County, Kentucky. Available at https://www.census.gov/searchresults.html?searchType=web&cssp=SERP&q=Muhlenberg%20County,%20KY.

_____. 2020. Explore Census Data. [Online Database]. Available at https://data.census.gov/cedsci/.

U.S. Department of Energy. 2006. Emissions of Greenhouse Gases in the United States 2005. Office of Integrated Analysis and Forecasting, November 2006.

U.S. Environmental Protection Agency (EPA). 1974. Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety, EPA-550/9-74-004, Washington, D.C. Available at http://nepis.epa.gov/Exe/ZyNET.exe/2000L3LN.TXT?ZyActionD=ZyDocument&Client=EPA&Index=Prior+to+1976&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C70thru75%5CTxt%5C00000001%5C2000L3LN.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL#area.

_____. 1995. AP-42 Compilation of Air Pollutant Emission Factors, Volume I – Stationary Point and Area Sources – 5th Edition. Office of Transportation and Air Quality, January 1995.

_____. 2015. Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category. Available at https://www.federalregister.gov/documents/2015/11/03/2015-25663/effluent-limitations-guidelines-and-standards-for-the-steam-electric-power-generating-point-source.

_____. 2016. National Ambient Air Quality Standards (NAAQS). Available at https://www.epa.gov/criteria-air-pollutants/naaqs-table. Updated December 20, 2016.

_____. 2018. Kentucky Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants, EPA Green Book. Available at https://www3.epa.gov/airquality/greenbook/anayo_ky.html.

U.S. Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. Available at http://www.fws.gov/northeast/ecologicalservices/pdf/NationalBaldEagleManagementGuidelines.pdf.

_____. 2013. Bald and Golden Eagle Protection Act. Available at http://www.fws.gov/northeast/ecologicalservices/eagleact.html.

_____. 2014. Northern Long-eared Bat Interim Conference and Planning. Available at https://www.fws.gov/northeast/virginiafield/pdf/NLEBinterimGuidance6Jan2014.pdf.

_____. 2020. IPaC Resource List. Available at https://ecos.fws.gov/ipac/location/index.

U.S. Forest Service (USFS). 1995. Landscape Aesthetics, A Handbook for Scenery Management. Available at https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5412126.pdf.

U.S. Geologic Survey (USGS). 2001. Contributions to the Geology of Kentucky. Available at https://pubs.usgs.gov/pp/p1151h/structure.html.

U.S. Water Resources Council. 1978. Guidelines for Implementing Executive Order 11988, Floodplain Management. FR Vol. 43, No. 29—Friday, February 10, 1978. pp. 6030-6054.

Whitaker, J. O. 1996. Field guide to North American Mammals. National Audubon Society. Alfred A. Knopf, New York, 937pp.

Woods, A. J., Omernik, J. M., Martin, W. H., Pond, G. J., Andrews, W. M., Call, S. M., Comstock, J. A., and Taylor, D. D. 2002. Ecoregions of Kentucky (color poster with map, descriptive text, summary tables, and photographs): Reston, VA., U.S. Geological Survey (map scale 1:1,000,000).

APPENDIX A – TVA PAF WILDLIFE AND VEGETATION ASSESSMENT

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Wildlife and Vegetation Assessment

Paradise Fossil Plant
Decontamination & Deconstruction

Muhlenberg County, KY

September 4, 2020

Prepared for: Tennessee Valley Authority

Prepared by: HDR Engineering, Inc.

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Introduction

The Tennessee Valley Authority's (TVA) Paradise Fossil Plant (PAF) is located in Muhlenberg County in western Kentucky, approximately 35 miles northwest of Bowling Green and 95 miles southwest of Louisville. The plant is on a large reservation of approximately 3,400 acres located on the west bank of the Green River near the former community of Paradise and about eight miles southeast of Central City (Figure 1 and Figure 2).

PAF was originally constructed with two coal-fired cyclone generation units. Each of these units, known as Unit 1 and 2, had a generating capacity of 704 megawatts (MW) and went on-line in 1963. A third unit, Unit 3, became operational in 1970 with a capacity of 1,150 MW. Combined, the three units had a generating capacity of 2,558 MW and could produce more than 14 billion kilowatt hours of electricity each year, enough to supply more than 950,000 homes. Each unit also had an associated large natural-draft cooling tower. PAF is TVA's only coal-fired power plant with cooling towers. In order to comply with the United States (U.S.) Environmental Protection Agency (EPA) 2010 Mercury and Air Toxics Standards (MATS), TVA retired Units 1 and 2 in April 2017 and replaced their generation with a new 1,100-MW natural gas-fired combined-cycle (NGCC) plant located on the PAF reservation just north of the coal units. Unit 3 ceased operation in February 2020.

TVA entered into a Federal Facilities Compliance Agreement (FFCA) with the EPA that resolved a dispute over how the Clean Air Act's (CAA) New Source Review program applied to maintenance and repair activities at TVA's coal-fired power plants. TVA also entered into a judicial consent decree with the States of Alabama, Kentucky, Tennessee, and North Carolina, and three environmental advocacy groups - (1) the Sierra Club, (2) the National Parks Conservation Association, and (3) Our Children's Earth Foundation. The consent decree is substantively similar to the FFCA. These agreements (collectively called the "EPA Agreements") require TVA to reduce emissions across its coal-fired generating system and take other actions at its coal plants, including retiring some of its units (including PAF Units 1 and 2). Subsequently, PAF Unit 3 was retired due to repair and maintenance costs. The EPA Agreements do not affect the operation of the NGCC plant.

TVA is investigating options for the future disposition of PAF including securing and maintaining the plant, deconstructing/demolishing the plant, or leaving the plant as is and taking no actions. Securing and maintaining the plant entails de-energizing the plant and placing it in an "idle and vacant" status during which basic maintenance is continued to prevent safety and environmental issues. The project area includes the buildings and structures located within the approximately 395-acre decontamination and deconstruction project area boundary. TVA has also identified five areas proposed for use as temporary laydown areas during construction.

On August 3 through August 6, 2020, HDR conducted a field survey following TVA's *Guidelines for Conducting Biological and Cultural Surveys and Impact Analysis* to map vegetation and identify potential habitat for federally and state-listed threatened and endangered species within the project Study Area.

Vegetation Field Survey

Methods

A field survey of the Study area of the 395-acre decontamination and deconstruction boundary including five temporary laydown areas was conducted on August 3 through August 6, 2020. This study delineated the PAF property for any streams and wetlands, and also examined all on-site structures for any evidence of species presence.

Based on a desktop review and previous site reconnaissance of the proposed decontamination and deconstruction project area and laydown areas, no unique plant communities are present within these areas. Vegetation within these disturbed areas has been managed to maintain its open condition and, as a result, it is dominated by mowed turf grasses and ruderal/early successional non-native and weedy herbaceous species.

Results

Most of the PAF project area is comprised of developed areas (Figure 3). As summarized in Table 1, the National Land Cover Database (NLCD) indicates that land use/land cover within the project area and laydown areas are dominated by developed land and barren land (project area: 26%), as well as undeveloped land with vegetative cover types including: hay/pastures (project area: 13.85%; laydown areas: 26.05%), open water (project area: 24.83%; laydown areas: 8.16%), and cultivated crops (project area: 7.94%; laydown areas: 3.95%). Developed and barren lands in the project area and laydown areas are associated with the industrial uses and driveways of the PAF facilities (Table 1). Many impervious road surfaces are found throughout the project area and laydown areas. The laydown areas are partially developed, while the remainder is comprised of undeveloped land or land cover that is primarily mowed herbaceous cover.

Table 1. On-Site Vegetation Communities and Land Use Types

Vegetation Community	Decontamination & Demolition Area (percentage)	Laydown Areas (percentage)
Evergreen Forest	0.39	-
Mixed Forest	0.68	-
Herbaceous	0.62	4.21
Barren Land	26.24	1.05
Emergent Herbaceous Wetlands	0.11	0.79
Hay/Pasture	13.85	26.05
Developed, High Intensity	8.05	22.63
Developed, Medium Intensity	11.04	21.32
Developed, Low Intensity	4.79	5
Developed, Open Space	0.45	3.16
Deciduous Forest	1.01	3.68
Open Water	24.83	8.16
Cultivated Crops	7.94	3.95

Vegetation within the wetlands predominately consisted of common reed (*Phragmites australis*), broadleaf cattail (*Typha latifolia*), willow oak (*Quercus phellos*), sycamore (*Platanus occidentalis*), black cherry (*Prunus serotina*), red canary grass (*Phalaris arundinacea*), and Johnson grass (*Sorghum halepense*). Associated upland areas were predominately comprised of ragweed (*Ambrosia psilostachya*), wild teasel (*Dipsacus sylvestris*), Japanese clover (*Kummerowia striata*), Johnson grass (*Sorghum halepense*), and white clover (*Trifolium repens*). There are no state or federally listed plants species for this Study Area. PAF is predominately dominated by existing industrial structures.

Wildlife Habitat Assessment

On August 3 through August 6, 2020, HDR surveyed the interior and exterior of buildings to be demolished and assessed them for potential habitat for wildlife (especially migratory birds and bats) and listed species. HDR staff looked for signs of presence such as fecal matter, staining on walls, nests, and feathers. Figure 4 and associated key depict the buildings that were surveyed (Appendix A).

During surveys, barn swallows and/or their nests were found in 12 buildings. A nest of an unknown songbird was found in another building. Nineteen (19) buildings offer potential habitat for bats based on construction, light exposure, ingress/egress points, and temperature. No bats or evidence of bats was observed during initial building surveys. Photographs were also taken to visually document the assessed areas (Appendix B). Below is a summary of the habitat assessment findings within the 89 on-site buildings (Appendix A).

Buildings with Nests

Table 2. Buildings Containing Barn Swallows Nests and Individuals

Building Name	Number of Barn Swallow Nests Found	Number of Individuals Found
Coal Silos 5 & 6, Side Building	2	7
Train Unloading Building	3	4
Shed to Tunnels Under Live Piles (West)	1	2
Shed to Tunnels Under Live Piles (East)	13	16
New Conditioner Building	6 (1 on ground)	7+
Supply Maintenance Shop	4	3
Old Conditioner Building	5	7
Small Break Room in front of Scrubbers	1	-
Unit 1 & 2 SO3 Mitigation Equipment Building	1	1
Vacuum Filter Building (Old GE Building	1	-
Contractor Storage	1 (unknown nest)	-
Rock Silo	5	4
Total	**43**	**51**

The 12 above listed buildings exhibited evidence of 42 barn swallow nests, 1 unknown song bird nest, and 51 barn swallow individuals. These buildings exhibited shaded areas with natural lighting, and moderate temperatures. Large open doors or open air access points provide good ingress/egress points. Bird nests are often used as roosting habitat for bat species. HDR determined that these buildings provide high suitable bat roosting habitat.

Potential Roosting Habitat

Fifteen buildings provided medium to high suitable roosting habitat: Transfer Station H, Wagner Building, Transfer Station P, Surge Hopped, Barge Unloader, G Station Fire Protection, Transfer Station A Breaker Building, Extension Building to Scrubbers, Unit 1 Powerhouse, Unit 2 Powerhouse, Unit 3 Powerhouse, Temporary Building for Auxiliary Boilers, Conny Burden Building, Container by Conny Burden Building, and Rock Silo for Unit 1 and 2 Base.

The following buildings are dark, provide moderate to cool temperatures, and predominately have limited ingress/egress points: Transfer Station H, Transfer Station P, Surge Hopper, Barge Unloader, Unit 1 Powerhouse, Unit 2 Powerhouse, and Unit 3 Powerhouse.

The following buildings are sheds or containers with open doors that provide good ingress/egress points, moderate temperatures, and contain shaded areas with natural lighting: Wagner Building, Extension Building to Scrubbers, Temporary Building for Auxiliary Boilers, and Container by Conny Burden Building.

The following buildings are predominately dark, with moderate to cool temperatures, with limited ingress/egress points: G Station Fire Protection, Transfer Station A Breaker Building, Conny Burden Building, and Rock Silo for Unit 1 & 2 Base. Some of these buildings are currently in use, but contain cooler, darker areas that potentially provide suitable roosting habitat.

Many of these buildings contain water on the ground levels, ranging from pooling to multiple feet deep. Due to the multiple floors contained within these buildings, there are countless cracks and crevices that could provide suitable bat roosting habitat. HDR determined that these buildings provide moderate to high suitable bat roosting habitat.

Open Air Buildings

The following buildings were bright, open air buildings that lack cool, dark crevices: Receiving Maintenance Shed, Break 3, Old Filter Plant, Fish Screen (Structure), Big Top, Loading/Unloading Station (Shed near Unit 1), Shed in Outfield, Dry Fly Ash Storage Silos, and Unit 1 and 2 Limestone Ball Mill. HDR determined that these buildings provide little to no suitable bat roosting habitat.

Closed Buildings with Natural Lighting

The following buildings contained vast amounts of natural lighting that is not preferred for bat roosting: Security Guard Shack near Facilities Building, Ammonia Station, Equipment Room, and Electrical Board Room (LHC1/C2). These buildings contain moderate to warm temperatures with limited ingress/egress points. HDR determined that these buildings provide little to no suitable bat roosting habitat.

Closed, Unlocked Buildings

The following buildings were unlocked buildings with closed doors, and do not contain any ingress/egress points: Ammonia Station Shed, H Station Board Room, G Station Board Room, Transfer Station G, Small Building near Breaker 3, Garages, Cyclean Building, Snake Pit, Gypsum Pump Room, Shed near Ponds, Electrical Board Room 1, Intake Structure, Electrical Board Room 2, Chlorination Building, Old Scale House, Gypsum Dewatering (GEW), Dry Fly Ash Blower Building, Unit 1 Modules, Unit 1 Scrubber Pump Alley, Unit 1 and 2 Control Room, Unit 2 Modules, Unit 2 Scrubber Pump Alley, Unit 3 Scrubber Raw Water Pump Room, Unit 3 ID Fans and Precipitator, Unit 3 Precipitator Control Room, Unit 3 Limestone Ball Mill, and Unit 3 SO3 Unit Mitigation Building. These buildings provide limited to no ingress/egress points for bat species. HDR determined that these buildings provide little to no suitable bat roosting habitat.

Closed, Locked Buildings

The following buildings were closed and/or locked and therefore inaccessible: Power Storage Warehouse/Warehouse J, Coal Silos 5 & 6, Transfer Station N, Receiving Maintenance/Quonset Hut, Live Pile 1 and 2, Scrubber 1 and 2 Maintenance Building, Tool Room/Firehouse, Grey Shed near Unit 1, Power Storage OB 3, Electrical Equipment Room, Switch Yard Maintenance Building, Unit 3 Ball Mill Receiving Hopper Electrical, and Training Receiving Board Room. HDR was unable to access these buildings and was unable to properly examine these structures for potential roosting habitat.

Buildings Still in Use

The following buildings were still in use and exhibited fluorescent lighting: Facilities Building, Credit Union and Training Facility, Environmental Group Trailers, Project Trailers, Security Office, Utility Building, Unit 3 Control Room, Unit 3 Maintenance Shop, Unit 3 Scrubber. HDR recommends these buildings be reassessed for potential bat roosting habitat once they are no longer in use.

Federally and State Listed Species Assessment

Listed species are recognized by federal, state, or other agencies in an effort to protect them and their habitat under the federal Endangered Species Act (1973). These species are vulnerable to habitat loss and population decline because of their rarity. HDR's assessment also considered species protected under the Bald and Golden Eagle Protection Act (BGEPA).

Methods

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) provides federally threatened and endangered species data at the county level for public use. An IPaC search identified three (3) federally listed bats and ten (10) federally listed mollusk as having potential to occur within the Study Area (USFWS 2020; Appendix C).

The TVA Heritage Database (TVA 2019) was also consulted to identify listed species having the potential to occur within specific buffers around the Study Area. These species include three (3) mammals and three (3) amphibian species. Table 3 provides a summary of the federally and state-listed species that were identified in the IPaC report and TVA Heritage Database search for the Study Area.

Table 3. Federally and State-Listed Species potentially near the Study Area

Scientific Name	Common Name	State Rank/Status	Federal Status	Effects Determination and Likelihood of Presence/Habitat
Mammals				
Myotis grisescens	Gray bat	S2/T	Endangered	May affect, not likely to adversely affect; roost in caves year round and sometimes found in buildings; individual recorded approximately 14 miles away from PAF.
Myotis septentrionalis	Northern long-eared bat	S2/E	Threatened	May affect, not likely to adversely affect; various habitats include hibernacula such as caves, abandoned mines, and cave-like structures; found to roost in abandoned buildings or under bridges; individual recorded approximately 5.12 miles from PAF
Myotis sodalis	Indiana bat	S1S2/E	Endangered	May affect, not likely to adversely affect; roost in caves in winter and found in exfoliating bark of dead snags and living trees in mature forests in summer; some documented to roost in buildings; individual recorded approximately 4.96 miles from PAF
Amphibians				
Cryptobranchus alleganiensis	Eastern hellbender	S2S3/S	Proposed Endangered	No effect; various habitats include shallow, fast-flowing rocky streams with large rocks.
Hyla avivoca	Bird-voiced tree frog	S3S4/N	--	No effect; various habitats include floodplain ponds, manmade ponds, and lakes near rivers or streams; individual recorded approximately 1.3 miles from PAF
Hyla cinerea	Green tree frog	S4S5/N	--	No effect; various habitats include marshes, wet prairies, cypress swamps and along edges of lakes, ponds, and streams

Source: USFWS 2020; NatureServe 2019; TVA 2019.

HDR also conducted a desktop database search and field survey to identify the types of habitats present on the proposed Study Area, including habitats that could potentially support the species listed in Table 3.

Results

HDR's desktop database search and field survey indicated that the Study Area contains suitable habitat for three (3) federally-listed bats, three (3) listed amphibians, and eight (8) migratory birds as described in this section.

Mammals

Three species of federally-listed mammals potentially occur in the Study Area: gray bat, northern long-eared bat (NLEB), and Indiana bat (USFWS 2020).

Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Brady et al. 1982, Tuttle 1976a). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Tuttle 1976b). Although they prefer caves, gray bats have been documented roosting in large numbers in buildings (Gunier and Elder 1971). Gray bats have been captured during mist net surveys approximately 14.0 miles away from the study area.

Indiana bats hibernate in caves in winter and use areas around them for swarming (mating) in the fall and staging in the spring, prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead snags and living trees in mature forests with an open understory and a nearby source of water (Pruitt and TeWinkel 2007, Kurta et al. 2002). Although less common, Indiana bats have also been documented roosting in buildings (Butchkoski and Hassinger 2002). Indiana bats are known to change roost trees frequently throughout the season, while still maintaining site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007). One acoustic recording, presumably from an Indiana bat was documented approximately 4.96 miles from the study area in Muhlenberg County. No Indiana bat hibernacula are known within 10 miles of PAF.

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees (typically greater than 3 inches in diameter). Roost selection by northern long-eared bat is similar to that of Indiana bat, however northern long-eared bats are thought to be more opportunistic in roost site selection. This species also roosts in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). The closet record of NLEB is from a mist net survey approximately 5.12 miles away from PAF. There are no known NLEB hibernacula in Muhlenberg County.

No caves are known from the project footprint and the nearest recorded cave is greater than three miles away. Suitable foraging habitat for all three bat species occurs over the Green River. Lower

quality foraging habitat also occurs over ash ponds and settling basins on the PAF. No tree removal is proposed at this time.

Buildings were surveyed for evidence of use by wildlife or terrestrial T&E species. Barns swallows and/or their nests were found in 12 buildings. A nest of an unknown songbird was found in another building. Nineteen buildings offer potential habitat for bats based on construction, light exposure, ingress/egress points, and temperature. No bats or evidence of bats was observed during initial building surveys.

Amphibians

The TVA Heritage Database identified one (1) federally-listed amphibian, the Eastern Hellbender, and two (2) state-listed amphibians, bird-voiced tree frog and green tree frog.

Bird-voiced tree frogs primarily inhabit swampy areas including large floodplain ponds, manmade ponds, and lakes that are near rivers or streams and in close proximity to forest (Powell et al. 2016; NatureServe 2020). The closest record of bird-voiced tree frog is approximately 1.3 miles away. Suitable habitat for this species occurs at ponds and wetlands adjacent to the PAF including those within the Peabody Wildlife Management Area (WMA), but does not occur on the plant site or within action areas.

Green tree frogs primarily inhabit marshes, wet prairies, cypress swamps and along edges of lakes, ponds, and streams (NatureWorks 2020). It's often found among floating plants or in the vegetation around the water, and prefers to shelter in moist, shady areas among vegetation. Suitable habitat for this species occurs at ponds and wetlands adjacent to the PAF including those within the Peabody WMA, but does not occur on the plant site or within action areas.

Eastern hellbenders primarily inhabit shallow, fast-flowing rocky streams. They are generally found near large, intermittent, irregularly shaped rocks within swift water (USFWS 2019). There does not appear to be suitable habitat for the eastern hellbender within the Study Area as the only fast flowing stream is located within a concrete flume. Therefore, no impacts to this species are anticipated.

Migratory Birds

Eight (8) migratory birds were identified by IPaC and TVA records search as potentially present within the study area. A composition of migratory birds of conservation concern that may or may not frequent the study area are listed in Table 4.

Table 4. Migratory Birds near the Study Area

Scientific Name	Common Name	Migratory Status	Federal Status (IUCN)
Migratory Birds			
Ammodramus henslowii	Henslow's Sparrow	BCC-BCR	Least concern
Cistothorus platensis	Sedge Wren	BCC-BCR	Least concern
Gallinula galeata	Common Gallinule	N/A	Least concern
Haliaeetus leucocephalus	Bald Eagle	Non-BCC Vulnerable	Least concern
Lophodytes cucullatus	Hooded Merganser	N/A	Least concern
Pandion haliaetus	Osprey	N/A	Least Concern

Riparia riparia	Bank Swallow	N/A	Least concern
Vireo bellii	Bell's Vireo	Non-BCC	Least concern

Source: USFWS 2020
BCC- Bird of Conservation Concern (throughout range in continental US and Alaska)
BCC-BCR- Bird of Conservation Concern- Bird Conservation Regions (in continental US)

According to the desktop review, eight (8) migratory birds could inhabit the study area at a given time. Henslow's sparrow, sedge wren, common gallinule, Bald eagle, hooded merganser, osprey, bank swallow, and bell's vireo all have migratory patterns that may result in seasonal occurrences in the project area.

Henslow's sparrows utilize pastures, and native grasslands, with a preference for areas with tall grass species with a residual layer of dead vegetation (Reinking et al. 2000). This bird species is a locally distributed summer resident across Kentucky and is known to occupy the Peabody WMA. Records of this species occur approximately 1.8 miles away. Small patches of marginally suitable habitat for this species may occur on the edges of the project area under transmission line ROWs.

Sedge wrens nest throughout Kentucky and reside in wet grasslands and savanna as well as moist areas where scattered bushes and shrubs are present. This species is highly sensitive to habitat conditions and will leave a potential breeding site if the site is too dry, wet, or overgrown (NatureServe 2020). Due to their sensitivity, habitat for the sedge wren is not likely to occur in the highly disturbed project area of the PAF. The closest record of this species is approximately 1.9 miles away on the Peabody WMA.

Common gallinules reside in wetland or riparian habitats including both freshwater and brackish marshes as well as the edges of lakes or ponds. They typically require areas with a mix of aquatic vegetation, submerged, floating and emergent (Cornell Lab of Ornithology 2019). Common gallinules have been recorded approximately 1.19 mi away within the Peabody WMA. No habitat for this species exists in the project area.

The hooded merganser, a species of waterfowl, requires bodies of water such as streams, rivers, and lakes, and typically utilizes both deep and shallow water habitats. Tree cavities or nest boxes are required for nesting and are often in close proximity to water (Cornell Lab of Ornithology 2019, NatureServe 2020). The closest known record of this species is approximately 2.6 miles away. Suitable nesting habitat for this species does not occur within PAF; however ample habitat is available along the Green River and within the waterfowl refuge portion of the Peabody WMA.

Osprey occupy riparian habitats alongside bodies of water such as rivers, lakes and reservoirs. They build nests of sticks on a variety of man-made structures (e.g., transmission line structures, lighting towers) near water (NatureServe 2020). Two active osprey nests were documented at PAF during field review in August 2020. One is on a light pole between the Project Trailers and the Train Unloading Building. The other is across the street from the Rock Silo and the Gypsum Dewatering (GEW).

Bank swallows nest in colonies where the birds burrow into steep sand and gravel banks creating cavity nests during the breeding season. The species utilizes open and partially open areas near flowing bodies of water (NatureServe 2020). A colony exceeding 100 nest burrows existed for

multiple years in a coal refuse pile in the southeast portion of the PAF reservation. This coal pile is no longer present and the area has been reseeded and left to forest regeneration. Suitable nesting habitat occurs along the banks of the Green River.

Bell's vireo requires shrub/scrub, dense brush, willow thickets, or narrow early successional wooded areas with dense understories such as those often found along small stream corridors (NatureServe 2020). Bell's vireos tend to prefer the above-mentioned habitats if they are scattered within more open grassland or agricultural landscapes versus forest dominated areas. Small blocks of grassland/shrub habitats surrounded by mature forests may be avoided by this species. This species has been observed on reclaimed surface mines that lie adjacent to PAF within Muhlenberg County, approximately 1.0 miles away. This species has been recorded within the South Spoil Area of PAF. A small amount of suitable habitat for the Bell's vireo may still occur in this area.

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2013). This species is associated with larger mature trees capable of supporting its massive nests. These are usually found near larger waterways where the eagles forage (USFWS 2007). Records document the occurrence of two bald eagle nests in Muhlenberg County, Kentucky. The closest of these is approximately 1.2 miles away. No bald eagle nests were observed during field reviews across the PAF plant site in August 2020.

The early successional habitats within the PAF Study Area could provide a limited amount of potentially suitable habitat for a few of these species including Henslow's sparrow, hooded merganser, osprey, bank swallows, and bell's vireo. However, the heavy industrialized and disturbed land uses in the immediate project vicinity likely limit the use of these areas by these species.

Conclusion

PAF is dominated by developed land use, while there are pastures and open waters located on the outskirts of the property. Vegetation within the disturbed areas have been managed to maintain its open condition and, as a result, it is dominated by mowed turf grasses and ruderal/early successional non-native and weedy herbaceous species.

After surveys of 89 buildings located on-site, barn swallow nests and/or individuals were found in twelve (12) buildings. Fifteen (15) additional buildings we recommended as providing suitable roosting habitat. The remaining buildings were not recommended as suitable habitat due to excess natural lighting, there was no ingress/egress points, they were still in use, or they were inaccessible. HDR recommends further examination of these buildings.

Suitable habitat exists within the Study Area for three (3) mammals; including, northern long-eared bat, gray bat, Indiana bat, and three (3) amphibians; including the Eastern Hellbender, bird-voiced tree frog, and green tree frog. At least 28 buildings on-site provide suitable roosting habitat for the northern long-eared bat, gray bat, and the Indiana bat. Avoidance and mitigations measures are necessary in order to limit impacts to these species and their habitats.

Eight (8) migratory birds have been identified as potentially being listed within the project area. The early successional habitats, primarily those within the PAF Study Area, could provide a limited amount of potentially suitable habitat for a few of these species including Henslow's sparrow, hooded merganser, osprey, bank swallows, and bell's vireo. However, the heavy industrialized and disturbed land uses in the immediate project vicinity likely limit the use of these areas by these species.

References

Brady, J., T.H. Kunz, M.D. Tuttle and D. Wilson. 1982. Gray bat recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado. 143 pp.

Butchkoski, C. M., and J. D. Hassinger. 2002. Ecology of a maternity colony roosting in a building. *In* Kurta, A. and J. Kennedy, eds. *The Indiana Bat: Biology and Management of an Endangered Species.* Bat Conservation International, Austin, Texas.

Cornell Lab of Ornithology. 2019. All About Birds. Cornell Lab of Ornithology, Ithaca, New York. Available online: https://www.allaboutbirds.org Accessed: August 25, 2020).

Gunier, W. J., and W. H. Elder. 1971. Experimental homing of gray bats to a maternity colony in a Missouri barn. *American Midland Naturalist 86(2): 502-506.*

Kurta, A, S. W. Murray, and D. H. Miller. 2002. Roost selection and movements across the summer landscape. *In* Kurta, A. and J. Kennedy, eds. *The Indiana Bat: Biology and Management of an Endangered Species.* Bat Conservation International, Austin, Texas.

NatureServe. 2019. NatureServe Explorer. [Online] URL: http://explorer.natureserve.org (Accessed on September 3, 2020).

_____. 2020. NatureServe Explorer: An Online Encyclopedia of Life. Arlington, VA. U.S.A. Available online: http://explorer.natureserve.org/. (Accessed: September 3, 2020).

NatureWorks. 2020. Green Tree Frog, *Hyla cinerea*. [Online] URL: https://nhpbs.org/natureworks/greentreefrog.htm#3 (Accessed on September 2, 2020).

Powell, R., R. Conant, and J. T. Collins. 2016. Field Guide to Reptiles and Amphibians of Eastern and Central North America (Fourth Edition). Peterson Field Guide, Houghton Mifflin Harcourt, Boston, Massachusetts. 494 pp.

Pruitt, L., and L. TeWinkel. 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, MN. 258 pp.

Reinking, D.L., D.A. Weidenfeld, D.H. Wolfe, and R.W. Rohrbaugh. 2000. Distribution, Habitat Use, and Nesting Success of Henslow's Sparrow in Oklahoma. Prairie Naturalist, 32(4): 219-232.

Tennessee Valley Authority (TVA). 2019. TVA Heritage Database Results (Provided July 2020).

Tuttle, M. D. 1976a. Population ecology of the gray bat (*Myotis grisescens*): philopatry, timing, and patterns of movement, weight loss during migration, and seasonal adaptive

strategies. *Occasional Papers of the Museum of Natural History*, University of Kansas, 54:1-38.

_____. 1976b. Population ecology of the gray bat (*Myotis grisescens*): factors influencing growth and survival of newly volant young. Ecology 57: 587-595.

U.S. Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. Available online: http://www.fws.gov/northeast/ecologicalservices/pdf/NationalBaldEagleManagementGuidelines.pdf (Accessed: September 3, 2020).

_____. 2013. Bald and Golden Eagle Protection Act. Available online: http://www.fws.gov/northeast/ecologicalservices/eagleact.html (Accessed September 3, 2020).

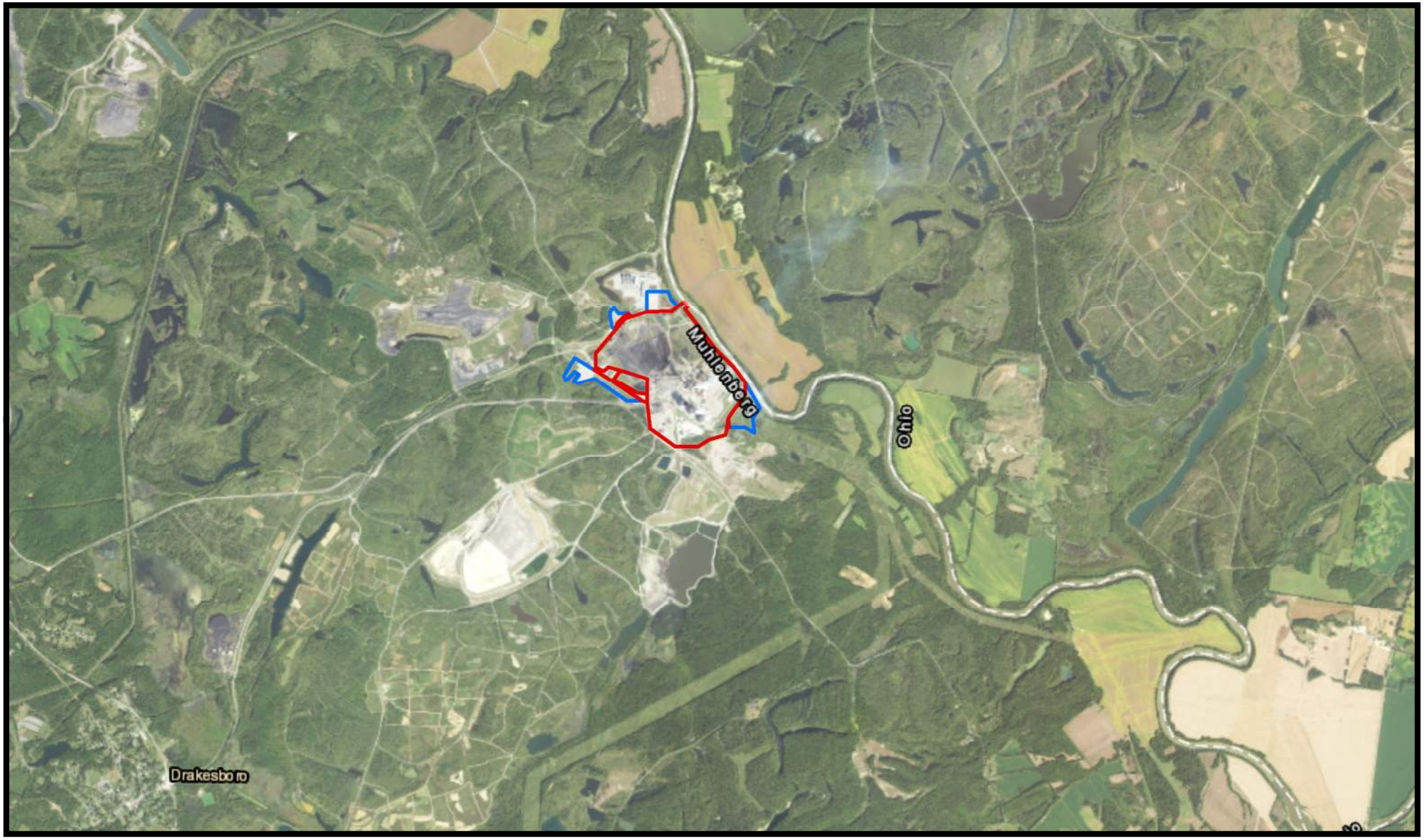
_____. 2014. Northern Long-eared Bat Interim Conference and Planning. Available online: https://www.fws.gov/northeast/virginiafield/pdf/NLEBinterimGuidance6Jan2014.pdf (Accessed September 3, 2020).

_____.2019. Eastern Hellbender, *Cryptobranchus alleganiensis alleganiensis*. September 2019. [Online] URL: https://www.fws.gov/southeast/wildlife/amphibians/eastern-hellbender/# (Accessed on September 3, 2020).

_____.2020. Information for Planning and Conservation (IPaC). [Online] URL: http://ecos.fws.gov/ipac/ (Accessed on September 3, 2020).

Appendix A

Figures



Legend

Project Area

Laydown Areas

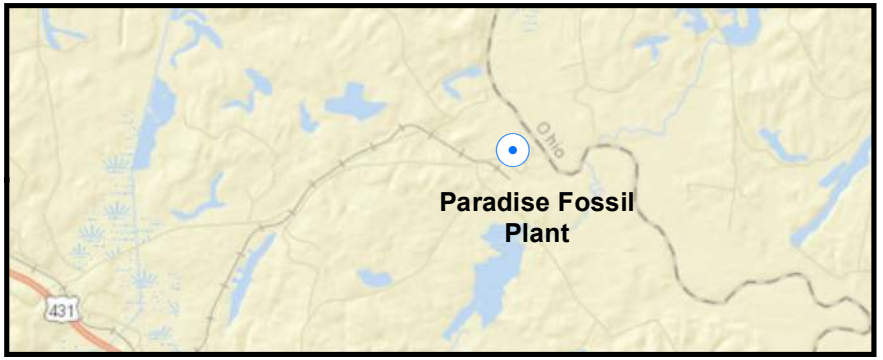
0 5,000 Feet

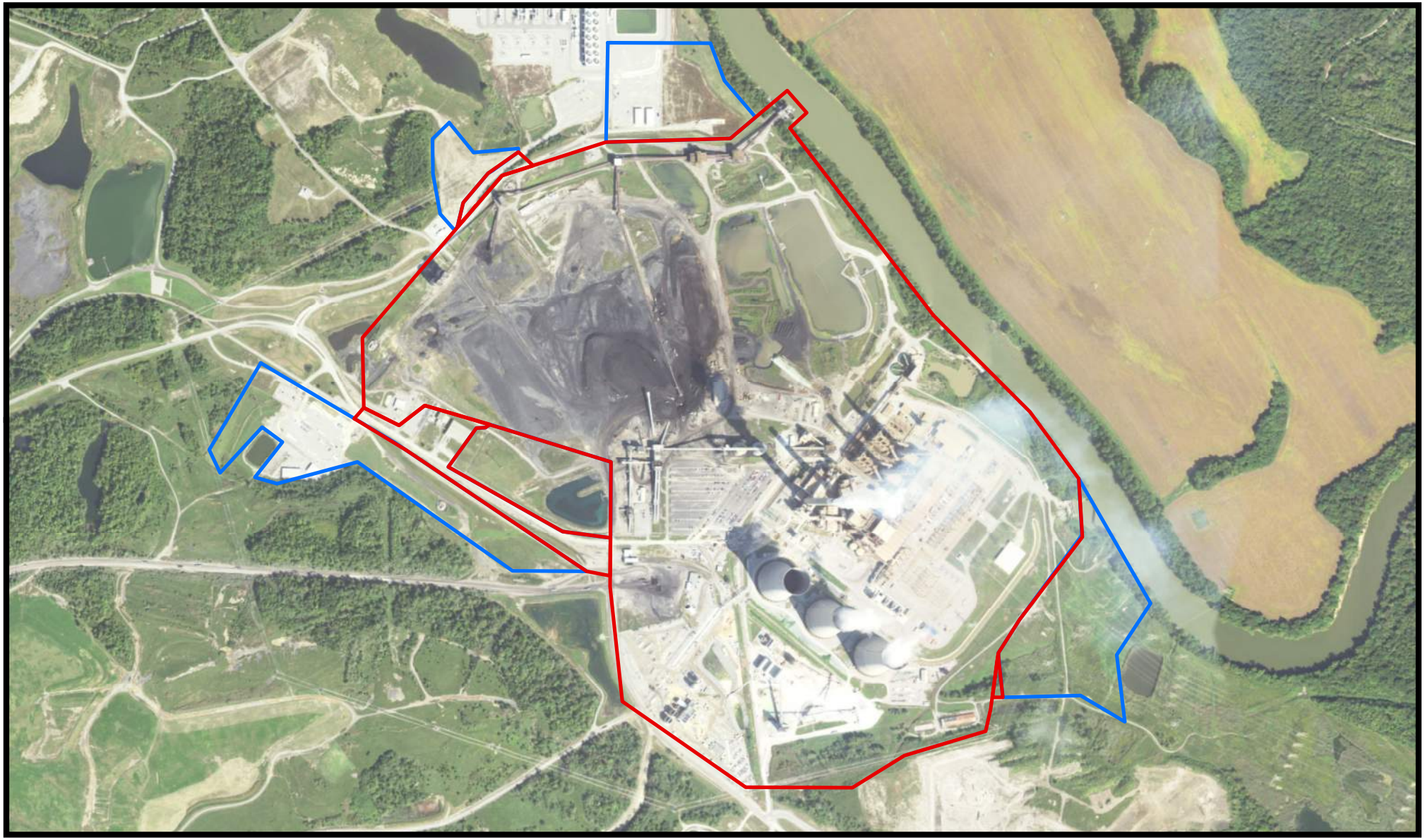
N

TENNESSEE VALLEY AUTHORITY
PARADISE, KENTUCKY

**PARADISE CCR MANAGEMENT OPERATIONS
ENVIRONMENTAL ASSESSMENT
MUHLENBERG COUNTY, KENTUCKY**

FIGURE 1. PROJECT VICINITY MAP





Legend

- Project Area
- Laydown Areas

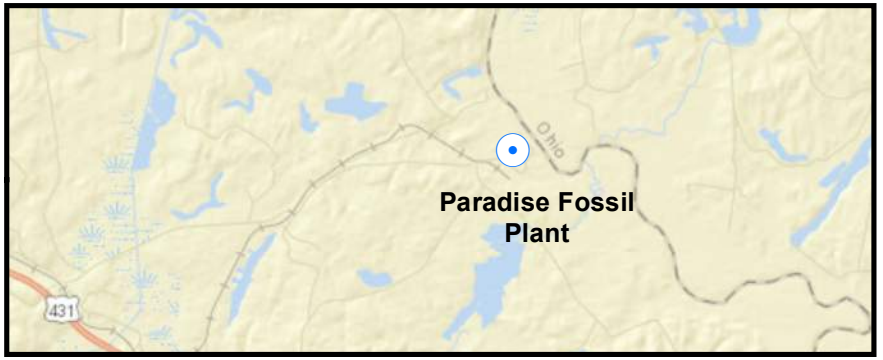
0 500 1,000 Feet

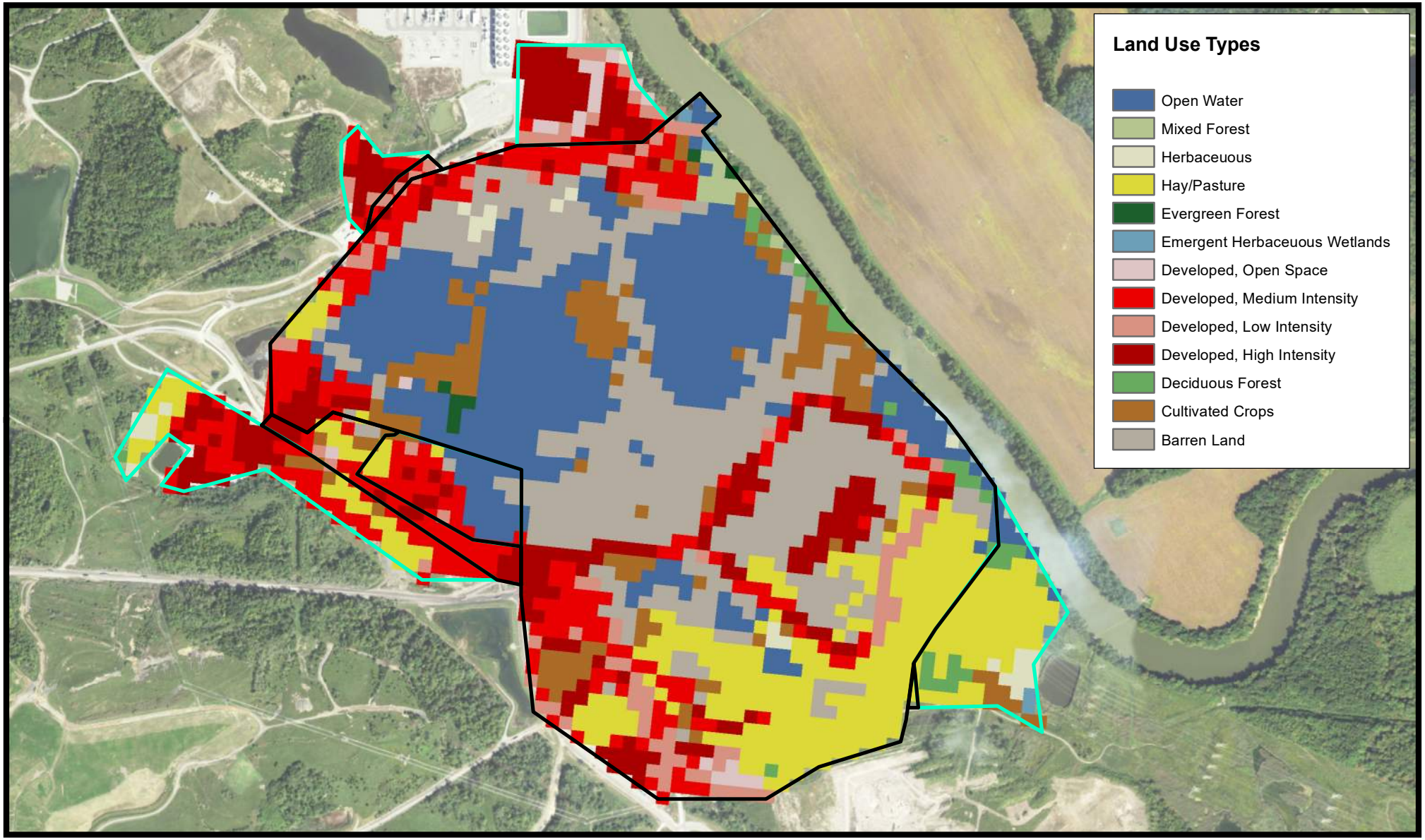
N

TENNESSEE VALLEY AUTHORITY
PARADISE, KENTUCKY

**PARADISE CCR MANAGEMENT OPERATIONS
ENVIRONMENTAL ASSESSMENT
MUHLENBERG COUNTY, KENTUCKY**

FIGURE 2. PROJECT AREA MAP





Legend

Project Area

Laydown Areas

0 500 1,000 Feet

N

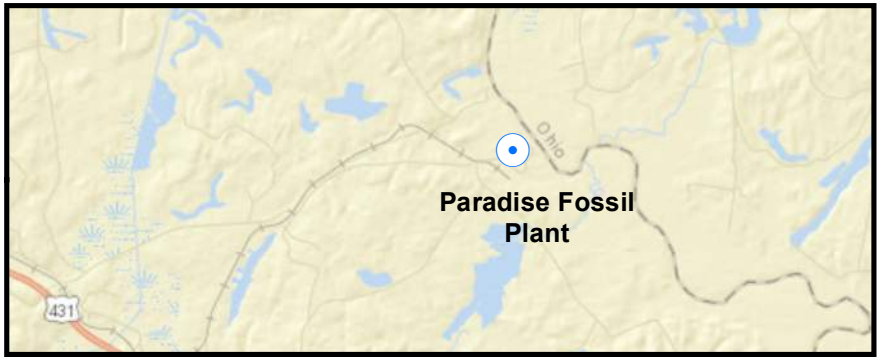
TVA

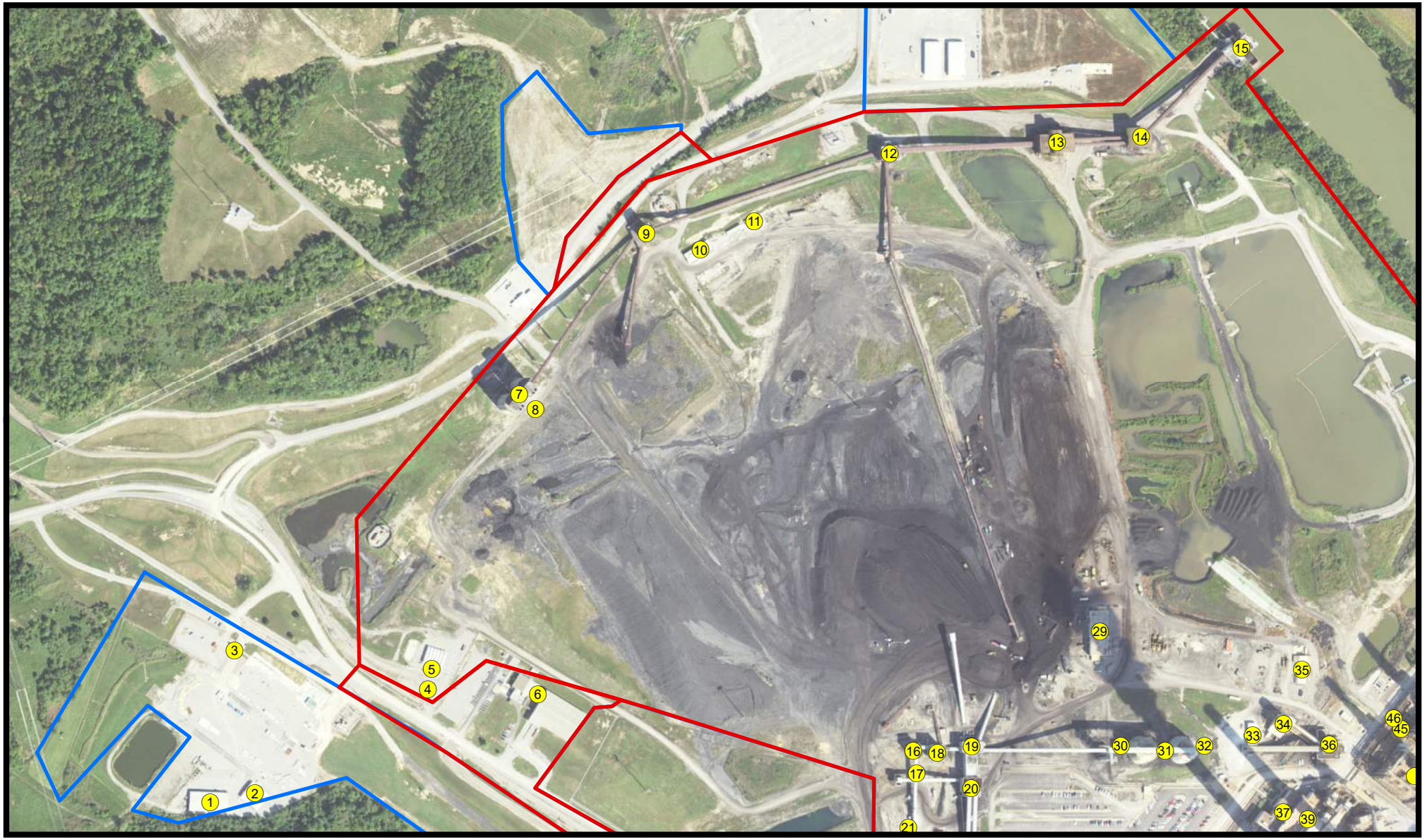
TENNESSEE VALLEY AUTHORITY
PARADISE, KENTUCKY

PARADISE CCR MANAGEMENT OPERATIONS
ENVIRONMENTAL ASSESSMENT
MUHLENBERG COUNTY, KENTUCKY

HDR

FIGURE 3. LAND USE TYPES





Legend

- Project Area
- Laydown Areas

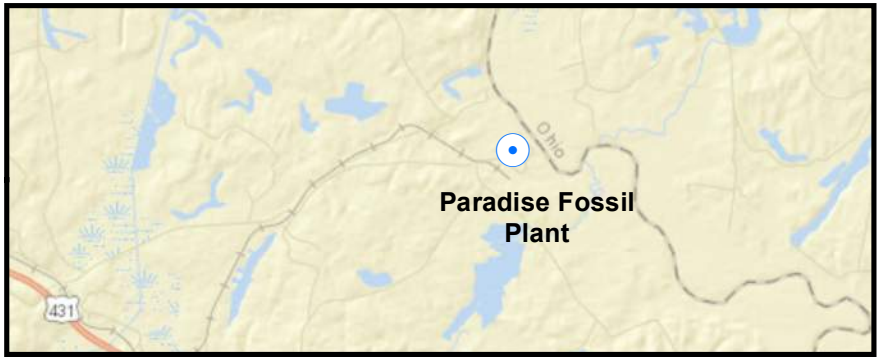
0 350 700 Feet

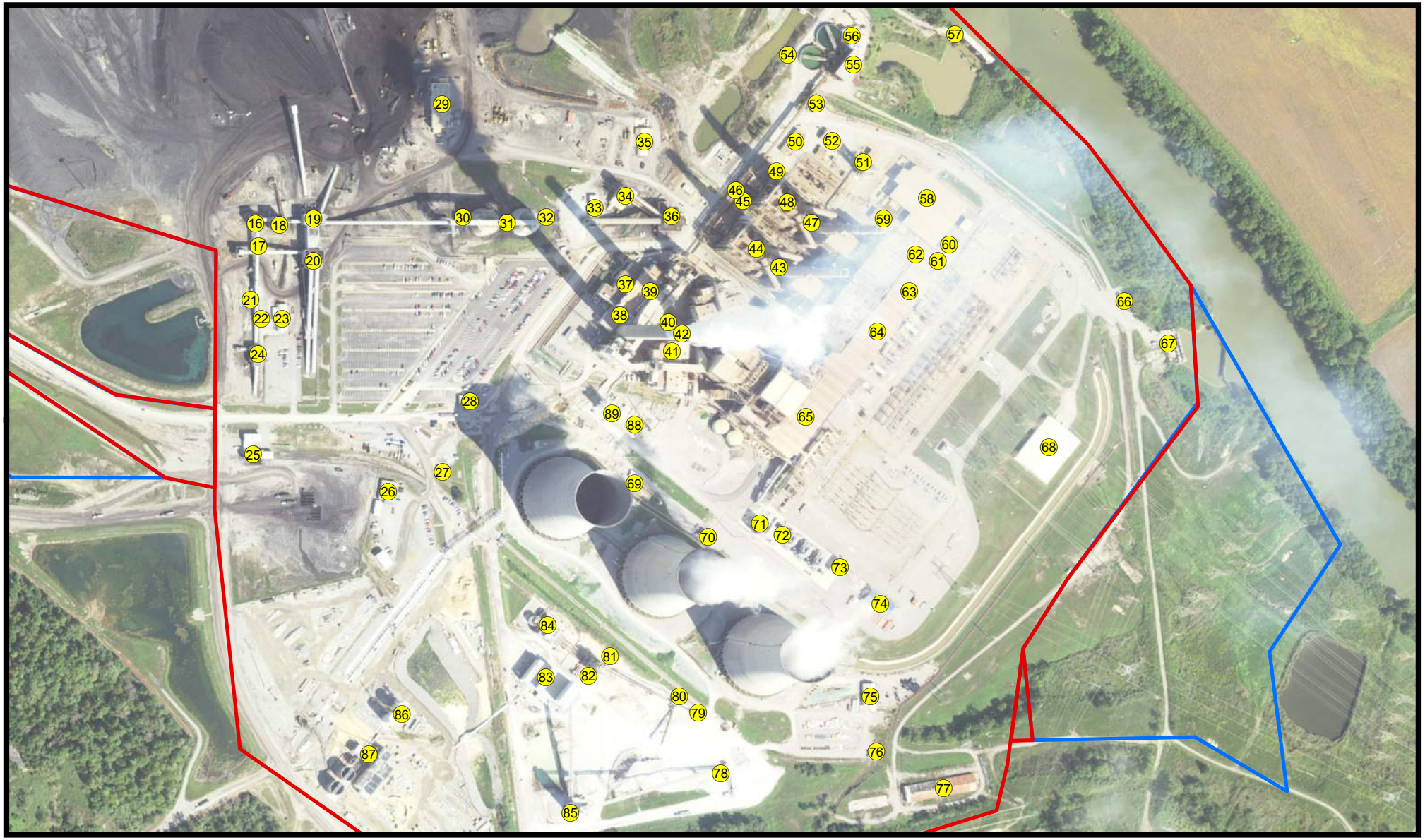
N

TENNESSEE VALLEY AUTHORITY
PARADISE, KENTUCKY

PARADISE CCR MANAGEMENT OPERATIONS
ENVIRONMENTAL ASSESSMENT
MUHLENBERG COUNTY, KENTUCKY

FIGURE 4A. BUILDINGS MAP





Legend

- Project Area
- Laydown Areas

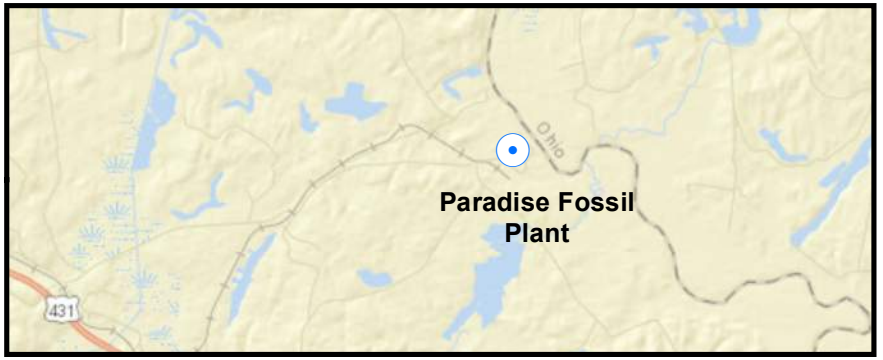
0 350 700 Feet

N

TENNESSEE VALLEY AUTHORITY
PARADISE, KENTUCKY

PARADISE CCR MANAGEMENT OPERATIONS
ENVIRONMENTAL ASSESSMENT
MUHLENBERG COUNTY, KENTUCKY

FIGURE 4B. BUILDINGS MAP



Building Number	Building Name
1	Power Storage Warehouse/Warehouse J
2	Facilities Building
3	Security Guard Shack (Near Facilities Building)
4	Shed (Ammonia Station)
5	Ammonia Station
6	Credit Union & Training Facility
7	Coal Silos 5 & 6
8	Coal Silos 5 & 6, Side Building
9	Transfer Station H
10	Wagner Building (Shed)
11	Environmental Group Trailers
12	Transfer Station P
13	Transfer Station N
14	Surge Hopper
15	Barge Unloader
16	H Station Board Room
17	G Station, Fire Protection
18	G Station Board Room
19	Transfer Station G
20	Breaker Building, Transfer Station A
21	Small Building (Breaker 3)
22	Shed (Receiving Maintenance)
23	Receiving Maintenance, Quonset Hut
24	Breaker 3
25	Train Unloading Building
26	Projects Trailers
27	Garages
28	Security Office
29	Utility Building
30	Shed to Tunnels Under Live Piles (West)
31	Live Pile 1 & 2
32	Shed to Tunnels Under Live Piles (East)
33	Cyclean building
34	New Conditioner Building
35	Supply Maintenance Shop
36	Old Conditioner Building
37	Unit 3 Control Room
38	Unit 3 Maintenance Shop
39	Unit 3 Scrubber
40	Unit 3 Scrubber, Raw Water Pump Room
41	Unit 3, ID Fans & Precipitator

Building Number	Building Name
42	Unit 3, Precipitator Control Room
43	Unit 2, Scrubber Pump Alley
44	Unit 2, Modules
45	Unit 1 & 2, Control Room
46	Small Break Room in front of Scrubbers
47	Unit 1, Scrubber Pump Alley
48	Unit 1, Modules
49	Extension Building to Scrubbers
50	Scrubber 1 & 2 Maintenance Building
51	Unit 1 & 2 SO3 Mitigation Equipment Building
52	Snake Pit, Maintenance Building
53	Gypsum Pump Room
54	Shed (Near Ponds)
55	Vacuum Filter Building (Old GE Building)
56	Old Filter Plant
57	Fish Screen (Structure)
58	Big Top
59	Tool Room/Firehouse
60	Contractor Storage
61	Grey Shed (Near Unit 1)
62	Loading/Unloading Station (Shed near Unit 1)
63	Unit 1, Powerhouse
64	Unit 2, Powerhouse
65	Unit 3, Powerhouse
66	Electrical Board Room (1)
67	Intake Structure
68	Power Storage OB 3
69	Electrical Board Room (2)
70	Chlorination Building
71	Equipment Room
72	Electrical Equipment Room
73	Switch Yard Maintenance Building
74	Temporary Building for Auxiliary Boilers
75	Conny Burden Building (Storage)
76	Container (By Conny Burden Building)
77	Shed (Outfield)
78	Unit 3, Ball Mill Receiving Hopper Electrical
79	Train Receiving Board Room
80	Electrical Board Room (LHC1/C2)
81	Old Scale House
82	Rock Silo for Unit 1 & 2 Base

Building Number	Building Name
83	Unit 3 Limestone Ball Mill
84	Unit 1 & 2 Limestone Ball Mill
85	Rock Silo
86	Dry Fly Ash Storage Silos
87	Gypsum Dewatering (GEW)
88	Dry Fly Ash Blower Building
89	Unit 3, SO 3, Unit Mitigation Building

Appendix B

Photographs

Photograph 1 – Building with barn swallow nests; Coal Silo 5 & 6 side building (August 5, 2020)

Photograph 2 – Building with barn swallow nests; Train Unload Building (August 6, 2020)

Photograph 3 – Potential roosting habitat; Transfer Station P (August 4, 2020)

Photograph 4 – Potential roosting habitat; Unit 2 Powerhouse (August 3, 2020)

Photograph 5 – Potential roosting habitat; Temporary Building for Auxiliary Boilers (August 6, 2020)

Photograph 6 – Potential roosting habitat; Conny Burden Building (August 6, 2020)

Photograph 7 – Open air building; Big Top (August 6, 2020)

Photograph 8 – Closed building with natural lighting; Security Guard Shack near Facilities Building (August 6, 2020)

Photograph 9 – Closed, unlocked building; Chlorination Building (August 6, 2020)

Photograph 10 – Closed, locked building; Electric Equipment Room (August 6, 2020)

Photograph 11 – Building still in use; Unit 3 Maintenance Shop (August 6, 2020)

Appendix C

IPaC List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670
Phone: (502) 695-0468 Fax: (502) 695-1024
http://www.fws.gov/frankfort/

In Reply Refer To: September 01, 2020
Consultation Code: 04EK1000-2020-SLI-1734
Event Code: 04EK1000-2020-E-04921
Project Name: Paradise Fossil Plant

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

Your concern for the protection of endangered and threatened species is greatly appreciated. The purpose of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA) is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. The species list attached to this letter fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the ESA to provide information as to whether any proposed or listed species may be present in the area of a proposed action. This is not a concurrence letter; additional consultation with the Service may be required.

The Information in Your Species List:

The enclosed species list identifies federal trust species and critical habitat that may occur within the boundary that you entered into IPaC. For your species list to most accurately represent the species that may potentially be affected by the proposed project, the boundary that you input into IPaC should represent the entire “action area” of the proposed project by considering all the potential “effects of the action,” including potential direct, indirect, and cumulative effects, to federally-listed species or their critical habitat as defined in 50 CFR 402.02. This includes effects of any “interrelated actions” that are part of a larger action and depend on the larger action for their justification and “interdependent actions” that have no independent utility apart from the action under consideration (e.g.; utilities, access roads, etc.) and future actions that are reasonably certain to occur as a result of the proposed project (e.g.; development in response to a new road). If your project is likely to have significant indirect effects that extend well beyond the project footprint (e.g., long-term impacts to water quality), we highly recommend that you

coordinate with the Service early to appropriately define your action area and ensure that you are evaluating all the species that could potentially be affected.

We must advise you that our database is a compilation of collection records made available by various individuals and resource agencies available to the Service and may not be all-inclusive. This information is seldom based on comprehensive surveys of all potential habitats and, thus, does not necessarily provide conclusive evidence that species are present or absent at a specific locality. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list.

Please note that “critical habitat” refers to specific areas identified as essential for the conservation of a species that have been designated by regulation. Critical habitat usually does not include all the habitat that the species is known to occupy or all the habitat that may be important to the species. Thus, even if your project area does not include critical habitat, the species on the list may still be present.

Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and associated information. To re-access your project in IPaC, go to the IPaC web site (https://ecos.fws.gov/ipac/), select “Need an updated species list?”, and enter the consultation code on this letter.

ESA Obligations for Federal Projects:

Under sections 7(a)(1) and 7(a)(2) of the ESA and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

If a Federal project (a project authorized, funded, or carried out by a federal agency) may affect federally-listed species or critical habitat, the Federal agency is required to consult with the Service under section 7 of the ESA, pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). Recommended contents of a Biological Assessment are described at 50 CFR 402.12. For projects other than major construction activities, the Service suggests that a biological evaluation

similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat.

ESA Obligations for Non-federal Projects:

Proposed projects that do not have a federal nexus (non-federal projects) are not subject to the obligation to consult under section 7 of the ESA. However, section 9 of the ESA prohibits certain activities that directly or indirectly affect federally-listed species. These prohibitions apply to all individuals subject to the jurisdiction of the United States. Non-federal project proponents can request technical assistance from the Service regarding recommendations on how to avoid and/or minimize impacts to listed species. The project proponent can choose to implement avoidance, minimization, and mitigation measures in a proposed project design to avoid ESA violations.

Additional Species-specific Information:

In addition to the species list, IPaC also provides general species-specific technical assistance that may be helpful when designing a project and evaluating potential impacts to species. To access this information from the IPaC site (https://ecos.fws.gov/ipac/), click on the text “My Projects” on the left of the black bar at the top of the screen (you will need to be logged into your account to do this). Click on the project name in the list of projects; then, click on the “Project Home” button that appears. Next, click on the “See Resources” button under the “Resources” heading. A list of species will appear on the screen. Directly above this list, on the right side, is a link that will take you to pdfs of the “Species Guidelines” available for species in your list. Alternatively, these documents and a link to the “ECOS species profile” can be accessed by clicking on an individual species in the online resource list.

Next Steps:

Requests for additional technical assistance or consultation from the Kentucky Field Office should be submitted following guidance on the following page http://www.fws.gov/frankfort/PreDevelopment.html and the document retrieved by clicking the “outline” link at that page. When submitting correspondence about your project to our office, please include the Consultation Tracking Number in the header of this letter. (There is no need to provide us with a copy of the IPaC-generated letter and species list.)

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Kentucky Ecological Services Field Office
J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670
(502) 695-0468

Project Summary

Consultation Code: 04EK1000-2020-SLI-1734

Event Code: 04EK1000-2020-E-04921

Project Name: Paradise Fossil Plant

Project Type: ** OTHER **

Project Description: TVA proposes the decontamination and deconstruction of Paradise Fossil Plant in Muhlenberg County, KY.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.22808184737343N87.13623770333305W

Counties: Muhlenberg, KY

Endangered Species Act Species

There is a total of 13 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 3 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS

Gray Bat *Myotis grisescens* — Endangered

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- The project area includes potential gray bat habitat.

Species profile: https://ecos.fws.gov/ecp/species/6329

General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/21/office/42431.pdf

Indiana Bat *Myotis sodalis* — Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.

This species only needs to be considered under the following conditions:

- The project area includes 'potential' habitat. All activities in this location should consider possible effects to this species.
- The project area includes known 'swarming 2' habitat.

Species profile: https://ecos.fws.gov/ecp/species/5949

General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/1/office/42431.pdf

Northern Long-eared Bat *Myotis septentrionalis* — Threatened

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- The specified area includes areas in which incidental take would not be prohibited under the 4(d) rule. For reporting purposes, please use the "streamlined consultation form," linked to in the "general project design guidelines" for the species.

Species profile: https://ecos.fws.gov/ecp/species/9045

General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/10043/office/42431.pdf

Clams

NAME	STATUS
Clubshell *Pleurobema clava*	Endangered
Population: Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3789 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/352/office/42431.pdf	
Fanshell *Cyprogenia stegaria*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4822 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/368/office/42431.pdf	
Northern Riffleshell *Epioblasma torulosa rangiana*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/527 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/374/office/42431.pdf	
Pink Mucket (pearlymussel) *Lampsilis abrupta*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7829 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/331/office/42431.pdf	
Purple Cat's Paw (=purple Cat's Paw Pearlymussel) *Epioblasma obliquata obliquata*	Endangered
Population: Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5602 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/323/office/42431.pdf	
Rabbitsfoot *Quadrula cylindrica cylindrica*	Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5165 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/3645/office/42431.pdf	
Ring Pink (mussel) *Obovaria retusa*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4128 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/341/office/42431.pdf	
Rough Pigtoe *Pleurobema plenum*	Endangered
No critical habitat has been designated for this species.	

NAME	STATUS

Species profile: https://ecos.fws.gov/ecp/species/6894
General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/338/office/42431.pdf

Sheepnose Mussel *Plethobasus cyphyus* — Endangered
No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/6903
General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/7816/office/42431.pdf

Spectaclecase (mussel) *Cumberlandia monodonta* — Endangered
No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/7867
General project design guidelines:
https://ecos.fws.gov/ipac/guideline/design/population/4490/office/42431.pdf

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

APPENDIX B – TVA BAT STRATEGY PROJECT SCREENING FORM

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Project Review Form - TVA Bat Strategy *(06/2019)*

*This form should **only** be completed if project includes activities in Tables 2 or 3 (STEP 2 below). This form is not required if project activities are limited to Table 1 (STEP 2) or otherwise determined to have no effect on federally listed bats. If so, include the following statement in your environmental compliance document (e.g., add as a comment in the project CEC): "Project activities limited to Bat Strategy Table 1 or otherwise determined to have no effect on federally listed bats. Bat Strategy Project Review Form NOT required." This form is to assist in determining required conservation measures per TVA's ESA Section 7 programmatic consultation for routine actions and federally listed bats.*[1]

Project Name: Paradise Fossil Plant Decontamination and Deconstruction EA **Date:** 10/28/2020

Contact(s): Carol Freeman **CEC#:** **Project ID:** 2020-20

Project Location (City, County, State): Drakesboro, Muhlenberg County, Kentucky

Project Description:

The purpose of the Proposed Action is to appropriately manage the disposition of the buildings, physical structures, coal yard, and limestone yard at PAF that are no longer needed for their original purpose of power generation.

SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES

STEP 1) Select TVA Action. If none are applicable, contact environmental support staff, Environmental Project Lead, or Terrestrial Zoologist to discuss whether form (i.e., application of Bat Programmatic Consultation) is appropriate for project:

- ☐ 1 Manage Biological Resources for Biodiversity and Public Use on TVA Reservoir Lands
- ☐ 2 Protect Cultural Resources on TVA-Retained Land
- ☐ 3 Manage Land Use and Disposal of TVA-Retained Land
- ☐ 4 Manage Permitting under Section 26a of the TVA Act
- ☑ 5 Operate, Maintain, Retire, Expand, Construct Power Plants
- ☐ 6 Maintain Existing Electric Transmission Assets
- ☐ 7 Convey Property associated with Electric Transmission
- ☐ 8 Expand or Construct New Electric Transmission Assets
- ☐ 9 Promote Economic Development
- ☐ 10 Promote Mid-Scale Solar Generation

STEP 2) Select all activities from Tables 1, 2, and 3 below that are included in the proposed project.

TABLE 1. Activities with no effect to bats. Conservation measures & completion of bat strategy project review form NOT required.

☐ 1. Loans and/or grant awards	☐ 8. Sale of TVA property	☐ 19. Site-specific enhancements in streams and reservoirs for aquatic animals
☐ 2. Purchase of property	☐ 9. Lease of TVA property	☐ 20. Nesting platforms
☐ 3. Purchase of equipment for industrial facilities	☐ 10. Deed modification associated with TVA rights or TVA property	☐ 41. Minor water-based structures (this does not include boat docks, boat slips or piers)
☐ 4. Environmental education	☐ 11. Abandonment of TVA retained rights	☐ 42. Internal renovation or internal expansion of an existing facility
☐ 5. Transfer of ROW easement and/or ROW equipment	☐ 12. Sufferance agreement	☑ 43. Replacement or removal of TL poles
☐ 6. Property and/or equipment transfer	☐ 13. Engineering or environmental planning or studies	☐ 44. Conductor and overhead ground wire installation and replacement
☐ 7. Easement on TVA property	☐ 14. Harbor limits delineation	☐ 49. Non-navigable houseboats

TABLE 2. Activities not likely to adversely affect bats with implementation of conservation measures. Conservation measures and completion of bat strategy project review form REQUIRED; review of bat records in proximity to project NOT required.

■ 18. Erosion control, minor	☐ 57. Water intake - non-industrial	☐ 79. Swimming pools/associated equipment
☐ 24. Tree planting	☐ 58. Wastewater outfalls	☐ 81. Water intakes – industrial
☐ 30. Dredging and excavation; recessed harbor areas	☐ 59. Marine fueling facilities	☐ 84. On-site/off-site public utility relocation or construction or extension
☐ 39. Berm development	☐ 60. Commercial water-use facilities (e.g., marinas)	☐ 85. Playground equipment - land-based
☐ 40. Closed loop heat exchangers (heat pumps)	☐ 61. Septic fields	■ 87. Aboveground storage tanks
☐ 45. Stream monitoring equipment - placement and use	☐ 66. Private, residential docks, piers, boathouses	■ 88. Underground storage tanks
☐ 46. Floating boat slips within approved harbor limits	■ 67. Siting of temporary office trailers	☐ 90. Pond closure
■ 48. Laydown areas	☐ 68. Financing for speculative building construction	☐ 93. Standard License
☐ 50. Minor land based structures	☐ 72. Ferry landings/service operations	☐ 94. Special Use License
☐ 51. Signage installation	☐ 74. Recreational vehicle campsites	☐ 95. Recreation License
☐ 53. Mooring buoys or posts	■ 75. Utility lines/light poles	☐ 96. Land Use Permit
☐ 56. Culverts	☐ 76. Concrete sidewalks	

Table 3: Activities that may adversely affect federally listed bats. Conservation measures AND completion of bat strategy project review form REQUIRED; review of bat records in proximity of project REQUIRED by OSAR/Heritage eMap reviewer or Terrestrial Zoologist.

☐ 15. Windshield and ground surveys for archaeological resources	☐ 34. Mechanical vegetation removal, includes trees or tree branches > 3 inches in diameter	☐ 69. Renovation of existing structures
☐ 16. Drilling	☐ 35. Stabilization (major erosion control)	☐ 70. Lock maintenance/ construction
☐ 17. Mechanical vegetation removal, does not include trees or branches > 3" in diameter (in Table 3 due to potential for woody burn piles)	■ 36. Grading	☐ 71. Concrete dam modification
☐ 21. Herbicide use	☐ 37. Installation of soil improvements	☐ 73. Boat launching ramps
☐ 22. Grubbing	☐ 38. Drain installations for ponds	☐ 77. Construction or expansion of land-based buildings
☐ 23. Prescribed burns	☐ 47. Conduit installation	☐ 78. Wastewater treatment plants
☐ 25. Maintenance, improvement or construction of pedestrian or vehicular access corridors	☐ 52. Floating buildings	☐ 80. Barge fleeting areas
☐ 26. Maintenance/construction of access control measures	☐ 54. Maintenance of water control structures (dewatering units, spillways, levees)	☐ 82. Construction of dam/weirs/ levees
■ 27. Restoration of sites following human use and abuse	☐ 55. Solar panels	☐ 83. Submarine pipeline, directional boring operations
■ 28. Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	■ 62. Blasting	☐ 86. Landfill construction
☐ 29. Acquisition and use of fill/borrow material	☐ 63. Foundation installation for transmission support	■ 89. Structure demolition
☐ 31. Stream/wetland crossings	☐ 64. Installation of steel structure, overhead bus, equipment, etc.	☐ 91. Bridge replacement
☐ 32. Clean-up following storm damage	☐ 65. Pole and/or tower installation and/or extension	☐ 92. Return of archaeological remains to former burial sites
☐ 33. Removal of hazardous trees/tree branches		

STEP 3) Project includes one or more activities in Table 3? ◉ **YES (Go to Step 4)** ○ **NO (Go to Step 13)**

STEP 4) Answer questions *a* through *e* below (applies to projects with activities from Table 3 ONLY)

a) Will project involve continuous noise (i.e., ≥ 24 hrs) that is greater than 75 decibels measured on the A scale (e.g., loud machinery)?
- ○ **NO** (NV2 does not apply)
- ◉ **YES** (NV2 applies, subject to records review)

b) Will project involve entry into/survey of cave?
- ◉ **NO** (HP1/HP2 do not apply)
- ○ **YES** (HP1/HP2 applies, subject to review of bat records)

c) If conducting **prescribed burning** (**activity 23**), estimated acreage**:** _____ and timeframe(s) below; ▣ **N/A**

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	☐ Oct 15 - Nov 14	☐ Nov 15 - Mar 31	☐ Apr 1 - May 31, Aug 1- Oct 14	☐ Jun 1 - Jul 31
VA	☐ Sep 16 - Nov 15	☐ Nov 16 - Apr 14	☐ Apr 15 - May 31, Aug 1 – Sept 15	☐ Jun 1 - Jul 31
AL	☐ Oct 15 - Nov 14	☐ Nov 15 - Mar 15	☐ Mar 16 - May 31, Aug 1 - Oct 14	☐ Jun 1 - Jul 31
NC	☐ Oct 15 - Nov 14	☐ Nov 15 - Apr 15	☐ Apr 16 - May 31, Aug 1 - Oct 14	☐ Jun 1 - Jul 31
MS	☐ Oct 1 - Nov 14	☐ Nov 15 - Apr 14	☐ Apr 15 - May 31, Aug 1 – Sept 30	☐ Jun 1 - Jul 31

d) Will the project involve vegetation piling/burning?
- ○ **NO** (SSPC4/ SHF7/SHF8 do not apply)
- ○ **YES** (SSPC4/SHF7/SHF8 applies, subject to review of bat records)

e) If **tree removal (activity 33 or 34)**, estimated amount: _____ ○**ac** ○**trees** ◉**N/A**

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	☐ Oct 15 - Nov 14	☐ Nov 15 - Mar 31	☐ Apr 1 - May 31, Aug 1- Oct 14	☐ Jun 1 - Jul 31
VA	☐ Sep 16 - Nov 15	☐ Nov 16 - Apr 14	☐ Apr 15 - May 31, Aug 1 – Sept 15	☐ Jun 1 - Jul 31
AL	☐ Oct 15 - Nov 14	☐ Nov 15 - Mar 15	☐ Mar 16 - May 31, Aug 1 - Oct 14	☐ Jun 1 - Jul 31
NC	☐ Oct 15 - Nov 14	☐ Nov 15 - Apr 15	☐ Apr 16 - May 31, Aug 1 - Oct 14	☐ Jun 1 - Jul 31
MS	☐ Oct 1 - Nov 14	☐ Nov 15 - Apr 14	☐ Apr 15 - May 31, Aug 1 – Sept 30	☐ Jun 1 - Jul 31

If warranted, does project have flexibility for bat surveys (May 15-Aug 15): ○ **MAYBE** ◉ **YES** ○ **NO**

**** For **PROJECT LEADS** whose projects will be reviewed by a Heritage Reviewer (Natural Resources Organization only), **STOP HERE**. Click File/ Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information. Otherwise continue to Step 5. ****

SECTION 2: REVIEW OF BAT RECORDS (applies to projects with activities from Table 3 ONLY)

STEP 5) **Review of bat/cave records conducted by Heritage/OSAR reviewer?**

◉ **YES** ○ **NO** (Go to Step 13)

Info below completed by:				
☐ **Heritage Reviewer**	(name)		Date	
☐ **OSAR Reviewer**	(name)		Date	
▣ **Terrestrial Zoologist**	(name)	Elizabeth Hamrick	Date	Nov 9, 2020

Gray bat records: ☐ None ☐ Within 3 miles* ☐ Within a cave* ☒ Within the County

Indiana bat records: ☐ None ☒ Within 10 miles* ☐ Within a cave* ☐ Capture/roost tree* ☒ Within the County

Northern long-eared bat records: ☐ None ☐ Within 5 miles* ☐ Within a cave* ☐ Capture/roost tree* ☒ Within the County

Virginia big-eared bat records: ☒ None ☐ Within 6 miles* ☐ Within the County

Caves: ☒ None within 3 mi ☐ Within 3 miles but > 0.5 mi ☐ Within 0.5 mi but > 0.25 mi* ☐ Within 0.25 mi but > 200 feet* ☐ Within 200 feet*

Bat Habitat Inspection Sheet completed? ◉ **NO** ○ **YES**

Amount of SUITABLE habitat to be removed/burned (may differ from STEP 4e): _____ **(**○**ac** ○**trees)*** ◉**N/A**

STEP 6) Provide any additional notes resulting from Heritage Reviewer records review in Notes box below then . . . . . Go to Step 13

Notes from Bat Records Review (e.g., historic record; bats not on landscape during action; DOT bridge survey with negative results):

Indiana bat record within 10 miles is an acoustic record. There are no Indiana bat hibernacula within 10 miles of Paradise plant

STEPS 7-12 To be Completed by Terrestrial Zoologist (if warranted):

STEP 7) Project will involve:

- ☐ Removal of suitable trees within 0.5 mile of P1-P2 Indiana bat hibernacula or 0.25 mile of P3-P4 Indiana bat hibernacula or any NLEB hibernacula.
- ☐ Removal of suitable trees within 10 miles of documented Indiana bat (or within 5 miles of NLEB) hibernacula.
- ☐ Removal of suitable trees > 10 miles from documented Indiana bat (> 5 miles from NLEB) hibernacula.
- ☐ Removal of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.
- ☐ Removal of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.
- ☐ Removal of suitable trees > 2.5 miles from Indiana bat roost trees or > 5 miles from Indiana bat capture sites.
- ☐ Removal of documented Indiana bat or NLEB roost tree, if still suitable.
- ☒ N/A

STEP 8) Presence/absence surveys were/will be conducted: ○ **YES** ○ **NO** ◉ **TBD**

STEP 9) Presence/absence survey results, on _____ ○ **NEGATIVE** ○ **POSITIVE** ◉ **N/A**

STEP 10) Project ○ **WILL** ◉ **WILL NOT** require use of Incidental Take in the amount of _____ ○ **acres or** ○ **trees** proposed to be used during the ○ **WINTER** ○ **VOLANT SEASON** ○ **NON-VOLANT SEASON** ◉ **N/A**

STEP 11) Available Incidental Take (prior to accounting for this project) as of _____

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
5 Operate, Maintain, Retire, Expand, Construct Power Plants				

STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: $ _____ OR ◉ **N/A**

TERRESTRIAL ZOOLOGISTS, after completing SECTION 2, review Table 4, modify as needed, and then complete section for Terrestrial Zoologists at end of form.

SECTION 3: REQUIRED CONSERVATION MEASURES

STEP 13) Review Conservation Measures in Table 4 and ensure those selected are relevant to the project. If not, manually override and uncheck irrelevant measures, and explain why in ADDITIONAL NOTES below Table 4.

Did review of Table 4 result in ANY remaining Conservation Measures in **RED**?

- ○ **NO** (Go to Step 14)
- ◉ **YES** (STOP HERE; Submit for Terrestrial Zoology Review. Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information).

Table 4. TVA's ESA Section 7 Programmatic Bat Consultation Required Conservation Measures

The Conservation Measures in Table 4 are automatically selected based on your choices in Tables 2 and 3 but can be manually overridden, if necessary. To Manually override, press the button and enter your name.

Manual Override

Name: Elizabeth Hamrick

Check if Applies to Project	Activities Subject To Conservation Measure	Conservation Measure Description
		NV1 - Noise will be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.
		AR1 - Projects that involve structural modification or demolition of buildings, bridges, and potentially suitable box culverts, will require assessment to determine if structure has characteristics that make it a potentially suitable unconventional bat roost. If so a survey to determine if bats may be present will be conducted. Structural assessment will include: o Visual check that includes an exhaustive internal/external inspection of building to look for evidence of bats (e.g., bat droppings, roost entrance/exit holes); this can be done at any time of year, preferably when bats are active. o Where accessible and health and safety considerations allow, a survey of roof space for evidence of bats (e.g., droppings, scratch marks, staining, sightings), noting relevant characteristics of internal features that provide potential access points and roosting opportunities. Suitable characteristic may include: gaps between tiles and roof lining, access points via eaves, gaps between timbers or around mortise joints, gaps around top and gable end walls, gaps within roof walling or around tops of chimney breasts, and clean ridge beams. o Features with high-medium likelihood of harboring bats but cannot be checked visually include soffits, cavity walls, space between roof covering and roof lining. o Applies to box culverts that are at least 5 feet (1.5 meters) tall and with one or more of the following characteristics. Suitable culverts for bat day roosts have the following characteristics: • Location in relatively warm areas • Between 5-10 feet (1.5-3 meters) tall and 300 ft (100 m) or more long • Openings protected from high winds • Not susceptible to flooding • Inner areas relatively dark with roughened walls or ceilings • Crevices, imperfections, or swallow nests o Bridge survey protocols will be adapted from the Programmatic Biological Opinion for the Federal Highway Administration (Appendix D of USFWS 2016c, which includes a Bridge Structure Assessment Guidance and a Bridge Structure Assessment Form). o Bat surveys usually are NOT needed in the following circumstances: • Domestic garages /sheds with no enclosed roof space (with no ceiling) • Modern flat-roofed buildings • Metal framed and roofed buildings • Buildings where roof space is regularly used (e.g., attic space converted to living space, living space open to rafters) or where all roof space is lit from skylights or windows. Large/tall roof spaces may be dark enough at apex to provide roost space
		AR2 - Additional bat P/A surveys (e.g., emergence counts) conducted if warranted (i.e., when AR1 indicates that bats may be present).

	SSPC2 - Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.
	SSPC3 (**Power Plants only**) - Power Plant actions and activities will continue to implement standard environmental practices. These include: o Best Management Practices (BMPs) in accordance with regulations: • Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy • Maintain every site with well-equipped spill response kits, included in some heavy equipment • Conduct Quarterly Internal Environmental Field Assessments at each sight • Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant. • When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage o Construction Site Protection Methods • Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites • Storm drain protection device • Check dam to help slow down silt flow • Silt fencing to reduce sediment movement o Storm Water Pollution Prevention (SWPP) Pollution Control Strategies • Minimize storm water contact with disturbed soils at construction site • Protect disturbed soil areas from erosion • Minimize sediment in storm water before discharge • Prevent storm water contact with other pollutants • Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac) o Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to • Minimize fuel and chemical use Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy • Maintain every site with well-equipped spill response kits, included in some heavy equipment • Conduct Quarterly Internal Environmental Field Assessments at each sight • Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant. • When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage o Construction Site Protection Methods • Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites • Storm drain protection device • Check dam to help slow down silt flow • Silt fencing to reduce sediment movement o Storm Water Pollution Prevention (SWPP) Pollution Control Strategies • Minimize storm water contact with disturbed soils at construction site • Protect disturbed soil areas from erosion • Minimize sediment in storm water before discharge • Prevent storm water contact with other pollutants • Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac) o Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to minimize fuel and chemical use

	SSPC5 (**26a, Solar, Economic Development only**) - Section 26a permits and contracts associated with solar projects, economic development projects or land use projects include standards and conditions that include standard BMPs for sediment and contaminants as well as measures to avoid or minimize impacts to sensitive species or other resources consistent with applicable laws and Executive Orders.
	L1 - Direct temporary lighting away from suitable habitat during the active season.
	L2 - Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).

[1]Bats addressed in consultation (02/2018), which includes gray bat (listed in 1976), Indiana bat (listed in 1967), northern long-eared bat (listed in 2015), and Virginia big-eared bat (listed in 1979).

Hide All Unchecked Conservation Measures

- (•) HIDE
- ( ) UNHIDE

Hide Table 4 Columns 1 and 2 to Facilitate Clean Copy and Paste

- (•) HIDE
- ( ) UNHIDE

NOTES (additional info from field review, explanation of no impact or removal of conservation measures).

A preliminary survey of buildings has narrowed down which buildings have the potential to provide habitat for bats. These buildings will be resurveyed in the appropriate season before demolition.

STEP 14) Save completed form (Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date") in project environmental documentation (e.g. CEC, Appendix to EA). _Submission of this form indicates that Project Lead/ Applicant:

[ ] (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified in Table 4 is required to comply with TVA's Endangered Species Act programmatic bat consultation.
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

For Use by Terrestrial Zoologist Only

☒ Terrestrial Zoologist acknowledges that Project Lead/Contact (name) Carol Freeman has been informed of any relevant conservation measures and/or provided a copy of this form.

☐ For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, Terrestrial Zoologist acknowledges that Project Lead/Contact has been informed that project will result in use of Incidental Take [ ] ○ ac ○ trees and that use of Take will require $ [ ] contribution to TVA's Conservation Fund upon completion of activity (amount entered should be $0 if cleared in winter).

For Terrestrial Zoology Use Only. Finalize and Print to Noneditable PDF.