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SUGAR CAMP ENERGY, LLC MINE NO. 1 SIGNIFICANT BOUNDARY REVISION 8

DRAFT ENVIRONMENTAL IMPACT STATEMENT

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE

August 2024

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COVER SHEET

Sugar Camp Energy, LLC Mine No. 1 Significant Boundary Revision 8

Proposed action:	The Tennessee Valley Authority (TVA) proposes to authorize the mining of TVA-owned coal, currently leased to Sugar Camp Energy, LLC (Sugar Camp), underlying approximately 21,868 acres and evaluate the divestment of TVA's coal, oil, and gas rights in southern Illinois (TVA Mineral Rights Area). Actions associated with Sugar Camp's proposed mining plan include subsidence of much of the mined area, the construction of bleeder shaft facilities, and the processing of the coal at an existing coal preparation plant.
Type of document:	Draft Environmental Impact Statement
Lead agency:	Tennessee Valley Authority
Cooperating agency:	U.S. Environmental Protection Agency
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Comments due date:	October 15, 2024

Abstract: TVA prepared this environmental impact statement (EIS) to evaluate the environmental effects of the proposed expansion of mining operations by Sugar Camp to extract TVA-owned coal from a 21,868-acre area in southern Illinois as proposed in Significant Boundary Revision (SBR) Number (No.) 8 of its Underground Coal Mine (UCM) Permit No. 382. Four alternatives are evaluated in this EIS, consisting of a No Action Alternative and three action alternatives. Under the No Action Alternative, TVA would not approve the requested expansion to mine TVA-owned coal within a slightly larger 22,414-acre area (SBR No. 8 Mine Area) nor sell the TVA Mineral Rights Area to another entity. Under Action Alternative A, TVA would implement the terms of the existing coal lease agreement and approve the plan to mine TVA-owned coal in the SBR No. 8 Mine Area. Under Action Alternative B, TVA would approve the plan to mine TVA coal as described for Action Alternative A and divest the remaining TVA Mineral Rights Area. Under Action Alternative C, TVA would not approve Sugar Camp's current plan to mine TVA coal and would divest the entire TVA Mineral Rights Area. Action Alternatives A and B include the planned subsidence above the extracted coal, the construction and operation of six bleeder shaft facilities, and the coal processing at an existing coal preparation plant. Connected actions associated with Action Alternatives B and C include the potential for future mining of divested coal reserves by other entities. At this time, TVA does not have a preferred alternative, and will select between these alternatives in a subsequent record of decision after consideration of comments received and consideration of environmental effects.

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EXECUTIVE SUMMARY

Purpose and Need for Action

Tennessee Valley Authority (TVA) owns coal reserves underlying approximately 64,689 acres of land in Franklin, Hamilton, and Jefferson counties, Illinois Figure 1-1. TVA executed a coal lease agreement with Sugar Camp Energy, LLC (Sugar Camp) in July 2002 for the TVA-owned coal. As part of Significant Boundary Revision (SBR) Number (No.) 8 of its Underground Coal Mine (UCM) Permit No. 382, Sugar Camp presented to TVA a mining plan to expand its underground longwall mining operations by approximately 22,414 acres (SBR No. 8 Mine Area). TVA-owned coal reserves underlie approximately 21,868 acres of the proposed 22,414-acre mine expansion. In fulfilling its responsibilities under the National Environmental Policy Act (NEPA), TVA has prepared this environmental impact statement (EIS) to support and inform TVA's decision on whether to approve Sugar Camp's application to mine TVA-owned coal in the SBR No. 8 Mine Area and/or to divest TVA of all remaining mineral reserves in Illinois (hereafter, TVA Mineral Rights Area), in part to support TVA's plans to retire aging coal units as they reach the end of their useful life (expected by 2035), and as part of TVA's aspirational goal of net-zero carbon emissions by 2050. The primary purpose of adhering to the executed lease agreement is to recoup the investment that TVA has already made and comply with the terms and conditions of the previously executed leases and agreements regarding the TVA Mineral Rights Area. The primary purpose of divesting the TVA Mineral Rights Area is for TVA to recover economic value from the initial expenditure.

Alternatives

In this EIS, TVA evaluates a No Action Alternative and three Action Alternatives. The No Action Alternative would consist of TVA not approving the mining of the SBR No. 8 Mine Area nor divesting the TVA Mineral Rights Area to another entity. Action Alternative A would consist of TVA implementing the terms of the existing coal lease agreement and approving the plan to mine the TVA-owned coal as submitted by Sugar Camp in SBR No. 8 of UCM Permit No. 382. Action Alternative B would consist of TVA implementing the terms of the existing coal lease agreement by approving mining of the TVA-owned coal in the SBR No. 8 Mine Area and divesting the remaining TVA Mineral Rights Area. Action Alternative C would consist of TVA not approving Sugar Camp's request to mine the TVA-owned coal in the SBR No. 8 Mine Area and divesting the entire TVA Mineral Rights Area. Action Alternatives A and B would also include the planned subsidence of the ground surface above the extracted coal in the SBR No. 8 Mine Area, the construction and operation of six bleeder ventilation shafts in the SBR No. 8 Mine Area, and the processing of the extracted TVA-owned coal at an existing coal preparation plant. Connected actions to Action Alternatives B and C include the possible future mining of the divested coal reserves by other entities, with consideration of subsidence and coal processing associated with the mining of divested coal. TVA's analyses of the Action Alternatives take into account the proposed mining plan in addition to the effects associated with ongoing mining operations and the divestment of the TVA Mineral Rights Area, given that TVA plans to retire aging coal units as they reach the end of their useful life and as part of TVA's aspirational goal of net-zero carbon emissions by 2050. At this time, TVA does not have a preferred alternative, and will select between these alternatives in a subsequent record of decision after consideration of comments received and consideration of environmental effects.

Affected Environment

Geology, Soils and Prime Farmland

The SBR No. 8 Mine Area and the TVA Mineral Rights Area lie within the southern portion of the Illinois Basin coalfield, the Herrin No. 6 coal seam, and an area with a high seismic risk. Soils range from moderately drained to poorly drained. A total of 48 soil units are mapped within the SBR No. 8 Mine Area and 63 soil units are mapped within the TVA Mineral Rights Area. Approximately 94.5 percent of the SBR No. 8 Mine Area and 61.2 percent of the TVA Mineral Rights Area are designated as prime farmland or farmland of statewide importance.

Water Resources

There are no recorded major aquifers in the SBR No. 8 Mine Area nor the TVA Mineral Rights Area. Minor aquifers with potential surficial sources exist in the Middle Fork Big Muddy River Valley and its larger tributaries and generally provide sufficient water for domestic supplies. As a result of the existing longwall mining operations, Sugar Camp has reportedly experienced water diminishment in wells within Sugar Camp Mine No. 1; however, the Illinois Department of Natural Resources (IDNR) has not been contacted by any resident regarding well water issues. Due to this diminishment, Sugar Camp provided well owners with public water supply connections and has a plan in place to continually monitor water levels in these wells.

The TVA Mineral Rights Area and the SBR No. 8 Mine Area lie within three watersheds: Rend Lake-Big Muddy River, Middle Fork Big Muddy River, and Big Creek. The TVA Mineral Rights Area lies within two additional watersheds: Middle Fork Saline River and North Fork Saline River. Eleven named streams and many unnamed tributaries and creeks flow through the SBR No. 8 Mine Area and the TVA Mineral Rights Area; an additional 11 named streams flow through the TVA Mineral Rights Area. Within the SBR No. 8 Mine Area and TVA Mineral Rights Area, there are ponds, lakes, freshwater forested/shrub wetlands, and emergent wetlands. Comprehensive environmental surveys were completed on the Viking District No. 4 bleeder shaft site (hereafter, No. 4 Bleeder Shaft) in fall 2023 and identified a total of two intermittent stream channels, nine ephemeral features, four wet weather conveyances, and one pond.

One-hundred-year floodplains occur in the TVA Mineral Rights Area within Franklin, Hamilton, and Jefferson counties.

According to the Illinois Environmental Protection Agency (IEPA), four streams within the TVA Mineral Rights Area are listed as impaired on the 2022 303(d) list: Sugar Camp Creek, Akin Creek, Greasy Creek, and Middle Fork Big Muddy River. Sugar Camp Creek is also located within the SBR No. 8 Mine Area.

SBR No. 8 Mine Area and the TVA Mineral Rights Area are served by multiple public utility water districts. The source of the water supply for these water districts is Rend Lake Inter-City Water System. One other known public water supply source is within 10 miles of the TVA Mineral Rights Area, the Mt. Vernon Water District.

Air Quality and Greenhouse Gases

Franklin, Hamilton, and Jefferson counties are currently designated as in attainment for all National Ambient Air Quality Standards. The existing Sugar Camp Energy Mine No. 1 is currently subject to the U.S. Environmental Protection Agency's (USEPA) Greenhouse Gas Reporting Program (GHGRP). Based on climate data from Mt. Vernon, Illinois,

approximately 20 miles north of the SBR No. 8 Mine Area, the average temperature ranges from 29.5°F (January) to 76.5°F (July). Annual precipitation averages 43.4 inches per year, with April and May tending to have the highest monthly precipitation. Average annual snowfall is around 14 inches per year. On average, approximately 54 tornados occur in Illinois per year.

The major sources of current GHG emissions associated with the TVA Mineral Rights Area result from previously approved mining and include mining and coal processing operations, venting of coal bed methane, transportation of mined coal to end users, and combustion of mined coal by end users.

Biological Resources

The SBR No. 8 Mine Area and the TVA Mineral Rights Area are located in the Southern Illinoian Till Plain, a subdivision of the Interior River Valleys and Hills ecoregion. Once covered by a mosaic of oak-hickory forests and bluestem prairies, the area has largely been converted to agricultural lands. Forested areas are now largely confined to side slopes and river bottoms unsuitable for farming, and bluestem prairies are found in a mosaic pattern with the oak-hickory forest. Vegetation on the No. 4 Bleeder Shaft is comprised of 72 percent cropland, 13 percent herbaceous plants, and 11 percent deciduous forests.

Species that cannot subsist in cropland areas are restricted to early successional habitats or forested habitats along the rivers and streams. According to the Illinois Natural History Survey, marbled salamander, gray tree frog, northern watersnake, eastern box turtle, American mink, river otter, beaver, swamp rabbit, and white-tailed deer may be found in bottomland forests. Relatively few bird species can use monocultural cropland habitat, though developed and disturbed areas are home to several common bird species, including American robin, American crow, Carolina chickadee, European starling, house finch, house sparrow, mourning dove, Carolina wren, northern cardinal, northern mockingbird, black vulture, and turkey vulture. Roadside ditches may provide habitat for amphibians, including American toad, Fowler's toad, southern leopard frog, and upland chorus frog; and potential habitat for reptiles, including red-bellied snake, gray rat snake, and smooth earth snake. A total of 32 species of birds of conservation concern may occur in the SBR No 8. Mine Area and TVA Mineral Rights Area, of which three may also occur in the footprint of the No. 4 Bleeder Shaft: chimney swift, field sparrow, and red-headed woodpecker.

Species of conservation concern potentially present within the TVA Mineral Rights Area, SBR No. 8 Mine Area, and No. 4 Bleeder Shaft were identified using U.S. Fish and Wildlife Service Information for Planning and Consultation and IDNR Ecological Compliance Assessment (EcoCAT) tools. For the TVA Mineral Rights Area and SBR No. 8 Mine Area, these species consist of two birds (piping plover and whooping crane), three mammals (Indiana bat, northern long-eared bat, and tricolored bat), and one insect (monarch butterfly). Bald eagles may be present within the TVA Mineral Rights Area. Designated critical habitat for these species does not occur in the SBR No. 8 Mine Area and TVA Mineral Rights Area. According to the IPaC, the range for the Indiana bat, northern long-eared bat, tricolored bat, whooping crane, and monarch butterfly may overlap with the No. 4 Bleeder Shaft. The little brown bat, whose listing status is under review, is also addressed in this EIS.

Natural Areas, Parks, and Recreation

Natural areas, parks, and recreation (including protected lands such as Illinois Nature Preserves, Illinois Natural Areas Inventory sites, public and privately-owned natural lands, and municipal parks) were identified using the IDNR EcoCAT tool. One State Fish and Wildlife Area (SFWA), Ten Mile Creek, lies within the TVA Mineral Rights Area. No natural areas nor protected lands lie within the boundaries of the SBR No. 8 Mine Area nor the No. 4 Bleeder Shaft. Seven natural areas are present within a 10-mile radius of the SBR No. 8 Mine Area and TVA Mineral Rights Area: Karcher's Post Oak Wood Nature Preserve, Benton Community Park, Rend Lake, Rend Lake SFWA, Wayne Fitzgerrell State Recreation Area, Mt. Vernon Game Propagation Center, and Ten Mile Creek SFWA.

Land Use

According to the U.S. Geological Survey's National Land Cover Database, land use is dominated by agriculture including hay/pasture and cultivated crops. Additional land uses include small areas of developed land including residential and industrial/commercial. There are 51 existing oil wells and 176 abandoned, plugged, and miscellaneous wells within the SBR No. 8 Mine Area and an additional 101 existing oil wells and 337 abandoned, plugged, and miscellaneous wells within the remaining TVA Mineral Rights Area. The SBR No. 8 Mine Area and TVA Mineral Rights Area are primarily within unincorporated portions of Franklin, Jefferson, and Hamilton counties that are not currently zoned. Approximately 646 acres of both the SBR No. 8 Mine Area and TVA Mineral Rights Area are located within the Village of Ewing. Approximately 39 acres of the TVA Mineral Rights Area is located within the Village of Macedonia and 36 acres is located within the Village of Belle Rive. The Cities of Benton and Rend Lake are located a few miles to the west.

Transportation

There are approximately 50 miles of local roads and 4.7 miles of railroad in the SBR No. 8 Mine Area and the TVA Mineral Rights Area. An additional 99 miles of roads and 18.7 miles of railroad are in the TVA Mineral Rights Area. Two rail lines intersect the SBR No 8. Mine Area and TVA Mineral Rights Area and are operated by Canadian National Railway Company and Evansville Western Railway. The closest general aviation airport is the Benton Municipal Airport in Benton, located approximately 4.6 miles southwest. The closest major airport is the Lambert-St. Louis International Airport in St. Louis, Missouri located approximately 118 miles northwest.

Utilities

There are multiple utility providers operating within the SBR No. 8 Mine Area and TVA Mineral Rights Area. Within the SBR No. 8 Mine Area and TVA Mineral Rights Area there are approximately 48 segments of communications lines, 33 segments of public water lines, and a portion of an electrical line. An additional 25 segments of communications lines, 45 segments of public water lines, two segments of gas lines, and one portion of an electrical line are within the TVA Mineral Rights Area.

Cultural Resources

According to the Illinois Inventory of Archaeological Sites (IIAS), the SBR No. 8 Mine Area is in an area with a low to moderate probability for archaeological sites. Forty-three archaeological sites have been recorded within the TVA Mineral Rights Area and 26 of these sites are within the SBR No. 8 Mine Area. Nine of these sites were recorded during surveys Sugar Camp conducted for their mining operations. None of these sites have been recommended eligible for the National Register of Historic Places (NRHP). Prior to the 2023 field survey of the No. 4 Bleeder Shaft site, previously identified archaeological sites and

surveys located within a 1-mile radius were identified via the IIAS. One previously recorded archaeological site was on the No. 4 Bleeder Shaft site. As a result of the survey, one new site was recorded. As both sites are unlikely to provide new knowledge about the prehistory or history of Hamiliton County, and lack integrity and significance, they are not recommended eligible for listing in the NRHP.

There are ten historic architectural resources within the TVA Mineral Rights Area, with four of the sites located within the SBR No. 8 Mine Area. The buildings are residential and/or farmstead buildings recorded during the structure survey for SBR No. 6 and located in rural areas outside of Benton and Thompsonville. Five churches and three cemeteries of unknown age were also identified during the structure survey for SBR No. 6; these are present within the SBR No. 8 Mine Area. If any of these are determined to be of potential historic age, they would be evaluated for NRHP eligibility. There are no known historic bridges in the SBR No. 8 Mine Area. During the architectural resources survey of the No. 4 Bleeder Shaft, six historic-age architectural resources were recorded, none of which are recommended eligible for listing in the NRHP.

Waste Management

Coarse coal refuse from the SBR No. 8 Mine Area is projected for disposal at the East Refuse Disposal Area (RDA) (pending approval from state and Federal authorities), and fine coal refuse is projected for disposal at the North RDA (more than 10 years of fine coal refuse life remaining). The North RDA of the existing Permit No. 382 area is used almost exclusively for disposal of both coarse and fine coal refuse produced during the coal preparation process.

A reverse osmosis (RO) treatment plant, located outside of the TVA Mineral Rights Area, treats the high chloride water into two waste streams. About 75 percent of the treated water (approximately two million gallons per day) is pumped directly to Pond 001, where it is then utilized by the coal preparation plant. The second waste stream is a liquid concentrate, consisting of approximately 675,000 gallons per day. About half of this second waste stream is disposed in two on-site deep injection wells, while the remaining half is sent to the North RDA. The RO treatment plant, combined with the deep injection wells, was the best available treatment option and has been approved by both the IEPA and IDNR Office of Mines and Minerals (OMM). Wastewater generated during potential future mining activities will be directed to the RO treatment plant. Concentrated saline reject water from the RO treatment plant is either pumped to underground injection wells or discharged to the North RDA; however, the treatment of wastewater is limited by the capacity of the RO treatment plant and the North RDA at the time of pumping.

Public and Occupational Health and Safety

Safety requirements are a condition of obtaining regulatory permits and approvals to construct, operate, and close mines. Safety issues are typically addressed under state and federal regulatory programs designed to ensure physical safety pertaining to engineering design and structural integrity of the project components and infrastructure, and safe storage, use, transportation, and disposal of materials, product, and waste streams. It also includes operational safety for workers, the safety of visitors to the facility, and the safety of the general public in the vicinity. Public emergency services include urgent care clinics, hospitals, law enforcement services, and fire protection services.

Socioeconomics

The SBR No. 8 Mine Area and TVA Mineral Rights Area are located in unincorporated, primarily rural portions of eastern Franklin County, western Hamilton County, and southeastern Jefferson County. The SBR No. 8 Mine Area and TVA Mineral Rights Area overlap USCB 2020 Census Tract (CT) 412 Block Groups (BGs) 2 and 3 in Franklin County, CT 9732 BG 3 and CT 9733 BG 1 in Hamilton County, and CT 504 BG 1 in Jefferson County. Additionally, the TVA Mineral Rights Area overlaps with CT 412 BGs 2 and 3 in Franklin County, CT 9732 BG 3 and CT 1933 BG 2 in Hamilton County, and CT 504 BG 1 in Jefferson County.

All CT BGs, except for two, have decreased in population from 2010 to 2020. Seven of the 10 BGs had unemployment rates above that of the state. Based on the ACS, per capita income in all the affected BGs was lower than that of the state (ACS 2022). Manufacturing, education services, and healthcare generally lead the industries for employment.

Environmental Justice

According to USCB data, Franklin, Hamilton, and Jefferson counties have lower median household incomes than across the state and nation. Minority populations constitute approximately 6 percent of the total population in Franklin County, 5 percent in Hamilton County, and 15 percent in Jefferson County. According to USEPA EJScreen data, three of the CT BGs in the SBR No. 8 Mine Area and TVA Mineral Rights Area contain pollutants at levels significantly higher than state averages.

Noise and Visual Resources

Ambient noise in the TVA Mineral Rights Area, SBR No. 8 Mine Area, and No. 4 Bleeder Shaft area consists mainly of agricultural, road and rail transportation, rural, and natural sounds such as wind and wildlife. Generally, noise levels of these types range from 45 to 55 dBA.

Visual characteristics of the TVA Mineral Rights Area, SBR No. 8 Mine Area, and No. 4 Bleeder Shaft area are mostly rural, with agricultural and pasture fields, flat terrain with rolling hills, forested areas, and generally small towns and communities. Many buildings, including schools, cemeteries, and churches, are located within the SBR No. 8 Mine Area and TVA Mineral Rights Area. Prominent visual receptors near the No. 4 Bleeder Shaft include six residential farm complexes and three isolated residential buildings.

Environmental Consequences

Under the No Action Alternative, impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated, per IDNR-OMM permit requirements.

Under Alternatives B and C, the TVA Mineral Rights Area would be divested, and the purchasing entity may or may not elect to mine divested coal reserves. If the purchasing entity elects to mine divested coal reserves, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A, the approval of Sugar Camp's SBR No. 8 mine plan. If the purchasing entity did not elect to mine the divested coal reserves, TVA assumes the impacts would be as described above for the No Action Alternative.

Geology, Soils and Prime Farmland

Approval of the plan to mine TVA-owned coal in the SBR No. 8 Mine Area (Alternative A) would result in temporary impacts to soils due to surface disturbances and planned subsidence. During construction and operation, farmland would be temporarily disturbed at the locations of six bleeder shaft facilities (approximately 39 acres). The bleeder shaft facility locations would be restored to IDNR-OMM-approved post-mining conditions, including re-contouring of the ground surface to restore the hydrologic conditions. If the purchasing entity did not elect to mine the divested coal reserves, impacts to geology, soils, and prime farmland would be as described for the No Action Alternative. If the purchasing entity elects to mine the divested coal reserves, impacts to geology, soils, and prime farmland would be as described for Alternative A.

Under all Action Alternatives, extraction of TVA-owned coal would result in a permanent change to the geology of the mined area. The subsidence resulting from the coal removal would also result in the long-term fracturing of the overburden. IDNR-OMM requires coal companies to reestablish drainage patterns and stream profiles affected by mining activities and ensures that the active coal mining operations are properly reclaimed, thereby assuring the restoration of lands affected by mining (including subsidence) to productive uses.

Water Resources

Surface disturbance activities due to mining activities are not anticipated to impact groundwater quantity as no consumptive uses of groundwater are planned. Temporary, short-term groundwater quantity impacts from subsidence could potentially occur resulting from the formation of subsidence fractures. While unlikely in the areas where the room-and-pillar method is used, planned subsidence of up to five and half feet would occur in areas where longwall mining methods are used. Any subsidence could potentially alter any water-bearing strata, however, the fracturing of rock layers during subsidence would not likely cause a significant change in underground hydrologic patterns. Groundwater quantity is expected to recover to pre-mining levels over time. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, the new owners of divested coal reserves would be required to monitor the groundwater throughout the life of the mine, up to and including the time of final bond release. IDNR-OMM reserves the right to add monitoring parameters or monitoring locations should the need arise. If the purchasing entity did not elect to mine the divested coal reserves, impacts to groundwater would be as described for the No Action Alternative.

Planned subsidence would result in minor and temporary impacts to surface waters and wetlands due to altered drainage patterns. As required and approved by IDNR-OMM, the site-specific subsidence mitigation plan, which consists of re-establishing pre-mining drainage patterns by grading and/or tiling to drain areas of trapped or standing water with input from the surface property owner and applicable government agencies, would be put into place. Therefore, temporary impacts could occur to surface waters and wetlands, including WOTUS because of subsidence, but hydrology and drainage would be restored with no permanent impacts to wetlands and surface water. Major impacts to surface water and wetlands at bleeder shaft facility locations are not expected and would be avoided to the maximum extent practicable. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, the new owners of divested coal reserves would be subject to CWA Section 404 permits and Section 401 WQS and IDNR-OMM permit requirements. If

the purchasing entity did not elect to mine the divested coal reserves, impacts to surface waters and wetlands would be as described for the No Action Alternative.

At the completion of any longwall mining, subsidence would occur within the floodplains of Jordan Creek, Taylor Branch, Sugar Camp Creek, Goose Creek, and several unnamed tributaries within the SBR No. 8 Mine Area. Prior to construction of surface facilities, Sugar Camp and/or any new owners of divested coal reserves would be required by IDNR-OMM to avoid or mitigate potential impacts. Subsidence from coal extraction could temporarily increase the size of floodplains and flood depths. Per IDNR-OMM requirements, mining operators, including new owners of divested coal reserves, would be required to correct any drainage changes caused by subsidence and repair any damage that may be caused by subsidence and subsidence-induced flooding. Construction of berms and/or dredging in advance of any planned subsidence would protect land, dwellings, and other structures within potentially flooded areas per IDNR-OMM permit requirements. Under Alternative B and C, if the purchasing entity did not elect to mine the divested coal reserves, impacts to floodplains would be as described for the No Action Alternative.

Temporary impacts to water quality may arise due to surface disturbances, mining operations, and planned subsidence in the SBR No. 8 Mine Area and adjacent areas. Construction and operation of the No. 4 Bleeder Shaft can affect surface water quality via stormwater runoff. However, with proper sediment and erosion controls, sediment loading and the introduction of pollutants to the receiving waters would be minimized. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, IDNR-OMM and NPDES permit requirements should be followed by all new owners and operators of divested coal reserves including groundwater monitoring programs, water quality sampling and treatment activities, and reclamation plans. If the purchasing entity did not elect to mine the divested coal reserves, impacts to water quality would be as described for the No Action Alternative.

Temporary impacts to water supplies due to planned subsidence of 16,129 acres in the SBR No. 8 Mine Area may occur. No effects to water supplies would occur from surface disturbances related to the potential construction and operation of the bleeder shaft facilities. Potential effects to water supplies or availability would be mitigated, per IDNR-OMM requirements. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, IDNR-OMM regulations should be followed by all new owners and operators. No significant, detrimental impacts on drinking, domestic, or residential water supplies are anticipated. Similar impacts would be expected under Alternatives B and C, if divested coal reserves are mined. If the purchasing entity did not elect to mine the divested coal reserves, impacts to water supplies would be as described for the No Action Alternative.

Air Quality and Greenhouse Gases

With approval of the mining plan under Alternative A, an estimated 283 million tons of TVA-owned coal would be mined over the period of 2025 through 2050, with an assumed average annual production of approximately 9.73 million tons. Mining of privately owned and previously approved TVA coal would occur simultaneously, along with other mining operations within a 20-mile radius of Sugar Camp Mine No. 1; together, these actions would result in a cumulative total of approximately 836 million tons of processed coal between 2025 and 2050. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, it is assumed the remaining unmined divested area with at least 427 million tons of recoverable coal would simultaneously be mined at the same annual rate beyond

2050 and end after 2068. Cumulatively, mining of privately owned and previously approved TVA coal would occur simultaneously, along with other mining operations within a 20-mile radius of Sugar Camp Mine No. 1; together, these actions would result in a cumulative total of approximately 1,087 million tons of processed coal between 2025 and 2050, and an additional 175 million tons between 2051 to 2068.

Direct impacts to air quality from anticipated mining of the underground coal would continue in amounts similar to those currently experienced; several indirect impacts to air quality would also continue to occur. The main direct source of criteria pollutant emissions is operation of the coal preparation plant. Based on the USEPA emissions inventory database, the coal preparation plant emitted a total of 40.65 tons of inhalable particulate matter (PM_{10}) and 10.814 tons of PM_{10} in 2017 (no other criteria pollutant emissions were reported). In that year the mine produced 12,812,197 tons of processed coal, which resulted in emission factors of 0.0063 pounds (lb) PM_{10}/ton processed coal produced and 0.0017 lb fine inhalable particulate matter ($PM_{2.5}$)/ton processed coal produced. Using these emission factors, the direct PM_{10} and $PM_{2.5}$ emissions associated with Alternative A are approximately 31 tons per year and 8 tons per year, respectively.

Construction of bleeder shaft facilities would generate air emissions mainly from combustion of diesel fuel for construction equipment and fugitive dust from land disturbance; however, they would be temporary and minor in comparison to the mining operations, coal transport, and eventual coal burning in power plants.

The indirect emissions resulting from potential transportation of the coal to end users were estimated based on information obtained from USEIA (2019 to 2022) for coal shipments from the Sugar Camp Mine No 1. to domestic power plants in 2019 through 2022, estimated rail distances to those sites in 2022, and rail locomotive emission factors developed by USEPA and state air protection agencies, coordinated through the Eastern Regional Technical Advisory Committee. The ultimate destination and shipment methods for the remainder of the coal mined in 2019 to 2022 (i.e., purchased by commodities firms) is unknown and beyond the control of TVA. Any attempt to quantify the amount of this coal, if any, that is exported abroad, and the travel distances/methods, would be highly speculative and add no value to the environmental review.

For the SBR No. 8 Mine Area, the direct and indirect emissions of each criteria pollutant and select hazardous air pollutants caused by potential coal mining and the downstream combustion of the extracted coal is estimated to be between 0.002 and 3.56 percent of the total 2020 U.S. emissions of all pollutants, except sulfur dioxide (SO_2). Comparing the direct and indirect emissions of these pollutants from Alternative B (2025-2050) to the corresponding emissions of the same pollutants at the national level provides a reasonable proxy for assessing potential downstream air quality impacts at a regional or larger scale. The direct and indirect emissions of carbon monoxide (CO), PM_{10}, $PM_{2.5}$, and volatile organic compounds (VOC) as a result of 2025-2050 coal mining and the downstream combustion of the extracted coal is estimated to be between 0.005 and 2.24 percent of the total 2020 U.S. emissions of these pollutants projected for the life span of Alternative B.

The direct and indirect emissions of nitric oxide and nitrous oxide (together, NO_x), SO_2, and mercury due to potential mining and the downstream combustion of the extracted coal from Alternative B are estimated to be between 0.22 and 4.11 percent, 1.25 and 53.5 percent, and 0.71 and 7.12 percent, respectively, of the total U.S. emissions of those pollutants in 2020 projected for the 2025-2050 period of Alternative B. These low percentages indicate a

less than significant air quality impact for these pollutants. Additionally, these emissions would be widely distributed over large regional areas due to transport and combustion of coal in multiple states. The upper bound SO_2 emissions were estimated at 26.75 percent of total U.S. SO_2 emissions in 2020 and the lower bound is 0.63 percent. The upper bound assumes all coal is burned in U.S. power plants with little, if any, emissions control, which is extremely conservative.

As a comparison between all alternatives, the total estimated carbon dioxide equivalent (CO_2e) emissions and Social Cost of Greenhouse Gases (SC-GHG) for each alternative are presented in Table ES-1. For Alternatives B and C, analyses assumed the purchasing entity elects to mine divested coal reserves. If the purchasing entity elects not to mine divested coal reserves, emissions would be as described for the No Action Alternative.

Table ES-1. Total direct and indirect CO_2e emissions by alternative and associated SC-GHG

Alternative	CO_2e Emissions (Million MT)	Time Period	Biden Administration SC-GHG (Nominal Billion $)	Trump Administration SC-GHG (Nominal Billion $)	Time Period
No Action	120	2025-2050	$10.7	$1.0	2025-2050
A	182	2025-2050	$16.3	$1.6	2025-2050
B	440	2025-2068	$32.6	$3.1	2025-2050
C	440	2025-2068	$32.6	$3.1	2025-2050

Notes: MT = metric tons; SC-GHG = social cost of greenhouse gases.

The majority of mining activities under Alternative A occur underground over 500 feet below the land surface. As such, climate change effects are expected to have minimal impact on these underground activities. Surface activities include coal processing which is located adjacent to high-risk floodplain areas. Subsidence of land may increase the number of areas subject to flooding. Construction of berms and/or dredging in advance of planned subsidence would protect land, dwellings, and other structures within potentially flooded areas per IDNR-OMM permit requirements. Increases in flooding events may require more frequent and robust construction activities to protect land and structures from flooding.

Biological Resources

Permanent impacts to vegetation may occur due to surface disturbances and planned subsidence. The footprint of the bleeder shaft facilities would have long term impacts to cultivated crops and pastureland. Once the bleeder shaft facilities are constructed, the portions of land that are not covered by hard surfaces (i.e., graveled areas, access roads, buildings) would be seeded with the approved temporary seed mixture to minimize the potential for erosion. With completion of the operational lives of these mining components, the bleeder shaft facility locations would be restored, based on the IDNR-OMM approved post-mining topographic conditions. Plant communities in the area of planned subsidence may be temporarily impacted by ponded water but would return to IDNR-OMM approved post-mining topographic conditions following reclamation. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, impacts to vegetation are expected to be similar. If the purchasing entity elects not to mine divested coal reserves, impacts to vegetation would be as described for the No Action Alternative.

Surface disturbances and planned subsidence resulting from mining activities would result in temporary, localized impacts to wildlife. Wildlife present at the time of construction of the associated bleeder shaft facilities may relocate to nearby similar habitat for the duration of construction. The temporary inundation of some subsided areas would affect wildlife by displacing some upland species and providing additional habitat for wildlife using wetland habitats. Effects to wildlife resulting from mining would be subject to mitigation under Sugar Camp's integrated fish and wildlife habitat reclamation plan; as such, the impacts to terrestrial wildlife would be insignificant after mitigation. Similarly, migratory bird flight patterns and stopovers would not be significantly impacted. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, impacts to wildlife are expected to be similar. If the purchasing entity elects not to mine divested coal reserves, impacts to wildlife would be as described for the No Action Alternative.

Surface disturbances and planned subsidence resulting from mining activities would result in temporary, localized impacts to aquatic life. While it is not anticipated that the bleeder shaft facilities would affect waterbodies due to avoidance and mitigation measures during siting, the construction and operation of these mining components would be reviewed by IDNR for potential effects on aquatic life. If surface waters occur at the proposed locations of these facilities, direct impacts to aquatic life would be avoided or mitigated, per the IDNR-OMM permit requirements. Prior to reclamation, aquatic life could be affected by the alteration of habitat conditions within streams and changes to riparian conditions due to subsidence. These impacts could result in increased erosion and siltation, loss of in-stream habitat, and increased stream temperatures. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, impacts to aquatic life are expected to be similar. If the purchasing entity elects not to mine divested coal reserves, impacts to aquatic life would be as described for the No Action Alternative.

Temporary impacts to federally- and state-listed threatened and endangered species may occur. Any habitat disturbances to threatened and endangered species resulting from the mining or planned subsidence would be subject to restoration under Sugar Camp's integrated fish and wildlife habitat reclamation plan, per IDNR permit requirements. Potential bat habitat was identified during environmental surveys of the No. 4 Bleeder Shaft. However, no tree clearing is expected therefore no impacts to federally listed bat species are anticipated. No state-listed species were identified in the vicinity of the No. 4 Bleeder Shaft. Prior to the construction of the remaining five bleeder shaft facilities, TVA would conduct additional reviews to determine the effects of the construction and operation of these facilities on federally and state-listed species. As a standard practice for surface disturbances, Sugar Camp would coordinate with USFWS and IDNR to conduct additional presence/absence survey to determine the potential effects on federally and state-listed species or assume presence. Coordination by Sugar Camp with USFWS and IDNR on the effects of subsidence and associated reclamation activities is not expected to occur within the next 12 months. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, impacts to threatened and endangered species are expected to be similar. If the purchasing entity elects not to mine divested coal reserves, impacts to threatened and endangered species would be as described for the No Action Alternative.

Natural Areas, Parks, and Recreation

No direct impacts to natural areas would occur due to surface disturbances or coal extraction in the SBR No. 8 Mine Area. Hydrologic impacts due to actions related to ongoing mining of previously approved TVA- and privately owned coal could result in direct or indirect adverse temporary impacts to natural areas in the vicinity of the TVA Mineral

Rights Area. Portions of Ten Mile Creek SFWA are within the TVA Mineral Rights Area and may experience direct or indirect impacts under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves. Under all alternatives, these impacts would continue to be minimized or mitigated, per IDNR-OMM permit requirements. If the purchasing entity elects not to mine divested coal reserves, impacts to natural areas, parks, and recreation would be as described for the No Action Alternative.

Land Use

Agricultural and pastoral land would be temporarily converted to heavy industrial uses by the construction and operation of bleeder shaft facilities. Upon conclusion of mining at each longwall panel, the end of mining components use-life, and/or the completion of active mining operations, reclamation operations would commence. Reclamation activities would be completed by Sugar Camp in accordance with the approved reclamation plan and the permit conditions developed in accordance with 62 IAC 1700-1850, Permanent Program Rules and Regulations. Sugar Camp estimates that the full reclamation of Sugar Camp Mine No. 1 would begin in 2040. Temporary, minor impacts to land use would occur because of subsidence. Examples of potential damage caused by subsidence include cracks in building foundations and road surfaces or ponding of water from subsided streams, which would have localized, temporary, and minor impacts to land use within the SBR No. 8 Mine Area. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, IDNR-OMM would require present or future owners to reestablish drainage patterns and stream profiles affected by mining activities. Overall, future mining activities would have minor effects on land use as cultivated crops are prevalent in Franklin, Jefferson, and Hamilton counties. Temporary, minor impacts to land use would occur because of subsidence. Consequently, no long-term impacts to land use are expected from underground extraction of coal. If the purchasing entity elects not to mine divested coal reserves, impacts to land use would be as described for the No Action Alternative.

Transportation

Direct impacts to transportation resources associated with implementation of Alternative A would be minor to moderate. No increase in traffic caused by an increase in employees would occur during the proposed mining activities due to capacity limitations. Temporary impacts to roads would occur due to planned subsidence in the SBR No. 8 Mine Area. Planned subsidence may affect Evansville Western Railway, which passes through the southeastern portion of the SBR No. 8 Mine Area. Sugar Camp, in close coordination with Evansville Western Railway, would monitor the railway section as subsidence occurs and implement temporary corrective measures to maintain safe railways. Once the entire subsidence event passes, Sugar Camp, in close coordination with the Evansville Western Railway, would restore any damage to the railways caused by subsidence, per IDNR-OMM requirements. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, IDNR-OMM permit requirements would be followed by all new owners and operators including communication with and waivers from the public authority governing affected roads, coordination with Canadian National Railway and Evansville Western Railway, and reclamation plans. If the purchasing entity elects not to mine divested coal reserves, impacts to transportation would be as described for the No Action Alternative.

Utilities

Planned subsidence would result in temporary impacts to utilities in the SBR No. 8 Mine Area. Utility components may become damaged, broken, or out of alignment because of subsidence. Subsidence could temporarily affect communications, water, natural gas, and electric utility lines that follow public roadways. Sugar Camp either has existing agreements

or would pursue agreements with governmental bodies and utility companies responsible for all utility lines expected to be affected by subsidence. Sugar Camp would be required by IDNR-OMM to inform utility companies well in advance of subsidence to adequately prepare for subsidence effects. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, IDNR-OMM permit requirements would be followed by all new owners and operators including communication with the public authority governing affected utilities, coordination with private utilities companies, and reclamation plans. If the purchasing entity elects not to mine divested coal reserves, impacts to utilities would be as described for the No Action Alternative.

Cultural Resources

Per an agreement between the Illinois Historic Preservation Agency (IHPA) and IDNR, "shadow areas in which there will be no surface disturbance" are a class of exempt activities that are "considered to have no effect on historic properties" (IDNR 2003). Sugar Camp is required by IDNR to repair or compensate owners for structural damage caused by subsidence. TVA would continue to consult with IHPA and interested tribes regarding Project effects to cultural resources in areas outside of the exempted area and activities as described in the agreement between IHPA and IDNR. INDR will review proposed projects and activities to determine if they fit within the classes of exempt projects or activities (IDNR 2003). No impacts to cultural resources caused by the No. 4 Bleeder Shaft construction are anticipated. Prior to construction of other bleeder shaft facilities, TVA would conduct a Phase I cultural resources survey of the areas of potential effect defined for these areas and provide results and recommendations to IHPA for consultation. However, it is expected that the construction and operation of the bleeder shaft facilities would cause minor visual changes to the overall landscape viewshed. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for approval of the plan to mine the TVA-owned coal in the SBR No. 8 Mine Area. If the purchasing entity elects not to mine divested coal reserves, impacts to cultural resources would be as described for the No Action Alternative.

Waste Management

Under Alternative A, TVA would approve Sugar Camp to mine the TVA-owned coal in the SBR No. 8 Mine Area, representing approximately 166 million tons of unprocessed coal. This would be in addition to the mining of the privately owned and previously approved TVA coal included in the No Action Alternative. Preparation of the unprocessed coal is anticipated to produce approximately 83 million tons of coal refuse for disposal in the existing RDAs and the planned East RDA. Refuse material would be managed at the 389-acre East RDA for long term storage from the coal preparation plant. The East RDA would be used to store refuse from the processing of both privately owned and TVA-owned coal. Sugar Camp does not consider any of the refuse onsite as waste, except for bulk oil stored in underground containment for use in mining equipment. Sugar Camp maintains a Spill Prevention, Control, and Countermeasure (SPCC) Plan for onsite bulk oil in containment and reports usage to USEPA, in accordance with applicable regulations.

The extracted coal, both TVA-owned and privately owned, from Sugar Camp Mine No. 1 would be processed at the existing coal preparation plant. The plant is located on privately owned lands occupying approximately 2,420-acres, outside of the SBR No. 8 Mine Area. The plant was approved by IDNR in 2008 and is currently operating. Use of the existing coal preparation plant for Alternative A would not result in new surface facilities, and the overall processing capacity would not change. Under Alternative A, the coal preparation

plant would operate for a longer period of time. The coal preparation plant has a set capacity that would not increase with the addition of the 166 million tons of unprocessed TVA-owned coal, which would result in generation of approximately 83 million tons of coal refuse that would not have otherwise been generated. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for approval of the plan to mine TVA-owned coal in the SBR No. 8 Mine Area. If the purchasing entity elects not to mine divested coal reserves, impacts to waste management would be as described for the No Action Alternative.

Public and Occupational Health and Safety

Sugar Camp complies with MSHA and OSHA through the implementation of numerous site-specific plans for each mining operation. Sugar Camp would follow CFR Part 70 for all underground components of the mine and CFR 30 Part 77 for mandatory safety standards for all surface components of the mine. Sugar Camp houses copies of their Ventilation Plan, Roof Control Plan, and Emergency Response Plan at each mining site. Plans for RDAs, bleeder shaft facilities, and seal installations are technically evaluated, reviewed, and approved by MSHA prior to construction. Sugar Camp also maintains a SPCC Plan and Emergency Management and Fire Fighting plans at the mining site.

Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for approval of the plan to mine TVA-owned coal in the SBR No. 8 Mine Area. As required and approved by IDNR-OMM, new owners' subsidence mitigation plans would be site specific and would restore the original drainage conditions and correct any damage that may have been caused by subsidence (e.g., cracks in building foundations and road surfaces or ponding of water from subsided streams), as necessary, with input from the surface property owner and applicable government agencies. Temporary, minor impacts to public and occupational health and safety would occur because of subsidence, but any subsidence damage to buildings, roads, drainages, or utilities would be restored with no permanent impacts to public and occupational health and safety. If the purchasing entity elects not to mine divested coal reserves, impacts to public and occupational health and safety would be as described for the No Action Alternative.

Socioeconomics

Positive socioeconomic impacts from the mining of SBR No. 8 Mine Area would occur. The mining of TVA-owned coal and the processing of that coal would be carried out by current Sugar Camp employees, with no additional non-construction hiring attributable to the proposed mine expansion. The mining of the TVA-owned coal under Alternative A, however, provides employment for a longer period of time. Employment needs would likely create some new local job opportunities during construction of the proposed mine expansion and bleeder shaft facilities, while mining operations would continue to have positive effects on the local economy through continued employment. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for approval of the plan to mine TVA-owned coal in the SBR No. 8 Mine Area. If the purchasing entity elects not to mine divested coal reserves, impacts to socioeconomics would be as described for the No Action Alternative.

Environmental Justice

Per IDNR permit requirements, bleeder shaft facilities may not be sited within 300 feet of any public building, school, church, community or institutional building, public park, or occupied dwelling, and landowners near the proposed facility location may state concerns about the proximity of these facilities to their properties. While low-income populations are present in the SBR No. 8 Mine Area, the proposed mine expansion would not disproportionately affect environmental justice (EJ) populations as compared to the impacts borne by all populations in and around the SBR No. 8 Mine Area and TVA Mineral Rights Area. Minor beneficial impacts to employment and income levels in the local region could provide additional opportunities to nearby environmental justice populations. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for approval of the plan to mine TVA-owned coal in the SBR No. 8 Mine Area. If the purchasing entity elects not to mine divested coal reserves, impacts to EJ would be as described for the No Action Alternative.

Noise and Visual Resources

Noise would be generated by heavy equipment used to construct the bleeder shaft facilities. Residents close to the bleeder shaft facilities would hear a temporary increase in noise because of construction activities. However, the bleeder shaft facilities are likely to be placed in agricultural areas away from residences and businesses. During normal operation, noise levels at the nearest residences would be comparable to normal ambient noise. After the operational life span of five years, the equipment would be removed, and no additional operational noise would be generated. Operational noise impacts of the bleeder shaft facilities are expected to be minor. Underground mining operations would generally not be heard above ground within the SBR No. 8 Mine Area. Planned subsidence is not expected to result in noise impacts. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, new owners of divested coal reserves should follow IDNR-OMM permit requirements, thus limiting adverse impacts caused by noise. If the purchasing entity elects not to mine divested coal reserves, impacts to noise would be as described for the No Action Alternative.

Visual impacts would occur during construction and operation of the bleeder shaft facilities. During construction, heavy machinery would be present and the SBR No. 8 Mine Area would appear as a mixture of browns and grays due to earthmoving, road construction, and other construction activities. During operation, the bleeder shaft facilities would not be dramatically different from the current scenery in the SBR No. 8 Mine Area. Due to the changing visual character of the SBR No. 8 Mine Area and surrounding area, and the proposed reclamation plan, the change in viewshed from agricultural land and forested areas to industrial coal facilities is not expected to result in permanent adverse impacts. Overall, the adverse visual impacts are expected to occur in various portions of the SBR No. 8 Mine Area over approximately 25 years. Reclamation of the bleeder shaft facilities would revert the industrial coal production views to a grassy area with comparable visual characteristics as the existing environment. Negligible visual impacts may occur as land subsides in a controlled manner, but this is not expected to be noticeable or change the visual character of the SBR No. 8 Mine Area vicinity. Under Alternatives B and C, if the purchasing entity elects to mine divested coal reserves, visual impacts are expected to be similar. If the purchasing entity elects not to mine divested coal reserves, impacts to visual resources would be as described for the No Action Alternative.

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SYMBOLS, ACRONYMS, AND ABBREVIATIONS

AFFF	Aqueous Film Forming Foams
amsl	Above mean sea level
APE	Area of Potential Effect
ARMPS	Analysis of Retreat Mining Pillar Stability
CAA	Clean Air Act
CBM	Coal Bed Methane
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	Methane
CMM	Coal Mine Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CPP	Coal Preparation Plant
CT	Census tract
CWA	Clean Water Act
dB	Decibel
dBA	A-weighted decibel
DBH	Diameter at breast height
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
°F	Fahrenheit
FPPA	Farmland Protection Policy Act
FR	Federal Register
GAO	Government Accountability Office
GHG	Greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GWP	Global Warming Potential
HAP	Hazardous Air Pollutants
HARGIS	Historic Architectural Resources GIS System
HI	Hazard index
HUC	Hydrologic Unit Code
IAC	Illinois Administrative Code

IBR	Incidental Boundary Revision
IDNR	Illinois Department of Natural Resources
IDNR-OMM	Illinois Department of Natural Resources – Office of Mines and Minerals
IDOA	Illinois Department of Agriculture
IDOT	Illinois Department of Transportation
IEM	Iowa Environmental Mesonet
IEPA	Illinois Environmental Protection Agency
IGPA	Illinois Groundwater Protection Act
IHPA	Illinois Historic Preservation Agency
IIAS	Illinois Inventory of Archaeological Sites
ILCS	Illinois Compiled Statutes
INAI	Illinois Natural Areas Inventory
INHS	Illinois Natural History Survey
IPaC	Information for Planning and Consultation
IPCC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan
ISGS	Illinois State Geological Survey
lb	Pound
L_{dn}	Day-night average sound
LRD	Land Reclamation Division
MBTA	Migratory Bird Treaty Act
MSHA	Mine Safety and Health Administration
MT	Metric tons
$MTCO_2e$	Metric tons of carbon dioxide equivalent
µg	Microgram
µm	Micrometer
NA	Natural Area
NAAQS	National Ambient Air Quality Standards
NCA	National Climate Assessment
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
No.	Number
NO	Nitrogen oxide
NO_2	Nitrogen dioxide

NOx	Nitrogen oxide and nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
N_2O	Nitrous oxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O_3	Ozone
OSHA	Occupational Safety and Health Administration
OWR	Office of Water Resources
Pb	Lead
$PM_{2.5}$	Particulate matter whose particles are less than or equal to 2.5 micrometers
PM_{10}	Particulate matter whose particles are less than or equal to 10 micrometers
PPB	Parts per billion
PPM	Parts per million
PRT	Potential Roost Tree
RBP	Rapid Bioassessment Protocol
RCRA	Resource Conservation and Recovery Act
RDA	Refuse disposal area
RFFA	Reasonably foreseeable future action
RMP	Risk management plan
RO	Reverse osmosis
ROM	Run-of-Mine
RRA	Resource Rich Area
SBR	Significant Boundary Revision
SC-GHG	Social cost of greenhouse gas
SCC	Social cost of carbon
SDPS	Surface Deformation Prediction System
SEA	Supplemental Environmental Assessment
SFWA	State Fish and Wildlife Area
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMCRA	Surface Mining Control and Reclamation Act
SO_2	Sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasure
tpy	Tons per year
TVA	Tennessee Valley Authority

UCM	Underground Coal Mine
U.S.	United States
U.S.C.	U.S. Code
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEIA	U.S. Energy Information Administration
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground storage tank
VOC	Volatile organic compound
WQC	Water Quality Certification

GLOSSARY OF TERMS

Bleeder shaft facilities	All six proposed bleeder shafts.
Bleeder ventilation shaft	Part of a ventilation system that removes methane gas from mine areas. Overall, a mine ventilation system consists of entries, ventilation controls, and fans. As part of the system, bleeder shafts circulate clean air throughout the underground workings and release methane-laden air from these areas.
Coal refuse	The reject material that is produced in the processing of coal. Coal naturally occurs interbedded within sedimentary deposits, and the reject material consists of varying amounts of slate, shale, sandstone, siltstone, and clay minerals, which occur within or adjacent to the coal seam, as well as some coal that is not separated during processing.
Coal reserves	Large deposits of coal that have been documented by geological surveys and engineering studies, are accessible, and from which coal can be economically mined.
Coal seam	A coal stratum deposit that occurs between layers of rock.
Coal shearer	A machine body containing electric motors, hydraulic equipment and controls that is mounted over the Armored Face Conveyor. Horizontal cutting drums are mounted on the machine with cutting picks and rotating in a plane parallel to the side of the machine. Coal shearers are sometimes referred to as “continuous miners.”
Coal slurry	Coal mining operations use water to rinse coal once extracted. Coal slurry is the water that is left over from the rinsing process and contains elevated levels of chlorides, sulfates, arsenic, lead, mercury, and selenium.
Continuous mining	An underground mining technique that utilizes machinery to cut and rip coal from the coal seam and load the coal onto conveyors in a continuous operation.
Longwall mining	An underground mining technique capable of extracting “panels” of coal known as “longwall panels.” A coal shearer removes a longwall panel as a single “slice,” while hydraulic jacks support the roof above and in front of the coal shearer. Once a longwall panel is extracted, the coal shearer and hydraulic jacks are advanced, and overlying rock collapses into the void behind, causing subsidence at the surface.
Longwall panel	The “panel” or “slice” of coal mined during the longwall mining process. Longwall panels can measure up to approximately 1,500 feet wide and two miles long.

Mineral rights	The rights to minerals, including coal, oil, and gas, contained beneath the surface of a tract of land. Mineral rights can be conveyed separately from surface land rights.
No. 4 Bleeder Shaft	Viking District No. 4 bleeder shaft facility site.
PFAS	Per- and polyfluoroalkyl substances.
Planned subsidence	Controlled sinking of the ground due to the extraction of coal, water, oil, natural gas, or mineral resources from underground mining, pumping, or fracking activities.
Plate testing	A load-bearing test of soil and rock strata (overburden) overlying an underground mine used for determining the ultimate bearing capacity of the earth's surface and the likelihood of settlement under a given load.
Refuse disposal area	An area used for the permanent disposal or long-term storage of coal refuse.
Room-and-pillar mining	An underground mining technique that extracts coal in a grid-like pattern such that portions of the coal seam are left intact to support the roof of the mine. The series of parallel areas or "rooms" from which coal is extracted are called "entries."
SBR No. 8 Mine Area	22,414-acre proposed mine expansion to Sugar Camp Mine Number 1.
Sedimentation pond	A constructed pond used to slow the velocity of water and cause the deposition of suspended materials.
Shadow area	The geographic area in an application or permit where underground mining is proposed or approved. This area includes all resources above and below the coal that are protected by applicable laws and regulations and may be adversely impacted by underground mining operations, including planned subsidence.
Slurry pond	A constructed pond or lagoon used to settle and drain the solids from coal slurry.
Sugar Camp	Sugar Camp Energy, LLC.
TVA Mineral Rights Area	TVA-owned mineral rights and the accompanying reserves in southern Illinois.

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

Tennessee Valley Authority (TVA) owns coal reserves underlying approximately 65,000 acres of land in Franklin, Hamilton, and Jefferson counties in Illinois and referred to as the TVA Mineral Rights Area (Figure 1-1). TVA executed a coal lease agreement with Sugar Camp Energy, LLC (Sugar Camp) in July 2002 to mine portions of the TVA coal reserves. The lease agreement facilitates the recovery of TVA-owned coal reserves in an environmentally sound manner. Under the terms of the lease agreement, Sugar Camp may not commence mining of TVA-owned coal reserves under a mining plan or any mining plan revision until completion of all environmental reviews required for compliance with applicable laws and regulations have been finalized. As part of Significant Boundary Revision (SBR) Number (No.) 8 of its Underground Coal Mine (UCM) Permit No. 382, Sugar Camp presented to TVA a mining plan to expand its underground longwall mining operations by approximately 22,414 acres (SBR No. 8 Mine Area). TVA-owned coal reserves underlie approximately 21,868 acres of the SBR No. 8 Mine Area (TVA-owned portion of the SBR No. 8 Mine Area) (Figure 1-1).

In fulfilling its responsibilities under the National Environmental Policy Act (NEPA), TVA has prepared this environmental impact statement (EIS) to inform TVA's decision on whether to approve Sugar Camp's application to mine TVA-owned coal reserves within the SBR No. 8 Mine Area and/or divest all remaining TVA-owned mineral reserves in Illinois , given that TVA plans to retire aging coal units as they reach the end of their useful life and as part of TVA's aspirational goal of net-zero carbon emissions by 2050. The primary purpose of adhering to the executed lease agreement is to recoup the investment that TVA has already made and comply with the terms and conditions of the previously executed leases and agreements regarding the TVA Mineral Rights Area. The primary purpose of divesting the TVA Mineral Rights Area is for TVA to recover economic value from the initial expenditure. Surface activities to support underground mining of TVA-owned coal would include partial operation of the existing coal preparation plant, treatment of the byproducts, storage, and transport of the coal. Sugar Camp would utilize its existing Sugar Camp Mine No. 1 facilities to process and ship the extracted coal, and expansion of these facilities is not needed to support the proposed mine expansion. Sugar Camp would also construct approximately six bleeder ventilation shafts and install associated utilities needed to operate the bleeder shafts within the SBR No. 8 Mine Area.

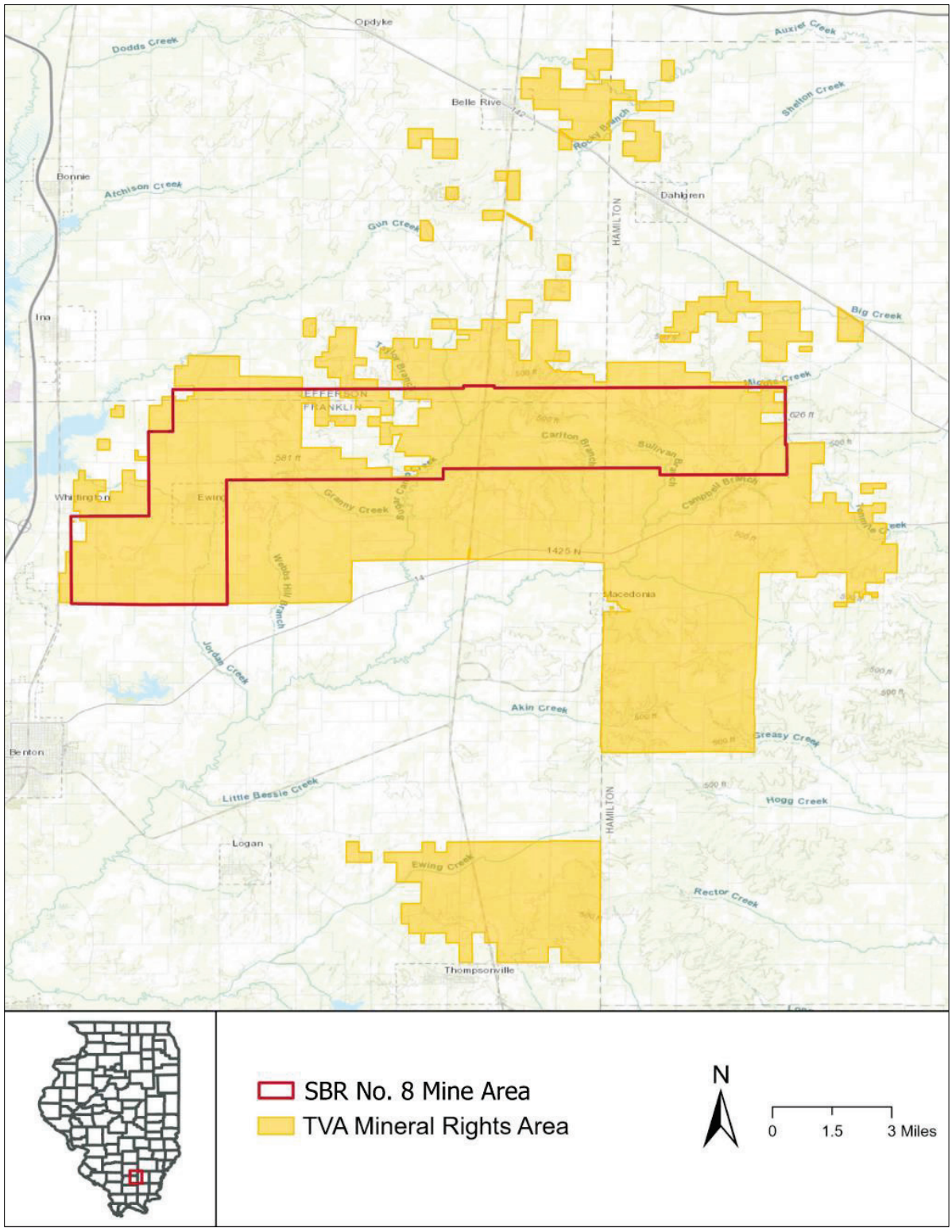

Figure 1-1. Project location

1.1 Background

TVA is a corporate agency of the United States (U.S.) and the largest public power provider in the country. Since 1933, TVA's mission has been to serve the people of the Tennessee Valley region to make life better. As part of its diversified energy strategy, TVA completed a series of land and coal mineral acquisitions from the 1960s through the mid-1980s that resulted in the ownership of two large coal reserve blocks in the southern Illinois section of the Illinois Basin coal region.

TVA generally leases its mineral rights to private coal mining companies and receives royalties on the amount of coal recovered under lease agreements. The coal mined by the companies is generally sold on the market, as is done for the coal reserves extracted by Sugar Camp. TVA occasionally enters into contracts to purchase coal mined from its reserves for use at TVA power plants. The environmental impacts of TVA's coal purchasing policies, as well as TVA's use of coal to generate electricity, have been evaluated in previous EISs, as described in Section 1.3.2.

In 2002, TVA leased its Illinois Basin coal reserves to Sugar Camp with the condition that any proposed mining plan be subject to environmental review and TVA approval. The mining plan is also subject to review and approval by the State of Illinois, which has regulatory authority delegated by the U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement under the Surface Mining Control and Reclamation Act (SMCRA) of 1977.

In 2008, Sugar Camp obtained UCM Permit No. 382 from the Illinois Department of Natural Resources (IDNR), Office of Mines and Minerals (OMM), Land Reclamation Division, referenced hereafter as IDNR-OMM, for Sugar Camp Mine No. 1. UCM Permit No. 382 originally authorized underground longwall mining operations under approximately 12,103 acres in Franklin and Hamilton counties. UCM Permit No. 382 also included a surface effects area to process, store, and transport the coal, where the existing coal preparation plant is located. Since then, Sugar Camp has received permit revisions to expand underground longwall mining operations for Sugar Camp Mine No. 1, and TVA has prepared multiple environmental assessments (EAs) and an EIS on the extraction of TVA-owned coal in these additional areas (see Figure 1-2 and Section 1.3 for further description).

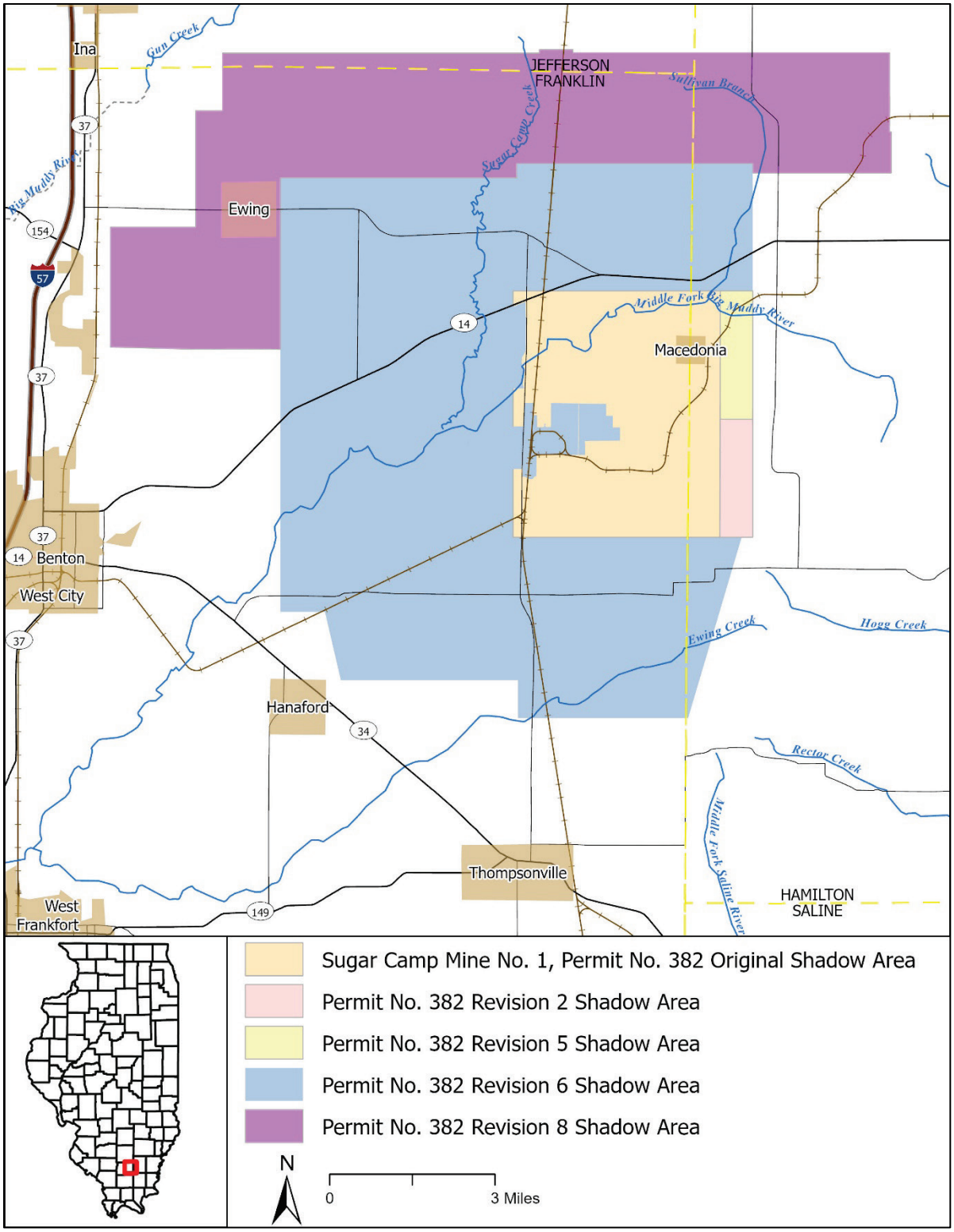

Figure 1-2. Mine area permitted under Sugar Camp Mine No. 1, Permit No. 382 and subsequent permit revisions

1.2 Decision to be Made

In June 2023, Sugar Camp submitted SBR No. 8 of UCM Permit No. 382, to IDNR-OMM for the SBR No. 8 Mine Area. TVA must determine whether or not to implement the terms of the existing coal lease agreement and approve Sugar Camp's proposal to mine the TVA owned coal in the SBR No. 8 Mine Area[1]. The coal reserves in 546 acres of the SBR No. 8 Mine Area are privately owned, and TVA has no decision or permission-granting authorities for the privately owned coal reserves. Connected actions considered as part of the Project include the operation of existing UCM Permit No. 382 facilities for the processing, storage, and transport of coal on an approximately 2,420-acre surface effects area in Franklin County. As part of alternatives to Sugar Camp's SBR No. 8, TVA would also decide whether to divest the TVA Mineral Rights Area.

1.3 Related Environmental Reviews

In 2008, Sugar Camp obtained UCM Permit No. 382 from the IDNR-OMM for underground longwall mining operations under approximately 12,103 acres in Franklin and Hamilton counties. UCM Permit No. 382 also includes a surface effects area to process, store and transport the coal (a connected action to the proposed mine expansion). Since then, Sugar Camp has received multiple permits from IDNR-OMM to expand underground longwall mining operations for Sugar Camp Mine No. 1, and TVA has prepared multiple EAs and supplemental EAs (SEAs) for the mining of TVA-owned coal within each expansion area. Revisions made to this permit and approved by IDNR are listed below, followed by TVA EAs and SEAs that address the mining of TVA-owned coal by Sugar Camp (see TVA [2020] for the NEPA documents listed below).

- Incidental Boundary Revision (IBR) No. 1 to UCM Permit No. 382 (2010) for 1.45 acres of land for road access on private property.
- IBR No. 2 for UCM Permit No. 382 (2010) for 17 acres of surface disturbance for bleeder ventilation shaft installation overlying TVA-owned coal.
- IBR No. 3 for UCM Permit No. 382 (2010) for a 19-acre shadow area associated with TVA-owned coal.
- SBR No. 1 to UCM Permit No. 382 (2010) for 817 acres of subsidence overlying TVA-owned coal. The boundaries of this permit include IBRs Nos. 1–3.
- IBR Nos. 4 and 5 to UCM Permit No. 382 for two concrete bore holes on private property.
- SBR No. 6 to UCM Permit No. 382 (2017) for an underground shadow area revision of an additional 37,972 acres to be mined with the extraction of coal in the Herrin No. 6 seam via longwall mining. The permit was granted in November when IDNR-OMM issued "Results of Review: Permanent Program Significant Revision Application No. 6 to Permit No. 382." This permanent program finding concluded that there was reasonable basis on which to issue a significant revision to UCM Permit No. 382, as modified.

[1] Any reference to TVA coal lease property applies only to TVA's ownership of mineral rights to the underlying coal. TVA does not own the surface land rights.

1.3.1 Sugar Camp Mine No. 1 Reviews

1.3.1.1 TVA Sugar Camp Mine No. 1. EA (May 2011)

This EA evaluated the potential environmental effects of Sugar Camp's proposed mining of approximately 2,600 acres of TVA-owned coal underneath the IBR No. 2 shadow area and a portion of the original 12,103-acre shadow area of the Sugar Camp Mine No. 1.

1.3.1.2 TVA Sugar Camp Mine No. 1. SEA (May 2013)

This SEA evaluated the potential environmental effects of Sugar Camp's proposed mining of TVA-owned coal underneath an additional 880 acres of the IBR No. 3 shadow area.

1.3.1.3 TVA Sugar Camp Mine No. 1 Expansion Viking District No. 2 EA (November 2018)

This EA evaluated the potential environmental effects of the proposed expansion along the north perimeter of its original mine perimeter, into a 2,250-acre area referred to as Viking District No. 2, included in SBR No. 6.

1.3.1.4 TVA Sugar Camp Mine No.1 Expansion Viking District No. 2 SEA (May 2019)

This SEA evaluated the potential environmental effects of the proposed expansion of mining into a 155-acre area adjacent to Viking District No. 2, included in SBR No. 6.

1.3.1.5 TVA Sugar Camp Mine No. 1 Boundary Revision No. 6 EIS (March 2020)

This EIS evaluated the potential environmental effects of the proposed mining of approximately 12,125 acres of TVA-owned coal, construction of five bleeder shaft facilities, and building of the east Refuse Disposal Area (RDA).

1.3.2 Coal Purchase and Utilization Reviews

TVA regularly enters into coal purchase contracts and these purchases have the potential to include the acquisition of TVA-owned coal extracted under the Action Alternatives. TVA generally evaluated the effects of purchasing and utilizing coal in previous NEPA reviews. In 1971, TVA issued the Final Environmental Statement on Policies Relating to Sources of Coal used by Tennessee Valley Authority for Electric Power Generation, which programmatically addressed the potential effects of TVA's continuing purchase of coal to burn at TVA power plants. Among other considerations, the document presents impacts from underground mining, including acid and chemical drainage, land stabilization issues, worker safety hazards, erosion, and visual effects, and considers several alternatives to coal purchase.

In June 2019, TVA completed an Integrated Resource Plan (IRP) and associated EIS to determine how TVA will meet the demand for electricity in its service territory over the next 20 years, while achieving TVA's objectives to deliver reliable, low-cost, and cleaner energy with fewer environmental impacts. The IRP EIS describes TVA's 2015—2018 coal purchasing activities. In FY2018, TVA purchased approximately 54 percent of its coal from the Illinois Basin, within which Sugar Camp Mine No. 1 operates, and most of that coal was extracted by underground mining methods. Illinois Basin coal is described as having higher methane emissions than other coal reserves from which TVA purchases coal, likely due to the higher methane content of bituminous coals.

1.4 Scoping and Public Involvement

On September 1, 2023, TVA published a Notice of Intent (NOI) in the *Federal Register* announcing that it planned to prepare an EIS to address the potential environmental effects associated with the proposed mine expansion and/or divesting TVA-owned mineral rights (Appendix A). The NOI initiated a 30-day public scoping period, which concluded on

October 2, 2023. The NOI solicited public input on other reasonable alternatives that should be considered in the EIS. In addition to the NOI in the *Federal Register*, TVA sent notification of the NOI to local and state government entities and federal agencies, issued a news release to media, and posted the news release on TVA's website (http://tva.com/nepa). TVA sent the scoping notice via email to agencies and organizations. TVA published notices regarding the NOI in newspapers that serve the area, including the *Franklin County Gazette*, *The Southern Illinoisan*, *Marion Republican*, and *Harrisburg Register*. The purpose of the scoping period was to describe the proposed mine expansion and TVA's initial alternatives as well as solicit comments from the public and interested stakeholders.

During the public scoping period, TVA received comments from the U.S. Environmental Protection Agency (USEPA), Sierra Club, Prairie Rivers Network, and private individuals. Most of the comments from individuals seemed to come through a letter campaign promoted by the Illinois chapter of the Sierra Club. Comments about the EIS process were related to the purpose and need, project description, alternatives, subsidence, natural resources, threatened and endangered species, air quality, water quality, GHG emissions and climate change, socioeconomics, and safety.

In its comments, the USEPA requested that it be a cooperating agency in preparing this EIS. TVA granted this request.

Based on internal and public scoping, identification of applicable laws, regulations, executive orders (EOs), and policies, TVA identified the resource areas listed below as requiring review within the EIS:

- Geology, Soils, and Prime Farmland
- Groundwater and Aquifers
- Surface Water and Wetlands
- Floodplains
- Water Quality
- Water Supply
- Air Quality and Greenhouse Gases
- Vegetation
- Wildlife
- Aquatic Life
- Threatened and Endangered Species
- Natural Areas, Parks, and Recreation
- Land Use
- Transportation
- Utilities
- Cultural Resources
- Waste Management
- Public and Occupational Health and Safety
- Socioeconomics
- Environmental Justice
- Noise and Visual Resources

The scoping process and its results are described in more detail in a scoping report prepared by TVA and available at tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/environment/environmental-stewardship/nepa-environmental-reviews/sugar-camp-eis-significant-boundary-revision-8-scoping-report.pdf?sfvrsn=91595dd7_1 (TVA 2023).

TVA has sent the draft EIS to USEPA, which published a notice of its availability in the *Federal Register*. TVA has also posted this draft EIS on its website for a 45-day public review and comment period, published a notice of its availability in newspapers that serve the area, including the *Franklin County Gazette*, *The Southern Illinoisan*, *Marion*

Republican, and *Harrisburg Register*, and notified local, state, and federal agencies and federally recognized tribes that the draft EIS is available for review and comment. Following the closure of the public review and comment period, TVA will carefully review all submitted comments. The subsequent final EIS will be revised as appropriate in response to the comments received and will contain TVA's responses to the comments.

1.5 Regulatory Compliance, Permits, Licenses, and Agency Coordination

This EIS was prepared consistent with both the 2020 Council on Environmental Quality's (CEQ) regulations for implementing NEPA at 40 Code of Federal Regulations (CFR) 1500-1508 (85 Federal Register [FR] 43304-43376, July 16, 2020, and 87 FR 23453, April 20, 2022), and TVA's 2020 NEPA regulations at 18 CFR 1318 (85 FR 17434, March 27, 2020). Table 1-1 presents the laws and EOs relevant to the Action Alternatives by environmental resource area in addition to NEPA.

Table 1-1. Laws and Executive Orders relevant to the Action Alternatives

Environmental Resource Area	Law / Executive Order
Geology, Soils, and Prime Farmland	Farmland Protection Policy Act (7 USC §§ 4201-4209)
Water Resources	CWA Sections 401, 402, and 404
	EO 11988 – Floodplain Management
	EO 11990 – Protection of Wetlands
	EO 13778 – Restoring the Rule of Law, Federalism, and Economic Growth by Reviewing the "Waters of the U.S." Rule
	EO 14008 – Tackling the Climate Crisis at Home and Abroad
	Flood Plain Management Criteria for Flood-prone Areas (44 CFR 60.3)
	Hydrologic Balance Protection (62 Illinois Administrative Code [IAC] 1817.41(j))
	Illinois Natural Areas Preservation Act (525 ILCS 30)
	Resource Conservation and Recovery Act (42 USC Ch. 82 § 6901 et seq.)
	Safe Drinking Water Act
	Section 7 of the Wild and Scenic Rivers Act (WSRA) Section 10 of the Wild and Scenic Rivers Act (WSRA)
Biological Resources	Bald and Golden Eagle Protection Act (BPEPA)
	Endangered Species Act (ESA) Section 7 (Consultation with U.S. Fish & Wildlife Service)
	EO 13112 – Invasive Species
	EO 13186 – Responsibilities of Federal Agencies to
	Illinois Endangered Species Protection Act (520 Illinois Compiled Statuses [ILCS] 10)
	Protect Migratory Birds
	Migratory Bird Treaty Act (MBTA)

Environmental Resource Area	Law / Executive Order
Air Quality and GHG Emissions	Clean Air Act (CAA)
	Designation of Areas for Air Quality Planning Purposes (40 CFR 81)
	Environmental Impact Statement – Incomplete or Unavailable Information (40 CFR 1502.22(b))
	EO 13990 – Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis
	EO 14008 – Tackling the Climate Crisis at Home and Abroad
	EO 14057 – Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability
	Mandatory Greenhouse Gas Reporting (40 CFR 98)
	Standards of Performance for Electric Utility Steam Generating Units (40 CFR 60.40Da-60.52Da)
	Use of Explosives – General Requirements (62 IAC 1817.61(d)2)
Utilities	Subsidence Control Plan (62 IAC 1784.20(b)8)
Cultural Resources	Archaeological Resources Protection Act
	Human Skeletal Remains Protection Act (20 ILCS 3440; 17 Illinois Administrative Code 4170)
	Illinois State Agency Historic Resources Preservation Act (Illinois revised statutes 1989, ch. 127, pars. 2661 et seq.) (known as: State 707)
	National Historic Preservation Act (NHPA) Section 106 Native American Graves Protection and Repatriation Act
Waste Management	Characteristics of Hazardous Waste (40 CFR 261.21-261.24)
	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
	Emergency Planning and Community Right-to-Know Act (EPCRA)
	Lists of Hazardous Wastes (40 CFR 261.31-261.33)
	Resource Conservation and Recovery Act (RCRA)
	Solid Waste Disposal Act (SWDA)
	Toxic Substances Control Act (TSCA)

Environmental Resource Area	Law / Executive Order
Public and Occupational Health and Safety	Occupational Safety and Health Act
	EO 13045 – Protection of Children From Environmental Health Risks and Safety Risks
	Federal Mine Safety and Health Act (30 USC §§ 801-962)
	Mandatory Health Standards – Underground Coal Mines (30 CFR 70)
	Mandatory Safety Standards – Underground Coal Mines (30 CFR 75)
	Mandatory Safety Standards, Surface Coal Mines and Surface Work Areas of Underground Coal Mines (30 CFR 77)
	Subsidence Control (62 IAC 1817.121(d))
Environmental Justice	EO 12898 – Federal Actions to Address Environmental Justice in Minority and Low-Income Populations
	EO 14008 – Tackling the Climate Crisis at Home and Abroad
	EO 14096 – Revitalizing Our Nation's Commitment to Environmental Justice for All
	Illinois Environmental Protection Act (Chapter 415, Act 5. Title III)
Intergovernmental Review	EO 12372 – Intergovernmental Review of Federal Programs
Coal Mining	Illinois Surface Coal Mining Land Conservation Reclamation Act (Chapter 225, Act 720)
	Permanent Program Rules and Regulations (62 IAC 1700-1850)
	Surface Mining Control and Reclamation Act (30 USC §§ 1201-1328)

In addition to TVA's approval, Sugar Camp's operations require permits from other state and federal agencies. These other agencies may require completion of environmental reviews and public comment periods as part of their permit approval processes. The permits and approvals from other agencies were incorporated in the authorization of Sugar Camp's mining plan included in UCM Permit No. 382, issued by IDNR-OMM in 2008, and in SBR No. 8, pending by the IDNR-OMM as of August 2023. A UCM permit is required to conduct underground mining activities and the surface operations associated with the underground activities. The permit area includes support areas, facilities, and roads. Insignificant Permit Revision(s) associated with UCM Permit No. 382 are required for the construction of bleeder shaft facilities. These IDNR coal mining permits must be renewed every five years.

1.5.1 IEPA NPDES

A National Pollutant Discharge Elimination System (NPDES) individual Coal Mine Permit (Permit No. IL0078565) was issued by Illinois Environmental Protection Agency (IEPA) Bureau of Water to Sugar Camp in 2008 for point source discharges of pollutants into Middle Fork Big Muddy River, Akin Creek, and two unnamed tributaries on privately-owned land of Sugar Camp Mine No. 1 in Franklin County. Coverage under this permit does not

authorize acid mine drainage disposal. Permit No. IL0078565 also included Construction Authorization No. 5212-13 for construction of mine components and associated storm water discharges during construction. This NPDES permit was renewed and modified on May 24, 2016, and expired on April 30, 2021; a renewal application was submitted on October 20, 2022 (Appendix B). Revisions to the permit would be necessary for additional surface water discharge outfall locations and land disturbance associated with all Sugar Camp Mine No. 1 construction projects.

Sugar Camp would submit a NOI or would update a previously submitted NOI prior to construction of each bleeder shaft facility, depending on the area of surface disturbance. TVA would conduct additional NEPA review for the bleeder shaft facility locations, including review of the terms of any permits associated with them.

1.5.2 IEPA Section 401 WQC and Section 404 USACE Permits

Sections 404 and 401 of the Clean Water Act (CWA) prohibit the discharge of dredged or fill material into Waters of the U.S., also known as jurisdictional waters, including wetlands and streams, unless authorized by the U.S. Army Corps of Engineers (USACE), IDNR-Office of Water Resources (OWR), and the IEPA through a joint application process. Permit applications filed simultaneously with these agencies would be processed concurrently in an independent manner. If the USACE, IDNR-OWR, or the IEPA determine that permits are not required by their agency, they would inform the applicant and the other agencies, as necessary. A CWA Section 404 nationwide permit and CWA Section 401 water quality certification (WQC) permit would be required for impacts to jurisdictional waters that are less than 0.5 acre. If impacts to jurisdictional waters are greater than 0.5-acre, CWA Section 404 and 401 individual permits would be required.

Drainage correction activities in the SBR No. 8 Mine Area following subsidence would involve dredging, and placement of fill would require additional wetland surveys through the CWA Section 404 and 401 permitting processes. It is anticipated that a Section 401 certification would be granted by IEPA Bureau of Water through this process. The locations of the six bleeder shaft facilities are known at this time. If it is not possible to avoid jurisdictional streams and wetlands for the construction of the bleeder shaft facilities, discharge of fill material to these features may be necessary and would require compliance with CWA Sections 404 and 401 and any associated mitigation. TVA analyzed surface water impacts for one of the bleeder shaft locations, referred to as Viking District No. 4 (No. 4 Bleeder Shaft), which is proposed to be constructed within five years (see Section 3.1.2). TVA would analyze surface water impacts of the additional five proposed bleeder shaft facilities in subsequent environmental reviews prior to construction.

1.5.3 Other State Permits

Clean Air Act (CAA) permits are required from IEPA Bureau of Air for the operations associated with coal processing plants and bleeder shaft facilities. The existing CAA permit (Title V Permit No. 12070021) associated with the coal preparation plant is on file with IEPA. As the annual quantities of coal processed at the coal preparation plant would not change with the processing of the TVA coal, a modification to the existing CAA permit would not be necessary to process additional coal at the coal preparation plant. However, revisions to this permit would be submitted for the construction of the bleeder shaft facilities. Documentation of the CAA permit is required for the IDNR-OMM-issued Insignificant Permit Revision(s) associated with the bleeder shaft facilities. Dust (particulate matter emissions) is not emitted during the operation of these facilities; thus, the bleeder shaft facility

operations would not need to be included in the fugitive dust emissions control plan associated with the coal preparation plant.

IDNR permits are required for dams, for any construction within a public body of water, and for construction within floodways. These permits are coordinated by IDNR-OWR. Certain floodway or floodplain construction activities may be authorized by a Statewide or Regional Permit. Statewide Permit No. 8 authorizes the construction of underground pipelines and utility crossings that have insignificant impacts on floodways and floodplains under the jurisdiction of IDNR-OWR. This permit may be required for bleeder shaft locations within floodplains.

A permit was issued by IDNR-OWR in November 2012 for the South RDA. The activity was described as fill and sediment pond excavation at Sugar Camp Mine in the Middle Fork Big Muddy River and Akin Creek floodplains. The South RDA has been fully constructed to final design. Reclamation activity has begun and includes soil cover on 90% of out-slopes. A permit was issued by IDNR-OWR in May 2015 for the North RDA. The North RDA is currently active and has two years of coarse coal refuse life and more than ten years of fine coal refuse life. The east RDA is currently in Mine Safety and Health Administration (MSHA) and IDNR (SBR No. 7) review for approval. Coarse coal refuse from the SBR No. 8 Mine Area is projected for disposal at the East RDA and fine coal refuse is projected for disposal at the North RDA.

IDNR does not regulate construction near the edge of floodplains if the obstructions would not cause a significant increase in flood levels. IDNR does not regulate construction activities in the floodways of streams draining less than ten square miles.

1.5.4 Consultation Requirements

1.5.4.1 USFWS and IDNR

Consultation with IDNR on the impact of the SBR No. 8 Mine Area on state-listed threatened and endangered species has not been initiated by Sugar Camp and is not expected to be initiated within the next 12 months. Consultation with USFWS on the bleeder shaft facilities would be finalized during the IDNR permitting process.

1.5.4.2 IHPA

Consultation with the Illinois Historic Preservation Agency (IHPA), which operates as the Illinois State Historic Preservation Office, on the impact of the proposed mine expansion on historic properties and archaeological sites in the SBR No. 8 Mine Area vicinity has not been initiated by Sugar Camp for surface disturbance and is not expected to be initiated within the next 12 months. TVA initiated consultation with IHPA under Section 106 of the National Historic Preservation Act (NHPA) regarding the proposed bleeder shaft on January 9, 2024 (Appendix D). The IDNR Cultural Resources Manager responded on February 16, 2024 (Appendix D).

1.5.4.3 Federally Recognized Tribes

Pursuant to Section 106 of the NHPA, TVA initiated consultation with federally recognized Indian tribes regarding the properties that may have religious and cultural significance to them that could be affected by the Project. The tribes consulted consist of:

- Menominee Indian Tribe of Wisconsin
- Miami Tribe of Oklahoma
- Osage Nation
- Peoria Tribe of Indians of Oklahoma

TVA initiated consultation with these tribes on January 9, 2024. No responses were received.

1.6 Environmental Impact Statement Overview

NEPA requires federal agencies to consider and study the potential environmental consequences of proposed major Federal actions on the human environment. Proposed actions, in this context, can include new and continuing activities that are conducted, financed, assisted, regulated, or approved by federal agencies, as well as new or revised plans, policies, or procedures. The NEPA process helps federal agencies make decisions based on an understanding of a proposed action's impacts and, if necessary, to take actions that protect, restore, and enhance the environment (40 CFR 1500.1(c)). NEPA also requires that federal agencies provide meaningful opportunities for public involvement in providing comments on proposed actions prior to the Federal decision-making process.

TVA has prepared this EIS to assess the environmental impacts of the SBR No. 8 Mine Area and divestment of the TVA Mineral Rights Area. This EIS includes discussion on the No Action Alternative and three action alternatives; analysis on the impacts of each action alternative to various resources; analysis of cumulative impacts to various resources, including geological, biological, aquatic, cultural, air and climate, and socioeconomic; maps; and supplemental data and reports as appendices.

The completed Final EIS will be made available to the public. The Final EIS will be placed on TVA's website and notices of its availability will be sent to those who received the Draft EIS or submitted comments on the Draft EIS. TVA also will send the Final EIS to USEPA, which will publish a notice of the availability of the Final EIS in the Federal Register. TVA will then issue a Record of Decision, which will include (1) the decision; (2) the rationale for the decision; (3) alternatives that were considered; (4) the alternative that was considered environmentally preferable; and (5) associated mitigation measures and monitoring, and enforcement requirements. TVA intends to publish the Final EIS in fall of 2024 but does not intend to sign a record of decision until issuance of IDNR SBR No. 8 UCM Permit No. 382.

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CHAPTER 2 – ALTERNATIVES

TVA has determined that there are four reasonable alternatives available to satisfy TVA's purpose and need for this project: the No Action Alternative and three action alternatives. TVA considered other alternatives but determined that they would not be feasible. Other potential alternatives determined to not be reasonable are discussed in Section 2.5 below.

2.1 The No Action Alternative

Under the No Action Alternative, TVA would neither approve the plan to mine the SBR No. 8 Mine Area nor divest the TVA Mineral Rights Area. Although Sugar Camp has submitted an application for SBR No. 8 to IDNR-OMM for mining the proposed TVA-owned coal as well as the adjacent privately owned and previously approved TVA-owned coal, the proposed mining requires approval from TVA for mining the TVA-owned coal. SBR No. 8 does not include the request to mine privately-owned coal if TVA-owned coal is unavailable for mining. Thus, in the absence of TVA approval, Sugar Camp would be limited in expanding its underground mining operations. TVA assumes that Sugar Camp would continue the previously approved mining of approximately 25,847 acres of TVA-owned coal and privately-owned coal. Sugar Camp plans to produce up to 14 million tons per year of processed coal through 2050. TVA previously approved the mining of TVA-owned coal reserves within a 2,250-acre area referred to as Viking District No. 2, within a 155-acre area adjacent to Viking District No. 2 referred to as Viking District No. 3, and within a 12,125-acre portion of the overall SBR No. 6 shadow area following NEPA reviews for each, discussed in Section 1.3 (TVA 2020a).

2.2 Alternative A – Approval of the SBR No. 8 Plan to Mine TVA-Owned Coal Reserves

Under Alternative A, TVA would implement the terms of the existing coal lease agreement and approve the proposed mining plan as submitted by Sugar Camp in SBR No. 8 and would not divest the TVA Mineral Rights Area. According to the IDNR-OMM-approved plan, TVA would allow Sugar Camp to mine TVA-owned coal in the SBR No. 8 Mine Area (Figure 1-1). This would be in addition to the mining of the privately-owned and previously approved TVA-owned coal included in the No Action Alternative (Table 2-1). Additional IDNR-OMM permits would be required for connected actions, such as the construction and operation of up to six bleeder shaft facilities. The mining plan also includes Sugar Camp's proposed reclamation plan, which addresses restoring the shadow area to IDNR-OMM-approved post-mining land use when mining operations are concluded.

Table 2-1. Quantity of TVA-owned coal impacted by alternative

Status of TVA-owned coal	No Action		Alternative A		Alternative B		Alternative C	
	Area (acres)	Recoverable coal (tons)	Area (acres)	Recoverable coal (tons)	Area (acres)	Recoverable coal (tons)	Area (acres)	Recoverable coal (tons)
Approved, mined	6,500	30,407,570	Same as No Action Alternative					
Approved, unmined	11,510	166,121,195	Same as No Action Alternative					
Proposed, to mine	Not approved by Alternative		21,868	252,881,000	Same as Alternative A		Not approved by Alternative	
Proposed, to divest	Not approved by Alternative		Not approved by Alternative		36,632	427,119,000	58,500	680,000,000

Extraction of newly proposed TVA-owned coal under SBR No. 8 would occur via longwall mining techniques with room-and-pillar techniques used where appropriate to facilitate the longwall operation. Longwall mining operations and associated planned subsidence would occur during a 23-year period between 2025 and 2050. While the estimated completion date for the proposed extraction of the SBR No. 8 Mine Area is 2050, actual mining durations would vary based on the actual annual production achieved.

Each aspect of Alternative A is described in the following sections.

2.2.1 Surface Facilities

2.2.1.1 Bleeder Shaft Facilities

A bleeder shaft is part of a ventilation system that removes methane gas from mine areas. A mine ventilation system consists of entries, ventilation controls, and fans. Bleeder shafts circulate clean air through the underground workings to eliminate accumulations of methane gas, and the methane-laden air is exhausted through the bleeder shaft (Figure 2-1). Fans are installed on the ventilation shaft to increase the rate of air circulation and, in turn, reduce the risk of explosions and fires.

The mining plan includes the construction of six bleeder shaft facilities required for the proposed mine expansion. The six facilities, identified as the Viking District 4 through Viking District 9 bleeder shaft facilities, would occupy sites ranging from 5.2 to 7.3 acres and totaling about 39 acres (Figure 2-2). Table 2-2 presents approximate acreages for the components of a bleeder shaft facility (based on previously constructed bleeder shaft facilities to support the mine). The 5.2-acre Viking District No. 4 is the only bleeder shaft facility planned to be constructed within the next five years and its site is referred to in this document as the No. 4 Bleeder Shaft.

Table 2-2. Example development of each bleeder shaft facility

Bleeder Shaft Site Development	Acres	Percent of Total Bleeder Shaft Site
Shaft cuttings stockpile	1.2	18.9%
Soil stockpiles	0.6	9.4%
Surfaced area	2.5	37.7%
Undeveloped area	2.2	34.0%

The siting of the bleeder shaft facilities is influenced by environmental and engineering constraints and state regulations. Proposed facility locations would be coordinated with landowners. According to Section 1761.11 of the IDNR Rules, surface coal mining operations, including bleeder shaft facilities, that do not predate August 3, 1977, shall not be sited within 300 feet of any public building, school, church, community or institutional building, public park, or occupied dwelling in existence, under construction, or contracted for at the time of public notice. During the public comment period on the IDNR-OMM permits associated with these facilities, landowners may state concerns about the proximity of proposed facilities, including bleeder shaft facilities; these concerns would be considered by Sugar Camp, and the siting of these facilities may be adjusted.

A typical bleeder shaft facility would be located on a site containing the following elements: a concrete pad (occupying approximately 2,430 square feet of surface area and approximately 4 feet thick), one 18- to 20-foot diameter concrete-lined ventilation shaft, two 16-inch diameter steel-lined boreholes with concrete pads, two 12-inch diameter steel-lined

utility boreholes with concrete pads, a transformer on a concrete pad, a compressor station, and a crib plant with associated facilities (see Figure 2-3 for the layout of a representative bleeder shaft facility). All the shafts and boreholes would be extended approximately 970 feet deep to the subject coal seam. Two (25 feet by 25 feet by 10 feet) temporary drill pits may be used during construction to support utility boreholes. The drill sites would be covered with eight inches of crusher-run gravel.

Removal of topsoil would occur immediately following any necessary vegetation clearing for construction. Topsoil material would be removed and placed in a stockpile for future reclamation. Excavated consolidated material would be utilized for road and parking area base construction or placed in a stockpile for future reclamation. Soil storage stockpiles would be situated outside of drainage ways to minimize soil erosion. Sugar Camp would seed these stockpiles with grasses, legumes, and small grain cover crops to minimize susceptibility to excessive water and wind erosion.

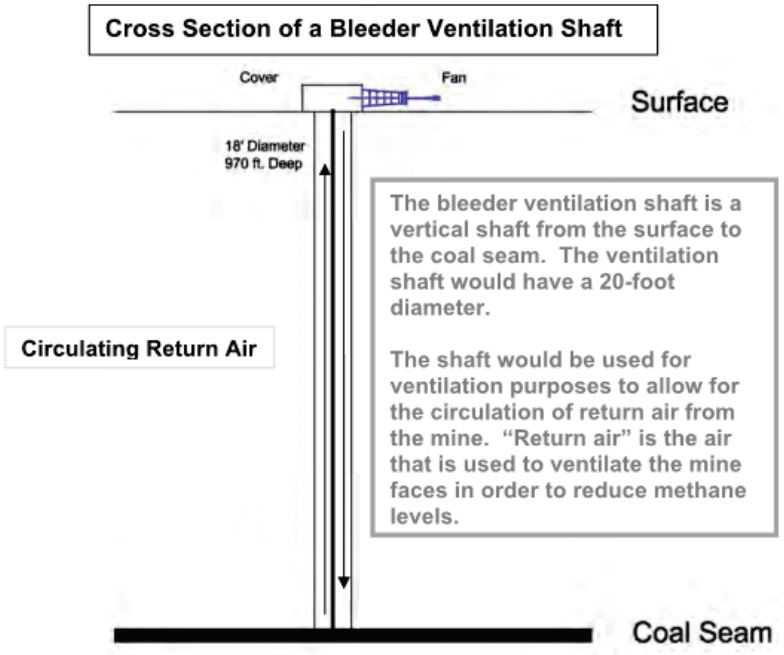


Figure 2-1. Diagram of representative bleeder shaft for typical Sugar Camp Mine No. 1 operations

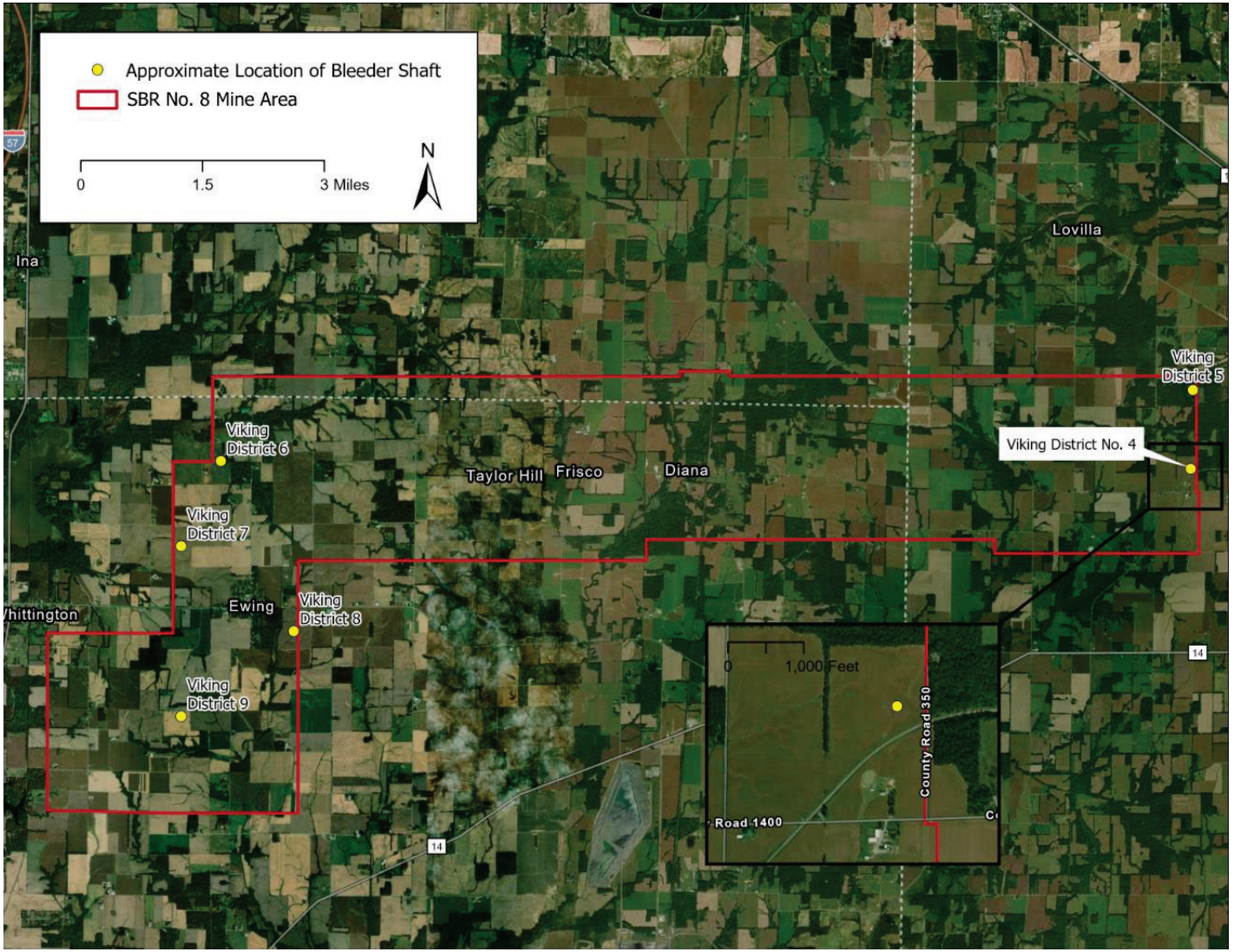


Figure 2-2. Approximate locations of bleeder shafts facilities within the SBR No. 8 Mine Area

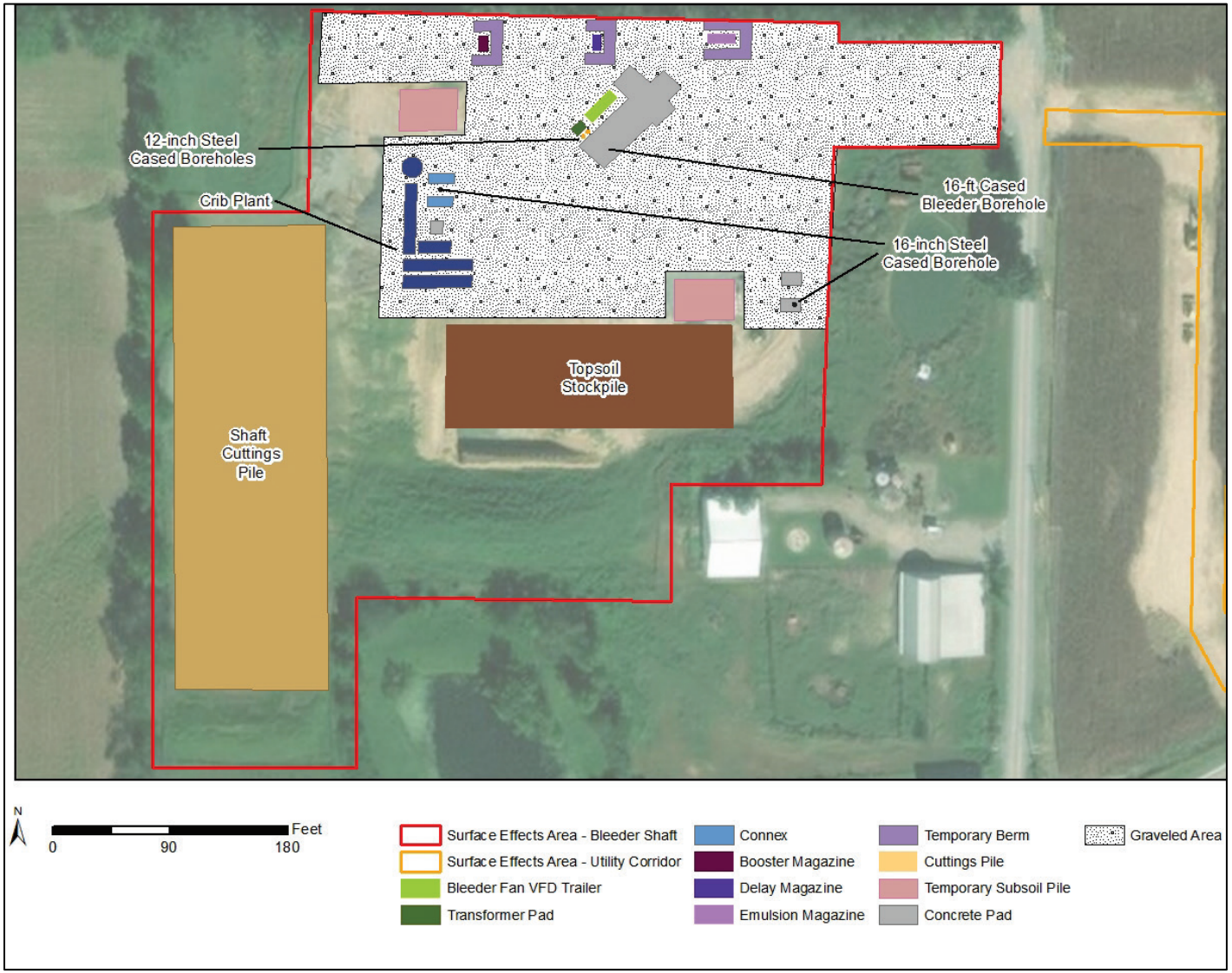


Figure 2-3. Representative bleeder shaft facility (Viking District No. 2)

2.2.1.2 Coal Preparation Plant

The extracted coal, both TVA- and privately-owned, would be processed at an existing coal preparation plant occupying an area of approximately 2,420 acres on privately owned lands and outside of the SBR No. 8 Mine Area. The currently operating plant was approved by IDNR-OMM in 2008 and did not require TVA approval. Water used at the plant is treated on-site. Sugar Camp holds a NPDES permit to discharge water from 15 locations outside of the SBR No. 8 Mine Area (Appendix B). Use of the existing coal preparation plant for Alternative A would not result in any new surface facilities, and the overall processing capacity would not change. Under Alternative A, the coal preparation plant would operate for a longer period of time.

2.2.2 Coal Extraction and Planned Subsidence

Approximately 60 percent of the coal mined in the world is extracted by underground mining methods. Two primary types of underground mining methods are room-and-pillar and longwall mining. Sugar Camp proposes longwall methods for mining portions of the Herrin No. 6 coal seam in the SBR No. 8 Mine Area. Room-and-pillar mining would be used for longwall main entries and gate development.

Room-and-pillar mining involves the extraction of coal in a grid-like pattern such that portions of the coal seam are left intact to support the roof of the mine. The series of parallel areas in which coal is extracted are called entries. Room-and-pillar mining would only be completed to develop main entries and gates for the longwall portions of the mine. For areas to be mined by the room-and-pillar method, entry and crosscut spacing would typically be on 120-foot centers, with an entry and crosscut width of 20 feet maximum. The referenced dimensions for conventional mining are based on site-specific strength values for coal pillars and floor for an adequate factor of safety for roof stability and to prevent unplanned subsidence. Plate testing would be conducted in conventional room-and-pillar sections within the first 1,000 feet of entering the area. Should any changes in mine stability or conditions be encountered, a more detailed study of floor, roof and pillars would be performed at that time. The entryways provide access for workers, ventilation, and mining equipment. Room-and-pillar equipment includes continuous miners, shuttlecars, conveyor belts, and roofbolters. The coal would be transported by conveyor from the SBR No. 8 Mine Area to the existing coal preparation plant. If approved, room-and-pillar mining would be expected to begin by the end of 2025.

Longwall mining involves the full extraction of coal from a section of the seam or face using mechanical shearers (Figure 2-4). Longwall mining creates an almost complete extraction of the coal reserve, which causes the overburden to subside (sink) in a controlled and predictable manner. The area of mining within this planned subsidence is defined as a longwall panel. The dimensions of longwall panels vary but may be 1,400 feet wide and up to 20,000 feet long. The longwall process results in a planned subsidence of surface areas within the shadow area. Walls consisting of standing coal pillars separate the panels and support the roof as well as providing access between panels. Longwall mining machinery includes hydraulic roof supports (shields), a conveyor system, and a coal shearer. A cut of the longwall panel is made by the shearer and the coal is transported by the conveyor system. The shields are advanced as the shearer cuts the coal to allow for a safe workspace for the mine workers. The removal of coal sequentially allows the overburden to collapse to fill the void with a resultant subsidence of the surface. This movement is predictable, uniform, and minimizes damage to surface structures as mining progresses.

Consistent with the requirements given in 30 § CFR 817.121 of SMCRA regulations, Sugar Camp must promptly repair or compensate the owner for material damage resulting from subsidence caused to any structure or facility that existed at the time of the coal extraction under or adjacent to the materially damaged structure. In addition, Sugar Camp must correct any material damage resulting from subsidence caused to surface lands, to the extent technologically and economically feasible, by restoring the land to a condition capable of maintaining the value and reasonably foreseeable uses that it could support before subsidence damage. These are herein referred to as IDNR-OMM-approved post-mining conditions.

The extraction of TVA-owned coal reserves under Alternative A is proposed to begin in 2025 and would occur during an estimated 26-year period between 2025 and 2050, resulting in the total production of approximately 122 million tons of processed TVA-owned coal. According to the mining plan, 14 longwall panels of TVA-owned coal would be mined during mining operations. Extraction height would be approximately 7.7 feet, and the total percentage of coal to be removed in the longwall extraction areas would be 90 percent. Up to 14 million tons per year of TVA-owned coal would be extracted. Figure 2-5 shows the location of the panels and the years they would be mined. Updates to the mining plan and schedule would be included in the annual underground workings map submitted to IDNR-OMM.

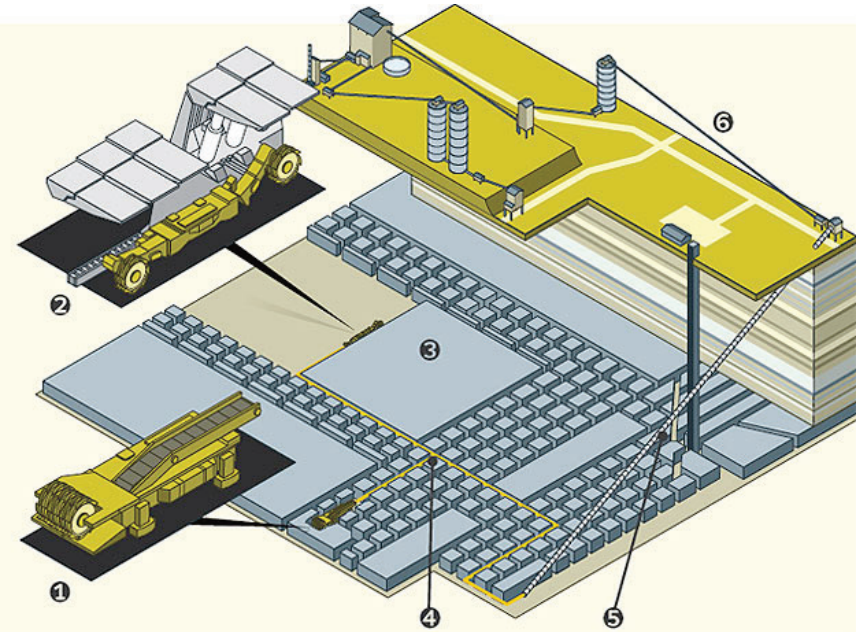


Image Source: Popular Mechanics

Figure 2-4. Typical longwall mine layout

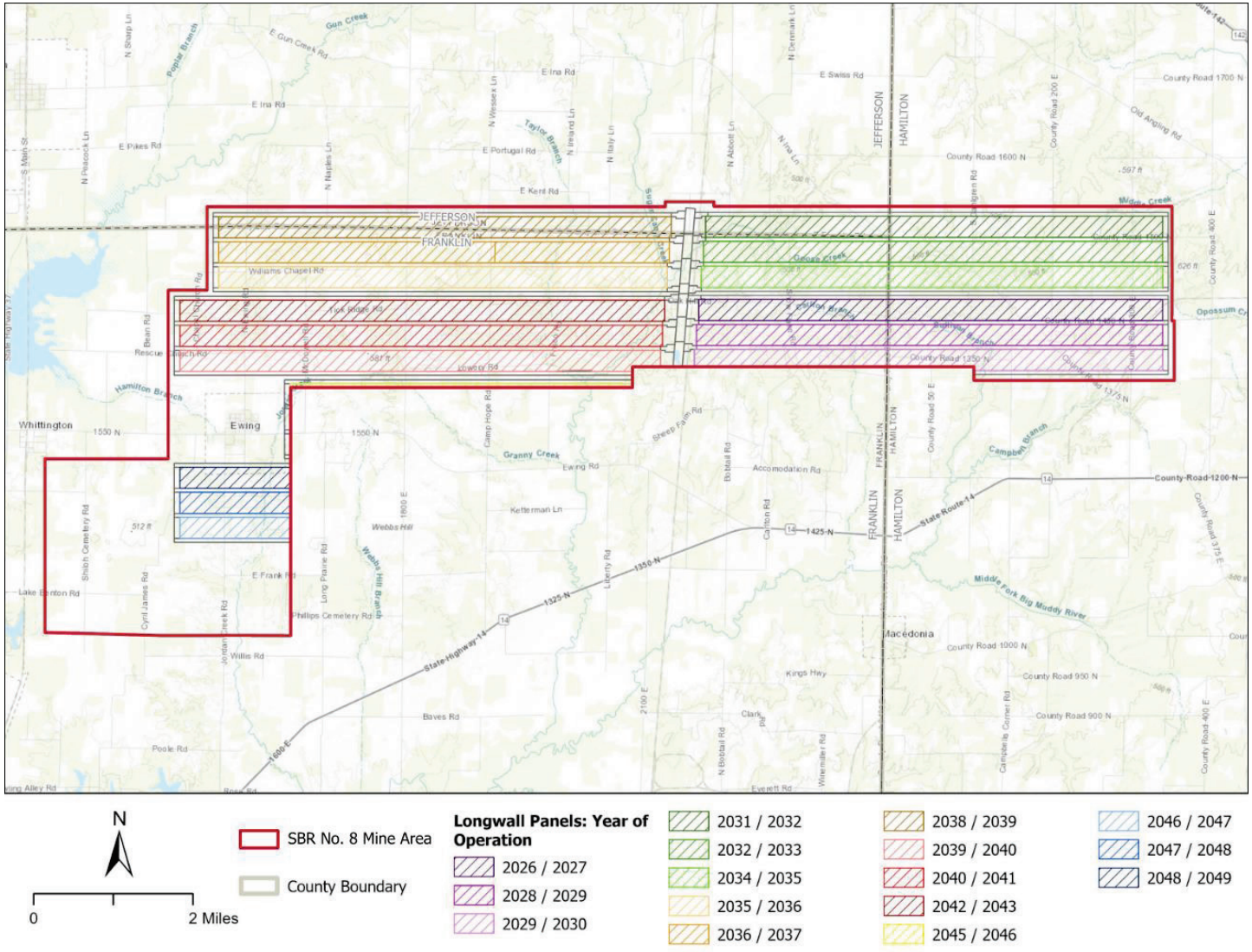


Figure 2-5. Location of underground panels and proposed years of operations for mining TVA-owned coal

Within the SBR No. 8 Mine Area, approximately 16,129 acres of surface lands would subside with a predicted maximum subsidence of five and a half feet. Table 2-3 describes the details of areas proposed for underground mining. The portion of the SBR No. 8 Mine Area that would not subside allows for equipment and necessary underground workings space. For longwall mining, continuous miner units are used to drive the entryways around the perimeter of the defined longwall panels. These non-subsided entryways provide access for workers, ventilation, and mining equipment. No subsidence is anticipated above the entryways since the percent extraction is small and only allows for worker and equipment access.

Table 2-3. Description of planned subsidence within the SBR No. 8 Mine Area

Classification	Proposed Mining Activity	Acres	Percent
Projected to subside	Longwall panels	16,129	72
Not projected to subside	Room-and-pillar or non-mining areas	6,285	28
	Total area	**22,414**	**100**

2.2.3 Reclamation

The UCM permit application requires detailed restoration plans for surface effects and subsided areas. Many components of mining operations would be decommissioned, and their sites restored as their operational life comes to an end. This includes components such as RDAs and bleeder shaft facilities. The timeframes and limits established in 62 Illinois Administrative Code (IAC) 1817.01 and 1817.113 govern the reclamation activities. If variances or extensions are necessary, timely requests would be made to IDNR-OMM for approval. While actual mining durations can vary, Sugar Camp estimates that final reclamation for Sugar Camp Mine No. 1 would begin in 2040. The post-mining land use for the Sugar Camp Mine No. 1 is included in Sugar Camp's reclamation plan, which addresses restoring Sugar Camp Mine No. 1 to IDNR-OMM-approved post-mining conditions when mining operations are concluded.

Sugar Camp would backfill and seal all mine openings associated with SBR No. 8 coal extraction, including bleeder shaft facilities and boreholes, in accordance with pertinent state and federal regulations. The boreholes would be permanently sealed within 60 days of inactivity. The bleeder shaft and any boreholes would be plugged from top to bottom according to all MSHA and IDNR-OMM regulatory standards after they are no longer needed. Steel casings would be cut off five feet below ground, and the void filled with subsoil, and then covered with topsoil, mulched, and seeded. Shaft holes would be filled with stockpile shaft material/rip rap and capped with concrete at least one foot thick. All utility boreholes would be plugged and filled with neat cement. The shaft would be surveyed, and the appropriate courthouse would be notified as required by Operator Memorandum 00-01.

All rough grading would be completed within 180 days following the removal of all facilities, except the RDAs (the reclamation for which is described below). Final grading, including root medium placement, topsoil placement, and temporary crop cover, would be completed within 12 months of the cessation of the active mining operation. Upon completion of reclamation and the first normal period for favorable planting or farming conditions, agricultural land would be seeded and returned to its pre-mine condition. Topsoil would be distributed over the site evenly. Sugar Camp would accomplish backfilling and re-grading procedures by using scrapers, dozers, loaders, and/or trucks to grade the disturbed areas and to re-distribute the stored subsoil and topsoil. Soil materials required for the

reclamation effort would be obtained from stockpiled native soils removed prior to disturbance by the mining operations. Topsoil and subsoil would be redistributed throughout the permitted area using a method that would allow for proper soil depth placement and minimize soil compaction. The minimization of soil compaction would allow for a better root medium and promote plant growth. In the surface effects area, topsoil depth would be the approximate thickness of pre-mining conditions, as approved by IDNR-OMM.

All the areas affected by the installation of surface facilities (except the RDAs) would be final-graded in accordance with the approved IDNR-OMM reclamation plan. In areas adjacent to undisturbed areas, re-grading would be blended with the adjacent undisturbed grades. Methods to deter erosion of the reclaimed area would include but not be limited to the use of terraces, ditches, hay bales, silt fence, vegetation, erosion control matting, and/or riprap.

Soil replacement and vegetation establishment are dictated by seasonal weather conditions. Soil replacement would generally be accomplished during the drier months of the year to avoid undesirable compaction. Grading and construction and the removal or renovation of water and erosion control structures would likely occur between April 1 and November 15, as this is a typical growing season and would result in the best opportunity to control runoff. This time schedule would allow for revegetation and mulching of the disturbed areas. Unforeseen situations may require that temporary erosion control structures be constructed during adverse weather conditions. If this should occur, a temporary vegetation seed mixture would be used until the area can be seeded with a permanent seed mixture.

The removal and/or renovation of anthropogenic structures would likely occur between the same time schedule of April 1 through November 1. Prior to this type of work being conducted, approval would be obtained from the appropriate regulatory agencies. The agencies involved would be dictated by the location of work and resource in need of protection but may include IDNR, IEPA, USFWS, IHPA, and USACE. The work would be performed in accordance with accepted engineering and conservation practices. Upon completion of grading activities, the reclaimed areas would be stabilized using cover crops, as stated below, and/or by applying mulch. The approved species would then be seeded to provide vegetative cover in accordance with the post-mining land use.

The partial reclamation of existing and proposed RDAs would consist of abandonment by filling in the reservoir areas of the RDAs (i.e., the impoundments) with coarse refuse (or other suitable material) to capacity. In conjunction with the abandonment, all outlet pipes would be filled with grout once the impounding capability has been removed. Soil materials would be placed as a cap over the entire embankment and slurry pond. These materials would be graded to provide adequate drainage over the entire portion of the SBR No. 8 Mine Area that has been impacted by refuse placement, and these areas would be seeded and mulched. Unless an alternate soil thickness is approved by the IDNR, the cover would consist of at least four feet of soil material over all refuse areas. Ditches and other auxiliary drainage features would be maintained to provide drainage. Due to the lack of full reclamation, the existing and proposed RDAs could serve as agricultural land following reclamation but would likely not be suitable for row crops.

In accordance with IDNR-OMM UCM Permit No. 382, Sugar Camp would restore the original drainage conditions and correct any damage that may have been caused by subsidence (e.g., cracks in building foundations, road surfaces, or ponding of water from

subsided streams). Drainage restoration may be accomplished through stream-dredging activities, which are subject to requirements under state law, and Sections 401 and 404 of CWA. The goal of the drainage restoration is to return the land to the baseline conditions that existed prior to the start of coal recovery.

Longwall mining results in predictable and uniform subsidence patterns. Pre-subsidence contours have been documented by aerial mapping. This mapping provides a basis to determine the extent of subsidence to the lands. Any impacts that may impair the value or use of the lands would be mitigated to ensure the land reaches a condition capable of maintaining the value and reasonably foreseeable uses that it could support prior to subsidence. Primary methods would include restoration of drainage by small cut and fill operations and filling of cracks that do not close on their own with soil or limestone materials.

A pre-subsidence survey of structures, such as buildings and bridges, would be conducted by trained and experienced personnel prior to subsidence occurring. This survey would include photographic and sketched documentation of the pre-subsidence condition of the structures. A report would be generated including a description of the structure and photographs and documentation of the physical condition of the structure. A copy would be provided to the property owner and any comments on the survey would be addressed. If a property owner decided to take a waiver and release Sugar Camp for any subsidence damages to their structures, then a pre-subsidence survey for that particular property is not completed and no future follow-up on that property is necessary.

After subsidence has occurred, a post-subsidence survey would be performed in the same manner and procedures as the pre-subsidence survey. Any changes to the structures due to subsidence would be noted and would provide a basis to determine the extent of material damage. Damages would be compensated either by providing property owners the pre-mining value of the structure, repairing the structure to pre-mining conditions, or providing property owners with the difference between the pre-mining and post-mining value of the structure.

2.3 Alternative B – Approval of the SBR No. 8 Plan to Mine TVA-Owned Coal Reserves and Divestment of the Remaining TVA-Owned Illinois Mineral Rights

Under Alternative B, TVA would implement the terms of the existing coal lease agreement and approve the plan to mine TVA-owned coal as submitted by Sugar Camp in the SBR No. 8 of UCM Permit No. 382 and divest the remaining TVA Mineral Rights Area. The mining of the TVA-owned coal would be as described under Alternative A.

Based in part on TVA's plans to retire aging coal units as they reach the end of their useful life (expected by 2050) and as part of TVA's aspirational goal of net-zero carbon emissions by 2050, Alternative B includes TVA divesting the remaining TVA Mineral Rights Area of 36,632 acres (Table 2-1). The divestment of the remaining TVA Mineral Rights would allow TVA to recover economic value from the initial expenditure and reduce its exposure to environmental liability associated with the continued ownership and mining of its coal reserves in Illinois. TVA Mineral Rights would be divested in accordance with authorized or legal means.

The purchasing entity may or may not choose to mine the divested coal reserves. Up to 427 million tons of coal may be recovered under future mining of the divested area; combined with the coal in the SBR No. 8 Mine Area, a total of 680 million tons of coal could be recovered under this alternative. The market and mining conditions in large part determine the amount of coal mined per year. For purposes of this analysis, TVA assumes that the divested coal reserves are either mined or not mined in the future. If the purchasing entity elects to mine the divested coal reserves, TVA assumes that the mining techniques and end uses of divested coal, as well as its type and chemical composition, would be the same as described for Alternative A. TVA also assumes, for purposes of this analysis, that the mining of the divested coal would be concurrent with the mining under SBR No. 8 of UCM Permit No. 382. Additional IDNR-OMM mining permits would be required for future mining of the divested coal reserves. If the purchasing entity elects not to mine divested coal reserves, TVA assumes impacts to the remaining TVA Mineral Rights Area (approximately 36,632 acres) would be as described for the No Action Alternative.

2.4 Alternative C – Divestment of the Remaining TVA-Owned Illinois Mineral Rights

Under Alternative C, TVA would not approve Sugar Camp's expansion request as detailed under SBR No. 8 of UCM Permit No. 382 and would divest the TVA Mineral Rights Area of 58,500 acres (Table 2-1). The divestment of TVA Mineral Rights Area would allow TVA to recover economic value from the initial expenditure and reduce its exposure to environmental liability associated with the continued ownership and mining of coal reserves in Illinois. Refer to Section 2.3 for details on the sale mechanism for the TVA Mineral Rights Area.

The purchasing entity may or may not choose to mine the divested coal reserves. Up to 680 million tons of coal may be recovered under future mining. The market and mining conditions determine the amount of coal mined per year. For purposes of this analysis, TVA assumes that the divested coal reserves are either mined or not mined in the future. If the purchasing entity elects to mine the divested coal reserves, TVA assumes that the mining techniques and end uses of divested coal, as well as its type and chemical composition, would be the same as described for Alternative A. TVA also assumes, for purposes of this analysis, that the mining of the divested coal would occur between 2025 and 2050. Additional IDNR-OMM mining permits would be required for future mining of the divested coal reserves. If the purchasing entity elects not to mine divested coal reserves, TVA assumes impacts would be as described for the No Action Alternative.

The TVA Mineral Rights Area includes approximately 2,000 acres of natural gas and oil reserves. TVA does not have a reserve study performed on their oil/gas reserves. To date no oil/gas assets have been leased. As TVA does not have estimates for the recoverable amounts of oil and gas, the effects of extracting and transporting the TVA oil and gas are not predictable at this time. However, according to the Illinois Petroleum Resources Board, more than 90 percent of Illinois's producing oil wells produce 1 to 2 barrels of oil per day (Illinois Petroleum Resources Board 2023).

2.5 Alternatives Considered but Eliminated from Further Analysis

During scoping, TVA received a comment that this EIS should include alternatives with differing site configurations, mining methods, or mine locations. TVA considered such alternative(s) but determined that they were not reasonable and were unlikely to result in reduced environmental impacts. Figure 2-6 shows the extent of the TVA-owned Illinois coal

reserves under lease to Sugar Camp, as well as the portions of the reserve that have been previously mined or approved for mining and the portions that are the subject of the current Proposed Action. The SBR No. 8 mining plan, including the SBR No. 8 Mine Area, was configured to maximize the efficient and economical mining of coal using a combination of room-and-pillar and longwall mining methods while utilizing existing surface facilities to process, store and transport the coal offsite and minimizing impacts to the extent feasible. The magnitude of most of the environmental impacts are directly related to the quantity of coal mined and, assuming the existing coal preparation plant would be used for a reconfigured mine, the environmental impacts would be similar. A major relocation of the SBR No. 8 Mine Area could also require the construction of a new coal preparation plant, likely resulting in greater overall environmental impacts. Shifting the SBR No. 8 Mine Area to the north, west, south, or east, while possible, offers no environmental or economical advantage over the current plan.

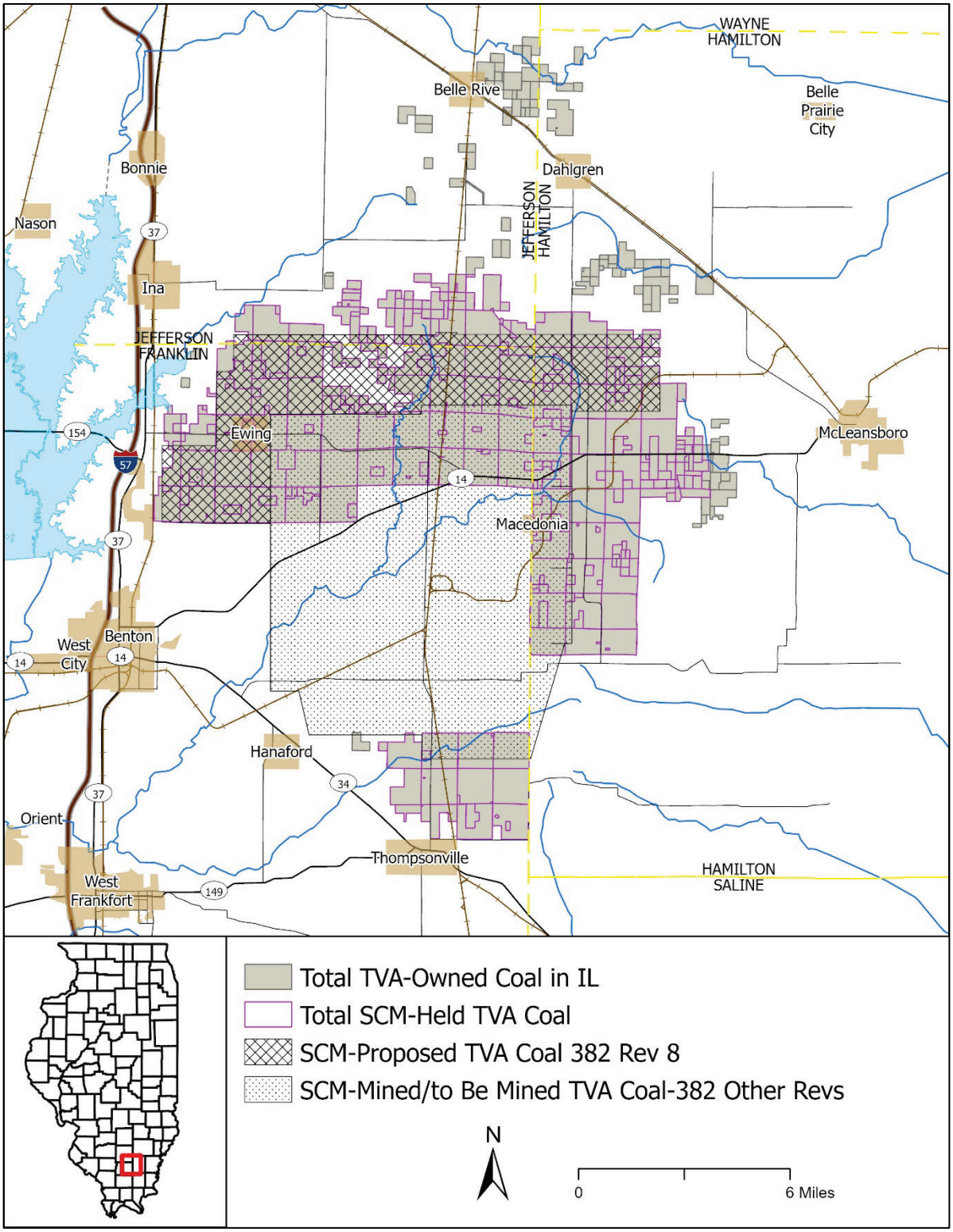


Figure 2-6. Location of TVA-owned coal and existing and proposed shadow areas

2.6 Comparison of Alternatives

Impacts evaluated may be beneficial or adverse and may apply to the full range of natural, aesthetic, historic, cultural, and socioeconomic resources within the project areas of each alternative and within the surrounding areas. Impact severity is dependent upon their relative magnitude and intensity and resource sensitivity. In this document, four descriptors are used to characterize the level of impacts in a manner that is consistent with TVA's current practice.

In order of degree of impact, the descriptors are as follows:

- No Impact (or "absent") – Resource not present or, if present, not affected by Project alternatives under consideration.
- Minor – Environmental effects are not detectable or are so minor that they would not noticeably alter any important attribute of the resource.
- Moderate – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- Significant – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

A comparison of the environmental consequences associated with each alternative is presented in Table 2-4.

Table 2-4. Summary and comparison of alternatives by resource area

Resource Area	No Action Alternative	Alternative A	Alternative B	Alternative C
Geology	No direct or indirect Project-related impacts on geology.	Minor permanent impacts to geology due to removal of a small portion of the Herrin No. 6 coal seam.	Approval of the mine plan and mining of divested coal reserves would result in minor permanent impacts to geology due to removal of a small portion of the Herrin No. 6 coal seam. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on geology would result from their mining.	If divested coal reserves are mined, minor permanent impacts to geology due to removal of a small portion of the Herrin No. 6 coal seam. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on geology would occur from their mining.
Soils	No direct or indirect Project-related impacts on soils.	Minor temporary impacts to soils and drainage due to planned subsidence. Impacts would be minimized or mitigated.	Approval of the mine plan and mining of divested coal reserves would result in minor temporary impacts to soils and drainage due to planned subsidence. Impacts would be minimized or mitigated. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on soils would result from their mining.	If divested coal reserves are mined, minor temporary impacts to soils and drainage due to planned subsidence that would be minimized through appropriate mitigation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on soils would result from their mining.
Prime Farmland	No direct or indirect Project-related impacts on prime farmland.	Minor temporary impacts to prime farmland due to planned subsidence. Impacts would be minimized or mitigated.	Approval of the mine plan and mining of divested coal reserves would result in minor temporary impacts to prime farmland due to planned subsidence. Impacts would be minimized or mitigated. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on prime farmland would result from their mining.	If divested coal reserves are mined, minor temporary impacts to prime farmland due to planned subsidence that would be minimized through appropriate mitigation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on prime farmland would result from their mining.

Resource Area	No Action Alternative	Alternative A	Alternative B	Alternative C
Groundwater and Aquifers	No direct or indirect Project-related impacts on groundwater and aquifers.	Minor temporary impacts to groundwater due to planned subsidence. Impacts would be minimized or mitigated.	Approval of the mine plan and mining of divested reserves would result in minor temporary impacts to groundwater due to planned subsidence. Impacts would be minimized or mitigated. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on ground water and aquifers would result from their mining	If divested coal reserves are mined, temporary impacts to groundwater that would be minimized through appropriate mitigation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on ground water and aquifers would result from their mining
Surface Waters and Wetlands	No direct or indirect Project-related impacts on surface waters and wetlands.	Moderate temporary impacts to surface waters and wetlands due to planned subsidence. Mine owners/operators would consult with USACE and IDNR regarding effects to surface waters and wetlands throughout the mine permit review process. Construction of the bleeder shaft facilities could result in impacts to surface water and wetlands, any impacts would be minimized or mitigated per IDNR-OMM permit requirements.	Approval of the mine plan and mining of divested reserves would result in moderate temporary impacts to surface waters and wetlands due to planned subsidence. Construction of the bleeder shaft facilities could result in impacts to surface water and wetlands, any impacts would be minimized or mitigated per IDNR-OMM permit requirements. Mine owners/operators would consult with USACE and IDNR regarding effects to surface waters and wetlands throughout the review process. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on surface waters and wetlands would result from their mining.	If divested coal reserves are mined, temporary impacts to surface waters and wetlands due to subsidence, and permanent impacts to surface waters and wetlands due to surface disturbances would be minimized through appropriate mitigation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on surface waters and wetlands would result from their mining.
Floodplains	No direct or indirect Project-related impacts on floodplains.	Minor temporary impacts to floodplains due to planned subsidence. Mine owners/operators would consult with IDNR regarding effects to floodplains throughout the mine permit review process.	Approval of the mine plan and mining of divested reserves would result in minor temporary impacts to floodplains due to planned subsidence. Mine owners/operators would consult with IDNR regarding effects to floodplains throughout the mine permit review process. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on floodplains would result from their mining.	If divested coal reserves are mined, temporary and permanent impacts to floodplains that would be minimized through appropriate mitigation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on floodplains would result from their mining

Resource Area	No Action Alternative	Alternative A	Alternative B	Alternative C
Water Quality	No direct or indirect Project-related impacts on water quality.	Minor temporary impacts to water quality due to surface disturbances, mining operations, planned subsidence, and mineralization. Mine owners/operators would consult with USACE and IDNR regarding effects to water quality throughout the mine permit review process.	Approval of the mine plan and mining of divested reserves would result in minor temporary impacts to water quality due to surface disturbances, mining operations, planned subsidence, and mineralization. Mine owners/operators would consult with USACE and IDNR regarding effects to water quality throughout the mine permit review process. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on water quality would result from their mining.	If divested coal reserves are mined, minor temporary impacts to water quality due to surface disturbances, mining operations, planned subsidence, and mineralization that would be minimized through appropriate mitigation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on water quality would result from their mining.
Water Supply	No direct or indirect Project-related impacts on water supply.	Minor temporary impacts to water supply due to surface disturbances, mining operations, and planned subsidence and mineralization. Mine owners/operators would consult with IDNR and affected landowners regarding effects to water supply throughout the mine permit review process.	Approval of the mine plan and mining of divested reserves would result in minor temporary impacts to water supply due to surface disturbances, mining operations, and planned subsidence and mineralization. Mine owners/operators would consult with IDNR and affected landowners regarding effects to water supply throughout the mine permit review process. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on water supply would result from their mining.	If divested coal reserves are mined, minor temporary impacts to water supply due to surface disturbances, mining operations, and planned subsidence and mineralization that would be minimized through appropriate mitigation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on water supply would result from their mining.

Resource Area	No Action Alternative	Alternative A	Alternative B	Alternative C
Air Quality and Greenhouse Gases (GHG)	The direct PM_{10} and $PM_{2.5}$ emissions are approximately 20 tons per year and 5 tons per year, respectively (2025-2050); like those currently experienced. Indirect impacts to air quality from coal transportation and coal combustion would occur in a distributed manner across the U.S. but at low percentages of national emissions inventory quantities for most pollutants and considered less than significant. Higher levels of SO_2 and other pollutant emissions could be mitigated by ensuring coal is combusted in newer or more well-controlled coal combustion plants. Between 2025-2050, CO_2e emissions 120 million metric tons (MT). The social cost of greenhouses (SC-GHG) is $10.7 Billion.	The direct PM_{10} and $PM_{2.5}$ emissions are approximately 31 tons per year and 8 tons per year, respectively (2025-2050. Indirect impacts to air quality from coal transportation and coal combustion would occur in a distributed manner across the U.S. but at low percentages of national emissions inventory quantities for most pollutants and considered less than significant. Higher levels of SO_2 and other pollutant emissions could be mitigated by ensuring coal is combusted in newer or more well-controlled coal combustion plants. Bleeder shaft construction would generate temporary and minor emissions in comparison to mining operations and indirect emissions. Between 2025-2050, direct and indirect CO_2e emissions of 182 million MT; SC-GHG is $16.3 Billion.	The direct PM_{10} and $PM_{2.5}$ emissions are approximately 61 tons per year and 17 tons per year between 2025-2050, respectively, and 31 tons per year and 8 tons per year, respectively, between 2051-2068. Indirect impacts to air quality from coal transportation and coal combustion would occur in a distributed manner across the U.S. but at low percentages of national emissions inventory quantities for most pollutants and considered less than significant. Higher levels of SO_2 and other pollutant emissions could be mitigated by ensuring coal is combusted in newer or more well-controlled coal combustion plants. Bleeder shaft construction would generate temporary and minor emissions in comparison to mining operations and indirect emissions. Between 2025-2068, direct and indirect CO_2e emissions of 440 million MT; SC-GHG is $32.6 Billion between 2025-2050. If divested coal reserves are not mined, emissions would be as described for Alternative A in the remaining TVA Mineral Rights Area.	The direct PM_{10} and $PM_{2.5}$ emissions are approximately 61 tons per year and 17 tons per year between 2025-2050, respectively, and 31 tons per year and 8 tons per year, respectively, between 2051-2068. Indirect impacts to air quality from coal transportation and coal combustion would occur in a distributed manner across the U.S. but at low percentages of national emissions inventory quantities for most pollutants and considered less than significant. Higher levels of SO_2 and other pollutant emissions could be mitigated by ensuring coal is combusted in newer or more well-controlled coal combustion plants. Bleeder shaft construction would generate temporary and minor emissions in comparison to mining operations and indirect emissions. Between 2025-2068, direct and indirect CO_2e emissions of 440 million MT; SC-GHG is $32.6 Billion between 2025-2050. If divested coal reserves are not mined, emissions would be as described for the No Action Alternative in the TVA Mineral Rights Area.

Resource Area	No Action Alternative	Alternative A	Alternative B	Alternative C
Vegetation	No direct or indirect Project-related impacts on vegetation.	Minor temporary and permanent impacts to existing plant communities at bleeder shaft facility sites. Impacts would be minimized or mitigated.	Approval of the mine plan and mining of divested coal reserves would result in minor temporary and permanent impacts to existing plant communities at bleeder shaft facility sites that would be minimized through appropriate mitigation. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on vegetation would result from their mining.	If divested coal reserves are mined, temporary impacts to vegetation due to mining that would be minimized through appropriate mitigation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on vegetation would result from their mining.
Wildlife	No direct or indirect Project-related impacts on wildlife.	Minor temporary impacts to wildlife due to surface disturbances. Impacts would be minimized or mitigated.	Approval of the mine plan and mining of divested coal reserves would result in minor temporary impacts to wildlife due to surface disturbances. Impacts would be minimized or mitigated. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on wildlife would result from their mining.	If divested coal reserves are mined, temporary impacts to wildlife due to surface disturbances. Impacts would be minimized or mitigated. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on wildlife would result from their mining.
Aquatic Life	No direct or indirect Project-related impacts on aquatic life.	Minor temporary impacts to aquatic life due to surface disturbances. Impacts would be minimized or mitigated.	Approval of the mine plan and mining of divested coal reserves would result in minor temporary impacts to aquatic life due to surface disturbances. Impacts would be minimized or mitigated. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on aquatic life would result from their mining.	If divested coal reserves are mined, minor temporary impacts to aquatic life due to surface disturbances. Impacts would be minimized or mitigated. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on aquatic life would result from their mining.

Resource Area	No Action Alternative	Alternative A	Alternative B	Alternative C
Threatened and Endangered (T&E) Species	No direct or indirect Project-related impacts on T&E species.	Minor temporary impacts on T&E species. Mine owners/operators would consult with USFWS and IDNR regarding effects to listed species during the mine permit review process.	Approval of the mine plan and mining of divested coal reserves would result in minor temporary impacts on T&E species. Mine owners/operators would consult with USFWS and IDNR regarding effects to listed species during the mine permit review process. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on T&E species would result from their mining.	If divested coal reserves are mined, temporary impacts to T&E species would be minimized through appropriate mitigation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on T&E species would result from their mining.
Natural Areas, Parks, and Recreation	No direct or indirect Project-related impacts on natural areas, parks, and recreation.	Minor, indirect temporary impacts to natural areas. Impacts would be minimized or mitigated.	Approval of the mine plan and mining of divested coal reserves would result in minor, indirect temporary impacts to natural areas. Impacts would be minimized or mitigated. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on natural areas, parks, and recreation would result from their mining.	If divested coal reserves are mined, minor, indirect temporary impacts to natural areas. Impacts would be minimized or mitigated. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on natural areas, parks, and recreation would result from their mining.
Land Use	No direct or indirect Project-related impacts on land use.	Minor temporary and permanent impacts to land use due to planned subsidence. TVA would coordinate with IDNR regarding effects to land use during the review process.	Approval of the mine plan and mining of divested coal reserves would result in minor temporary and permanent impacts to land use due to planned subsidence. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on land use would result from their mining.	If divested coal reserves are mined, temporary impacts to land use that would be minimized through appropriate mitigation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on land use would result from their mining.

Resource Area	No Action Alternative	Alternative A	Alternative B	Alternative C
Transportation	No direct or indirect Project-related impacts on transportation.	Moderate, temporary and permanent direct impacts on transportation during construction and subsidence that would be minimized through appropriate mitigation and repairs per IDNR-OMM requirements. Construction of the bleeder shaft facilities would result in minimal traffic increases. Mining of the coal would result in coal shipments via rail over a longer period.	Approval of the mine plan and mining of divested coal reserves would result in moderate, temporary and permanent direct impacts on transportation during construction and subsidence that would be minimized through appropriate mitigation and repairs per IDNR-OMM requirements. Construction of the bleeder shaft facilities would result in minimal traffic increases. Mining of the coal would result in shipments via rail over a longer period. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on transportation would result from their mining and coal shipments via rail would occur over a shorter period.	If divested coal reserves are mined, moderate, temporary and permanent direct impacts on transportation during construction and subsidence could occur. Impacts would be minimized through appropriate mitigation and repairs per IDNR-OMM requirements. Mining of the coal would result in shipments via rail over a longer period. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on transportation would result from their mining and coal shipments via rail would occur over a shorter period.
Utilities	No direct or indirect Project-related impacts on utilities.	Temporary direct impacts on utilities during construction and subsidence would be minimized through appropriate mitigation per IDNR-OMM requirements. Permanent impacts to two public water line segments present in the footprint of the proposed bleeder shaft facilities that would be mitigated through relocation.	Approval of the mine plan and mining of divested coal reserves would result in temporary direct impacts on utilities during construction and subsidence that would be minimized through appropriate mitigation per IDNR-OMM requirements. Permanent impacts to two public water line segments present in the footprint of the proposed bleeder shaft facilities that would be mitigated through relocation. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on utilities would result from their mining.	If divested coal reserves are mined, temporary direct impacts on utilities during construction and subsidence that would be minimized through appropriate mitigation per IDNR-OMM requirements. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on utilities would result from their mining.

Resource Area	No Action Alternative	Alternative A	Alternative B	Alternative C
Cultural Resources	No direct or indirect Project-related impacts on cultural resources.	Potential temporary and permanent impacts to cultural resources. Mine owners/operators would continue to consult with IHPA, IDNR and interested tribes regarding effects to cultural resources throughout the mine permit review process.	Approval of the mine plan and mining of divested coal reserves would result in potential temporary and permanent impacts to cultural resources that would be minimized through appropriate mitigation. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on cultural resources would result from their mining.	If divested coal reserves are mined, potential temporary and permanent impacts to cultural resources would be minimized through appropriate mitigation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on cultural resources would result from their mining.
Waste Management	No direct or indirect Project-related impacts on waste management.	Permanent impacts on waste management due to an increase in coal refuse disposal.	Approval of the mine plan and mining of divested coal reserves would result in permanent impacts on waste management due to an increase in coal refuse disposal. I If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on waste management would result.	If divested coal reserves are mined, impacts on waste management due to mining activities If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on waste management would result.
Public Health and Safety	No direct or indirect Project-related impacts on public health and safety.	Minor direct impacts to public health and safety during mine operation and subsidence that would be minimized through appropriate mitigation and compliance with MSHA, OSHA, IDNR Mine Safety and Training Division, and other relevant regulatory programs.	Approval of the mine plan and mining of divested coal reserves would result in minor direct impacts to public health and safety during mine operation and subsidence that would be minimized through appropriate mitigation and compliance with MSHA, OSHA, IDNR Mine Safety and Training Division, and other relevant regulatory programs. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on public health would result from their mining.	If divested coal reserves are mined, minor direct impacts to public health and safety during mine operation and subsidence that would be minimized through appropriate mitigation and compliance with MSHA, OSHA, IDNR Mine Safety and Training Division, and other relevant regulatory programs. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on public health would result from their mining.

Resource Area	No Action Alternative	Alternative A	Alternative B	Alternative C
Socioeconomics	No direct or indirect Project-related impacts on socioeconomics.	Moderate short- to long-term positive direct impacts during construction and mine operation through construction employment, continued mine operation employment, and necessary purchases. Minor positive indirect impacts from wage expenditure.	Approval of the mine plan and mining of divested coal reserves would result in moderate short- to long-term positive direct impacts during construction and mine operation through construction employment, continued mine operation employment, and necessary purchases. Minor positive indirect impacts from wage expenditure. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on socioeconomics would result from their mining.	If divested coal reserves are mined, potential moderate short- to long-term positive direct impacts during construction and mine operation and minor positive indirect impacts from wage expenditure. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on socioeconomics would result from their mining.
Environmental Justice (EJ)	No direct or indirect Project-related impacts on EJ.	Minor direct or indirect impacts on EJ. Minor indirect beneficial impacts to employment and income levels during mine operation.	Approval of the mine plan and mining of divested coal reserves would result in minor direct or indirect impacts on EJ. Minor indirect beneficial impacts to employment and income levels during mine operation. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on EJ would result from their mining.	If divested coal reserves are mined, minor direct or indirect impacts on EJ and minor indirect beneficial impacts to employment and income levels during mine operation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on EJ would result from their mining.
Noise and Visual Resources	No direct or indirect Project-related impacts on noise and visual resources.	Moderate and temporary direct noise impacts and minimal and temporary direct visual impacts during construction and mine operation.	Approval of the mine plan and mining of divested coal reserves would result in moderate and temporary direct noise impacts and minimal and temporary direct visual impacts during construction and mine operation. If divested coal reserves are not mined in the remaining TVA Mineral Rights Area, no direct or indirect impacts on noise and visual resources would result from their mining.	If divested coal reserves are mined, moderate and temporary direct noise impacts and minimal and temporary direct visual impacts during construction and mine operation. If divested coal reserves are not mined in the TVA Mineral Rights Area, no direct or indirect impacts on noise and visual resources would result from their mining.

2.7 Identification of Mitigation Measures

Sugar Camp mining operations would be carried out in compliance with Illinois Regulatory Program 62 IAC 1700-1850, which specifies a comprehensive set of environmental protection measures for the control of adverse ecological impacts resulting from coal mining.

Included are considerations for air, water, acidic, and toxic materials, soils, landform, and vegetation, among others, in both spatial and temporal capacities. As such, general protective measures for all environmental values are inherent within the regulatory program. The expanse of mining and mining-related disturbances would be limited to that acreage necessary for conducting mining operations in compliance with the applicable land reclamation regulatory requirements. Disturbances to sites not required for mining or mining-related activities would be held to a minimum.

IDNR would require Sugar Camp to implement best management practices and mitigation to minimize potential adverse environmental effects throughout the SBR No. 8 Mine Area as conditions of its mine permit.

Permit conditions would be enforced by the State of Illinois; TVA does not regulate the mining activities of Sugar Camp. State of Illinois mitigation measures include:

1. The implementation of sediment and erosion control practices (e.g., silt fences, straw, mulch, or vegetative cover) and fugitive dust minimization (e.g., wetting roads prior to heavy use).
2. The implementation of water quality protection measures (e.g., sediment pond treatment, water quality monitoring, or establishment of riparian zone buffer zones).
3. The repair or compensation of any damage to buildings or other structures caused by subsidence.
4. The minimization of invasive species transmission per the requirements of the Illinois Noxious Weed Law.
5. Compensation for any interruption to well water quality or quantity caused by subsidence until the groundwater is restored.
6. The repair of any damage to roads caused by subsidence.
7. The repair of any drainage alteration caused by subsidence.
8. The compensatory mitigation of wetlands and streams impacted by subsidence, if necessary. This condition would also be enforced by the USACE.
9. The repair of any damage to utilities caused by subsidence.

Additional mitigation requirements may arise in conjunction with each alternative; these are listed by resource area below.

2.7.1 Soils

- Implement other soil stabilization and vegetation management measures to reduce the potential for soil erosion during site operations.
- Try to balance cut-and-fill quantities to alleviate the transportation of soils off-site during construction.

2.7.2 Water Resources

- Develop a project specific SWPPP as required under the General Permit for Stormwater Discharges Associated with Construction Activities (IEPA 2023) prior to beginning construction of the bleeder shafts.
- Comply with the terms of the individual NPDES permit for industrial wastewater discharge(s) by ensuring any proposed process water discharge meets applicable effluent limits and water quality standards, as identified in the NPDES permit.
- Comply with the terms of the erosion and sediment control plans prepared as part of the NPDES permitting process.
- Use TVA BMP procedures for controlling soil erosion and sediment control, such as the use of 50-foot buffer zones, to the extent practicable, surrounding perennial and intermittent streams and wetlands; impaired or high-quality designated water features may require larger buffer zones and the installation of erosion control silt fences and sediment traps; and
- Implement other routine BMPs as necessary, including:
    - Non-mechanical tree removal within stream and wetland buffers;
    - Placement of silt fence and sediment traps along buffer edges;
    - Selective herbicide treatment to restrict application near receiving water features;
    - Proper vehicle maintenance to reduce the potential for adverse effects to surface and groundwater; and
    - Use of wetland mats for temporary crossing, dry season work across wetlands, and no soil rutting of 12 inches (depth) or more in wetlands.

2.7.3 Air Quality and GHG Emissions

- Comply with local ordinances or burn permits if burning of vegetative debris is required and use BMPs, such as periodic watering, covering open-body trucks, and establishing a speed limit to mitigate fugitive dust.
- Maintain engines and equipment in good working order.
- Comply with state air quality regulations.
- Comply with the USEPA mobile source regulations in 40 CFR Part 85 for on-road engines and 40 CFR Part 1039 for non-road engines, requiring a maximum sulfur content in diesel fuel of 15 parts per million (ppm).
- During construction and demolition activities, AIRNOW, the U.S. Air Quality Index (https://www.airnow.gov/AirNow) should be used to monitor local air quality conditions to inform decisions to reduce or change the timing of construction/demolition activities.

2.7.4 Biological Resources

- Revegetate with native and/or noninvasive vegetation consistent with EO 13112 (Invasive Species), including species that attract pollinators, to reintroduce habitat, reduce erosion, and limit the spread of invasive species.

- If tree removal were to be required at future bleeder shaft facility sites, endeavor to remove trees in compliance with permit requirements when listed bat species are not expected to be roosting in trees and when most migratory bird species of conservation concern are not nesting in the region.
- In areas requiring chemical treatment, only USEPA-registered and TVA-approved herbicides should be used in accordance with label directions designed, in part, to restrict applications near receiving waters and to prevent unacceptable aquatic effects.
- Follow USFWS recommendations regarding biological resources and pollinator species; and
- Instruct construction personnel on wildlife resource protection measures, including applicable federal and state laws, such as those that prohibit animal disturbance, collection, or removal; the importance of protecting wildlife resources; and avoiding unnecessary vegetation removal.

2.7.5 Transportation

- Implement staggered work shifts during daylight hours, when feasible, and a flag person during the heavy commute periods to manage construction traffic flow near the project site(s), if needed.

2.7.6 Cultural Resources

- Keep access routes and construction activities outside of the 30-meter buffers surrounding any archaeological sites listed in, or eligible or potentially eligible for listing in, the National Register of Historic Places (NRHP).
- When access routes must be placed within such buffers, avoid modifications and use wetland mats and light-duty equipment when practicable.
- Locate new structures and buildings at least 0.5 mile from, and out of view of, any NRHP-listed or eligible historic architectural structures, when practicable. When avoidance is not practical, mitigation would be performed in consultation with SHPO.

2.7.7 Waste Management

- Develop and implement a variety of plans and programs to ensure safe handling, storage, and use of non-hazardous and hazardous materials.

2.7.8 Public and Occupational Health and Safety

- Implement BMPs for site safety management to minimize potential risks to workers.

2.7.9 Noise and Visual Resources

- Minimize construction activities during overnight hours, where possible, and ensure that heavy equipment, machinery, and vehicles utilized at the project site meet all federal, state, and local noise requirements.
- Use of downward- and inward-facing lighting.

2.8 Preferred Alternative

At this time, TVA does not have a preferred alternative, and will select between these alternatives in a subsequent record of decision after consideration of comments received and consideration of environmental effects.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing environmental, social, and economic conditions of the project area, as defined for each resource area, and the potential environmental effects on those resource areas that could result from implementing the No Action Alternative or Action Alternatives. TVA determined that the potentially affected resources are geology, soils, and prime farmland; groundwater and aquifers; surface water and wetlands; floodplains; water quality; water supply; air quality and greenhouse gases; vegetation; wildlife; aquatic life; threatened and endangered species; natural areas, parks, and recreation; land use; transportation; utilities; cultural resources; waste management; public and occupational health and safety; socioeconomics and environmental justice; and noise and visual resources.

3.1 Past, Present, and Reasonably Foreseeable Future Actions

3.1.1 Geographic Area of Analysis

The appropriate geographic area over which past and present actions, as well as reasonably foreseeable future actions (RFFAs) could contribute to cumulative effects is variable and dependent on the resource evaluated. To evaluate the cumulative impacts to most resources, the geographic area of analysis includes the watersheds that encompass the SBR No. 8 Mine Area (Alternative A) or TVA Mineral Rights Area (Alternatives B and C). To assess impacts to air quality and from GHG emissions, the analysis includes emissions from active mining operations within 20 miles of the SBR No. 8 Mine Area.

To address cumulative impacts, the existing affected environment surrounding the SBR No. 8 Mine Area (Alternative A), or TVA Mineral Rights Area (Alternatives B and C), were considered in conjunction with the environmental impacts described in each resource area of Chapter 3. These combined impacts are defined by 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 the No Action Alternative and three Action Alternatives.

3.1.2 Identification of Other Actions

Depending on the geographic area of analysis for each resource area, past, present and RFFAs that are considered in this cumulative analysis include coal mining activities and other identified federal and private actions within the watersheds that encompass the SBR No. 8 Mine Area and the watersheds that encompass the TVA Mineral Rights Area. The cumulative analysis considered for the SBR No. 8 Mine Area (SBR No. 8 Mine Area watersheds) included mining activities within the Middle Fork Big Muddy River Watershed, the Big Creek Watershed, and the Rend Lake-Big Muddy River Watershed (Figure 3-2). The cumulative effects analysis considered for the TVA Mineral Rights Area (TVA Mineral Rights watersheds) included all watersheds in the SBR No. 8 Mine Area and an additional two watersheds: the Middle Fork Saline River Watershed and North Fork Saline River Watershed (Figure 3-2). The following identified activities draw from the 2020 TVA EIS, on the extraction of TVA-owned coal under SBR No. 6 (TVA 2020b), and data available from the U.S. Energy Information Administration (USEIA) on mining activities beginning after the completion of the 2020 EIS (USEIA 2023).

Underground coal mining activities taking place within the SBR No. 8 Mine Area watersheds and TVA Mineral Rights watersheds include four underground mine operations and one coal recovery/refuse mine operation (Table 3-1).

Table 3-1. Active mining activities in the cumulative effects area of analysis

Mine Name	Mine Type	SBR No. 8 Mine Area watersheds	TVA Mineral Rights watersheds
Hamilton County Coal Mine No. 1	Underground	X	X
IL Coal Recovery LLC Old Ed No. 1	Refuse	X	X
IL Land Resources Inc. Galatia	Underground		X
Sugar Camp Mine No. 1	Underground	X	X
Williamson Energy Pond Creek 1 Mine	Underground		X

Source: TVA 2020b; USEIA 2023

Together, production rates at the five mines account for approximately 48 percent of overall mine production in Illinois; 27 percent of overall mine production in Illinois occurs at the three mines within the SBR No. 8 Mine Area watersheds (USEIA 2023). Nine additional mines—including two coal recovery mines, two surface mines, and five underground mines—occur within the SBR No. 8 Mine Area watersheds that are either not currently active or not operating at production rates requiring reporting to USEIA. An additional 19 mines—including six coal recovery mines, six surface mines, and seven underground mines—occur within the TVA Mineral Rights watersheds that are either not currently active or not operating at production rates requiring reporting to USEIA. However, these mining activities are factored in, as relevant, due to being known past activities in the vicinity of the Project.

Mining activities considered within the SBR No. 8 Mine Area watersheds and TVA Mineral Rights watersheds are as follows:

- Approved or completed activities associated with Sugar Camp Mine No. 1, including:
    - Extraction of private/TVA-approved coal beneath approximately 38,384 acres and planned subsidence of approximately 33,024 acres within the extraction area;
    - Surface disturbance of about 53 acres within the longwall-mined coal extraction area for construction of bleeder shaft facilities in approximately 10 additional locations; and
    - Approximately 2,420 acres developed with surface facilities, including three refuse disposal areas occupying approximately 1,200 acres, altogether, that would not be fully reclaimed but rather capped with soil and partially restored, per IDNR-OMM requirements.
- Other completed or IDNR-OMM-approved coal mining activities, as shown on the IDNR Coal Mine Viewer (IDNR 2023a) and the Illinois State Geological Survey (ISGS) Coal Mine Permit Viewer (ISGS 2023); these activities involve or have involved:

- Extraction of coal beneath approximately 879,654 acres and planned subsidence of up to approximately 633,351 acres within the extraction area;
- Surface disturbance of about 223 acres within the longwall-mined coal extraction area for construction of bleeder shaft facilities in approximately 42 additional locations.

Table 3-2 presents the affected acreage associated with substantial mining activities separately for the Proposed Action, the other active and inactive mining actions (including other Sugar Camp Mine actions) described above, and the cumulative total, including both the Proposed Action and the other actions.

Table 3-2. Affected acreages associated with mining activities in cumulative effects area of analysis

Mining Component/ Activity	Proposed Action	Other Mining Actions[1]	Cumulative Total
Coal extraction area	22,414	879,654	902,068
Herrin 6 coal seam	22,414	354,318	376,732
Subsidence	16,129	633,351[2]	649,489
Bleeder shaft facilities	6	42	48

Source: TVA 2020b; IDNR 2023a; ISGS 2023
[1]These numbers include all constructed mines including both active and inactive mines of a variety of types.
[2]Actual subsidence information was not available for other mining actions. Subsidence was estimated at the same ratio as the Proposed Action (approximately 72 percent).

Other federal or private actions that could have similar effects to the SBR No. 8 Mine Area were reviewed and considered for inclusion in the cumulative analyses for the SBR No. 8 Mine Area and TVA Mineral Rights Area. These consist of the following:

- Interstate 57 (I-57) widening project, which would add an additional lane to I-57 between Interstate 64 near Mount Vernon, Jefferson County and Interstate 24 south of Marion, Williamson County. The I-57 widening project location is located within the SBR No. 8 Mine Area. Much of the effort to expand this 26-mile stretch of I-57 is expected to take place from 2022 to 2028 (IDOT 2023a).
- Illinois State Highway 14/I-57 interchange modification in Benton, Franklin County, located in the SBR No. 8 Mine Area, to a split-diamond configuration. While specific impacts will be considered as the NEPA process advances, a preliminary assessment of environmental impacts indicated that the project could potentially affect prime farmland, surface water resources, noise receptors, cultural resources, threatened and endangered species, and waste resources (HMG Engineers 2015). This project is projected to begin in 2025 (IDOT 2023b).

3.2 Geology, Soils, and Prime Farmland

3.2.1 Affected Environment

The SBR No. 8 Mine Area and TVA Mineral Rights Area lie within rolling uplands with elevations ranging from approximately 420 feet to 540 feet above mean sea level (amsl) for the SBR No. 8 Mine Area and 417 feet to 580 feet amsl for the TVA Mineral Rights Area. The soils and landforms were created by erosion of the bedrock and glacial deposits and were likely sculpted by the existing streams. Soils within the SBR No. 8 Mine Area and TVA

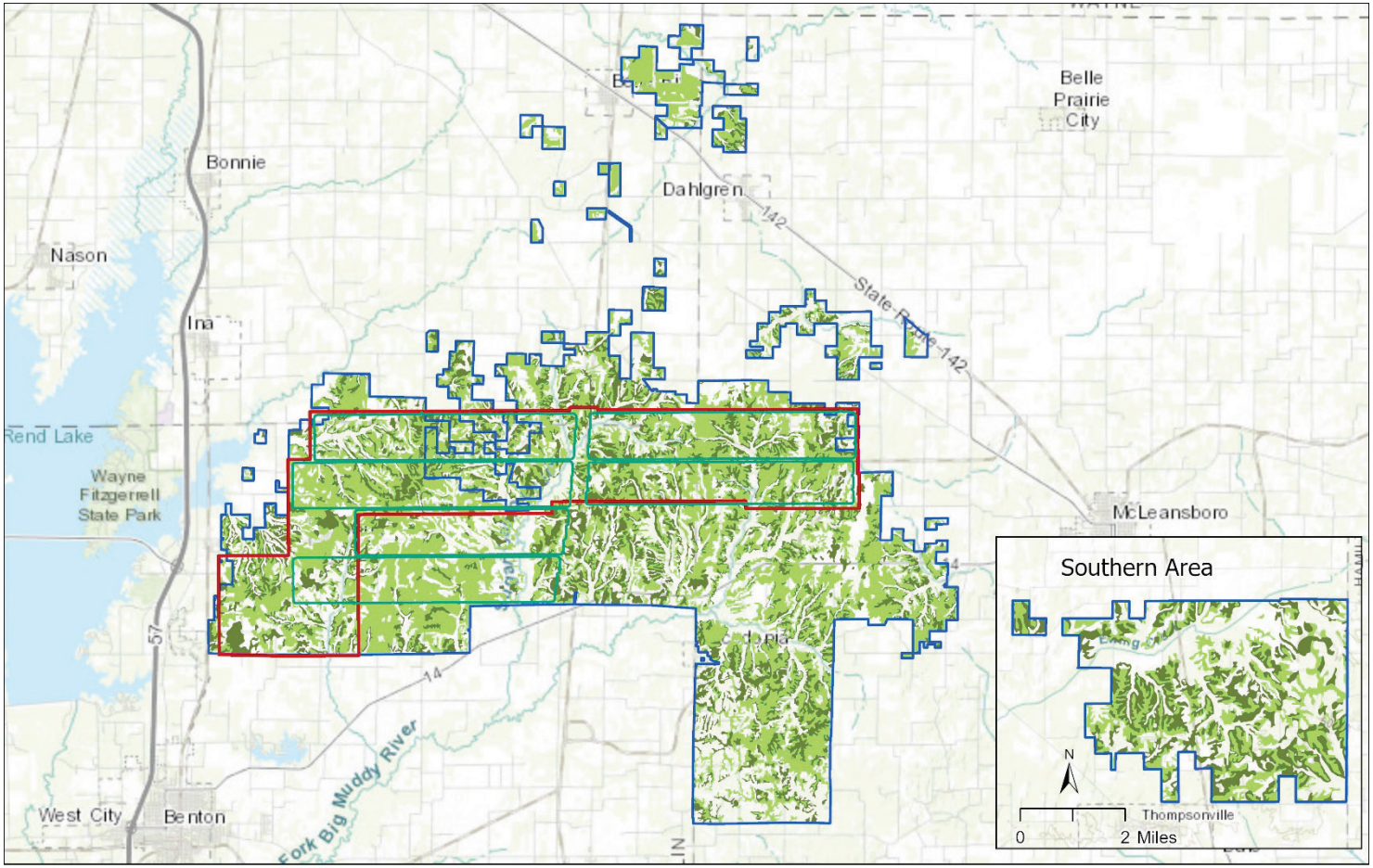
Mineral Rights Area range from moderately drained, which support agriculture, to poorly drained, which support wetlands. Constructed drainage ditches have extended the agricultural land into areas that were previously wetland. The SBR No. 8 Mine Area and TVA Mineral Rights Area are located within the Southern Illinoian Till Plain ecoregion, which is characterized by flat to rolling till plains (large flat plains covered with rocks, silt, and gravel that were deposited by glaciers) that become hillier to the south. Low moraines (i.e., till plains with irregular topography covered in soil, boulders, and rocks deposited by a glacier) also occur in this area.

Both the SBR No. 8 Mine Area and TVA Mineral Rights Area are located in the southern portion of the Illinois Basin coalfield. The Herrin No. 6 coal seam, which Sugar Camp is proposing to mine, lies from 650 feet to more than 900 feet below ground. The Herrin No. 6 coal seam is part of the Carbondale formation, which is of Middle Pennsylvanian age (300 to 318 million years old). Claystone, sandy shale, and limestone underlie the coal seam. The Pennsylvania System and several layers of shale and limestone (e.g., Anvil Shale, Brereton Limestone, Anna Shale, and Energy Shale) overlie the Herrin No. 6 coal seam. Unconsolidated glacial drift (rocks deposited by glaciers) lies above the Pennsylvania System.

There are no recorded major aquifers in the SBR No. 8 Mine Area nor the TVA Mineral Rights Area. The Pennsylvanian sandstones and limestones may be considered as minor aquifers with low permeability and porosity and are highly mineralized. Use of these aquifers is minimal due to depth from the surface and the resulting requirements for deep wells. Additional details on these and other aquifers are provided in Section 3.3.1.

Both the SBR No. 8 Mine Area and TVA Mineral Rights Area are in an area with a high seismic risk according to USACE (USACE 2016). The effective peak horizontal acceleration due to earthquake forces is 0.12g (Algermissen et al. 1982; ATC 1978). A 0.1g earthquake is expected to have strong perceived shaking with light potential for damage.

A total of 48 soil units are mapped within the SBR No. 8 Mine Area and a total of 63 soil units are mapped within the TVA Mineral Rights Area. Soil types include silt loams, silty clay loams, and clay loams. A portion of the soils within the SBR No. 8 Mine Area and within the TVA Mineral Rights Area are designated as prime farmland (USDA 2023b). The term “prime farmland” is assigned by the USDA to land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for such uses. Similarly, farmland of statewide importance is land other than prime farmland or unique farmland that is also highly productive. The Farmland Protection Policy Act (FPPA) requires federal agencies to consider the adverse effects of their actions on prime farmland, unique farmland, and farmland of statewide importance. Farmland subject to FPPA requirements does not have to be currently used for crop production. The land can be forested land, pastureland, cropland, or other land, but it cannot be water or urban land. 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.” FPPA does not authorize federal agencies to regulate the use of private or non-federal land, or in any way affect the property rights of owners. Approximately 21,181 acres (94.5 percent) of the SBR No. 8 Mine Area and 41,735 acres (61.2 percent) of TVA Mineral Rights Area are designated as prime farmland or farmland of statewide importance (USDA 2023b) (Figure 3-1).



Farmland Use Classification	Acres (Shadow Area)	Acres (TVA Coal Rights)
All areas are prime farmland	9500.65	26894.27
Farmland of statewide importance	5419.15	14840.42
Prime farmland if drained	3851.44	13139.9
Not prime farmland	1231.29	6409.96
Prime farmland if protected from flooding or not frequently flooded during the growing season	396.19	1238.02

Figure 3-1. Prime farmland within the SBR No. 8 Mine Area and TVA Mineral Rights Area

3.2.2 Environmental Consequences

3.2.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to geology or soils. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated, per IDNR-OMM permit requirements.

These impacts consist of temporary impacts to soils due to surface disturbances and planned subsidence and permanent impacts to soils and prime farmland in the location of the East RDA. Since the private/TVA-approved area would be restored to agricultural use, permanent impacts would not occur to prime farmland as a result of subsidence. Ongoing mining operations would result in a permanent change to the geology of the private/TVA-approved area due to removal of the Herrin No. 6 coal seam and fracturing of the overburden due to subsidence.

3.2.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. This would result in temporary impacts to soils due to surface disturbances and planned subsidence. Although the SBR No. 8 Mine Area would not be subject to FPPA due to plans to fully restore it to agricultural use (USDA 2019), TVA opted to consider the effects of Alternative A on prime farmland and farmland of statewide importance.

Surface Disturbances

During construction and operations, farmland would be temporarily disturbed at the locations of six bleeder shaft facilities (approximately 39 acres). The bleeder shaft facility locations would be restored to IDNR-OMM-approved post-mining conditions, including re-contouring of surface topography to restore hydrologic conditions, as described in Section 2.2.1. Therefore, no permanent impacts to soils or farmland are anticipated in these areas. A blind drilling system, which can be utilized in challenging overburden ground conditions, would be used to complete the construction of the bleeder shafts. The operational life of each bleeder shaft facility is expected to be approximately five years. After that time, the equipment would be removed (vans, bleeder ventilation shaft, etc.); however, the permanent fractures and changes to the geology at the bleeder shaft locations would occur.

Coal Extraction-Related Effects

Alternative A would result in a permanent change to the geology of the SBR No. 8 Mine Area due to removal of a portion of the Herrin No. 6 coal seam and the long-term fracturing of the overburden due to subsidence. Subsidence could temporarily affect approximately 13,750 acres of prime farmland and farmland areas of statewide importance within the SBR No. 8 Mine Area due to changes in surface drainage patterns and soil moisture.

IDNR-OMM requires coal companies to reestablish drainage patterns and stream profiles affected by mining activities. Topsoil removed during surface-disturbing activities would be replaced with a six-inch thick layer of topsoil during reclamation, as outlined in the UCM application to IDNR-OMM. Sugar Camp is required to compensate landowners for any temporary crop loss from impaired drainage and any permanent crop loss due to the alteration or installation of waterways.

The permanent impact to prime farmland post-reclamation would be minor due to planned reclamation efforts to return the area to IDNR-OMM-approved post-mining drainage patterns. Per IDOA, “Agriculture Department staff serve as advisors to the coal mining industry and the IDNR in mined land reclamation and restoration efforts. The Agriculture Department reviews mining permit applications to ensure they contain adequate farmland reclamation plans. Employees conduct on-site inspections to monitor the quality and timeliness of reclamation work. By overseeing the collection of crop samples on mined land, the Department helps determine whether yields meet specified targets that correspond to the land’s pre-mining production levels” (IDOA 2023).

IDNR-OMM ensures that the active coal mining operations are properly reclaimed, thereby assuring the restoration of lands affected by mining (including subsidence) to productive uses. IDNR-OMM inspects all coal mining sites to ensure reclamation standards are met and that approved reclamation plans are followed. Additionally, IDNR-OMM responds to citizen complaints through investigation and inspections. It is the responsibility of the mining company to correct impaired surface drainage in a timely manner and to compensate farmers for crop loss until repairs are completed. Some prime farmland and farmland areas of statewide importance could be temporarily impacted during the process of correcting drainage problems, but the permanent impact would be minor.

If temporarily impaired drainage or drainage repair work from subsidence causes crop losses or prevents the temporary planting of crops, the surface owner or tenant farmer would be eligible for compensation as follows:

- Crop loss would be compensated by paying an agreed to posted price at the local farm service center for the year’s loss based on the average prior yields for the affected fields, and
- Alteration or construction of additional waterways would be compensated by paying the fair market value for the acreage removed from production, or
- Other reasonable compensation that may be mutually negotiated with a landowner on a case-by-case basis.

Cumulative Effects

Cumulatively, Alternative A along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds, would result in permanent removal of approximately 37.6 percent of the Herrin No. 6 coal seam and fracturing of the overburden due to subsidence.

Past, present, and RFFAs would permanently affect geology in the SBR No. 8 Mine Area watersheds of analysis, given the extraction of some available Herrin No. 6 coal seam. Permanent impacts to other geological resources and soils would continue to be avoided, minimized, or mitigated by mine operators, per IDNR-OMM permit requirements. Within the geographic area of analysis, temporary impacts to soils due to planned subsidence would occur.

3.2.2.3 Alternative B

Under Alternative B, TVA would approve the proposed mining plan and would divest from the remaining TVA Mineral Rights Area. The impacts of approval of the mine plan and subsequent mining are described in Section 3.2.2.2.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.2.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A.

Cumulative Effects
Cumulatively, Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and TVA Mineral Rights Area watersheds would result in the permanent removal of some available Herrin No. 6 coal seam and fracturing of the overburden due to subsidence. Permanent impacts to other geological resources and soils would continue to be avoided, minimized, or mitigated by mine operators, per IDNR-OMM permit requirements. Within the geographic area of analysis, temporary impacts to soils due to planned subsidence would occur.

3.2.2.4 Alternative C
Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.2.2.3).

Cumulative Effects
Cumulatively, Alternative C along with the other actions as described in Section 3.1 for the TVA Mineral Rights Area watersheds would result in the permanent removal of approximately 49 percent of the Herrin No. 6 coal seam and fracturing of the overburden due to subsidence.

Past, present, and RFFAs would permanently affect geology in the geographic area of analysis, given the extraction of some of the available Herrin No. 6 coal seam. Permanent impacts to other geological resources and soils would continue to be avoided, minimized, or mitigated by mine operators, per IDNR-OMM permit requirements. Within the geographic area of analysis, temporary impacts to soils due to planned subsidence would occur.

3.3 Water Resources

3.3.1 Groundwater and Aquifers

3.3.1.1 Affected Environment
The SBR No. 8 Mine Area and TVA Mineral Rights Area are located in the glaciated upland area of northeastern Franklin County, southeastern Jefferson County, and western Hamilton County, situated at the headwaters of the major drainage systems of the region. In this area, no specific geologic unit has been identified as a major surficial aquifer. According to ISGS Circular 212, Groundwater Geology in Southern Illinois, the thickest unconsolidated material in Franklin County is in Big Muddy River Valley, west of the SBR No. 8 Mine Area and TVA Mineral Rights Area. The glacial deposits are generally thin and are not water-yielding (ISGS 1956).

Minor scattered sand and gravel surficial aquifers exist in the Middle Fork Big Muddy River Valley and its larger tributaries, such as Sugar Camp Creek, Ewing Creek, Akin Creek and Jordan Creek. These aquifers produce some low-yield water supplies.

Pennsylvanian sandstones in the northern and southeastern portions of Franklin County, southern Jefferson County, and western portion of Hamilton County can usually provide sufficient water for individual domestic supplies. Yields from wells completed in these formations are usually less than 10 gallons per minute (gpm), with yields less than five gpm common. The low permeability of the Pennsylvanian System rocks causes the water in the deeper formations to be highly mineralized. Therefore, some deeper bedrock aquifers may contain water of unsatisfactory drinking water quality without treatment and are generally not developed. Recharge to these bedrock aquifers is primarily from precipitation that percolates into and through the overlying unconsolidated materials and primarily takes place at outcrop areas for the various bedrock units. Several landowners within the SBR No. 8 Mine Area reported using wells installed in Pennsylvanian sandstone ranging from 200 to 360 feet in depth. This aquifer is locally known as “white sandstone,” as described in available drilling logs, and is reported to provide high quality water in quantities sufficient for domestic and farm use. Yields of less than 5,000 gallons per day are generally reported for domestic wells completed in this formation. The use of groundwater is addressed in more detail in Section 3.3.5.

As a result of the existing longwall mining operations, Sugar Camp has reportedly experienced water diminishment in wells within the Sugar Camp Mine No. 1 area; however, IDNR has not been contacted by any resident regarding well water issues (Foresight Energy 2023). Due to this diminishment, Sugar Camp provided well owners with public water supply connections and has a plan in place to continually monitor water levels in these wells. Additionally, the Illinois Groundwater Protection Act (IGPA) outlines a prevention-orientated process for monitoring and establishing groundwater protection standards. IGPA establishes partnerships with agencies like IEPA and IDNR to assist in compliance and enforcement of groundwater quality standards, as necessary (IGPA 2014).

IEPA and IDNR previously approved high chloride water treatment methods used at existing Sugar Camp Mine No. 1 facilities. As the longwall operation progresses and the roof rock fractures, high chloride water is draining into the mine workings. The water is then pumped to the surface and treated at a RO plant. Approximately two million gallons per day (75 percent) of the treated water are pumped directly to a settling pond, where it is then used in the existing coal preparation plant. Approximately 675,000 gallons per day (25 percent) of the treated water is disposed of in existing on-site deep injection wells or is deposited to the existing RDAs in the surface effects area. As another measure, Sedimentation Pond 003, located at the existing South RDA, is managed by pumps to reduce discharges from Outfall 003 that may potentially contain high chloride water. The existing RDAs were constructed with a low permeability liner that restricts the water flow into and out of the RDAs. The design of the existing RDAs, including the low permeability liner, was approved by IDNR-OMM. At the time of this EIS, the design of the East RDA is pending approval by MSHA and IDNR-OMM.

Sugar Camp holds an individual NPDES permit issued by IEPA to discharge water from the 13 existing sedimentation pond outfalls associated with the existing RDAs and one existing sanitary wastewater discharge (NPDES Permit No. IL0078565). The NPDES permit identifies discharge limitations, monitoring, and reporting requirements and details specific conditions for each outfall. The permit also requires monitoring and reporting requirements for 21 groundwater monitoring wells associated with the existing RDAs. No additional outfalls are proposed for SBR No. 8.

3.3.1.2 Environmental Consequences

3.3.1.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to groundwater. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated, per IDNR-OMM permit requirements.

As a result of subsidence fractures, temporary, short-term groundwater quantity impacts could occur in the planned subsidence area associated with the private/TVA-approved area. Sugar Camp is required to continue implementing its groundwater monitoring program, including routine monitoring and any necessary mitigation. Therefore, minor, temporary impacts to groundwater would continue to occur under the No Action Alternative.

3.3.1.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Surface disturbance activities are not anticipated to impact groundwater quantity as no consumptive uses of groundwater are planned. Temporary, short-term groundwater quantity impacts from subsidence could potentially occur resulting from subsidence fractures. Additionally, soil hydraulic properties such as saturated hydraulic conductivity and water content (Wang et al. 2017) may be altered by subsidence, impacting the field capacity of septic drain fields as well as septic tank placement. Soil hydraulic properties are relatively uniform in soils after land rehabilitation, including an increase in field capacity (Wang et al. 2017).

Sugar Camp's groundwater monitoring program is designed to provide sufficient lead time for identification of any potential impacts, as well as to provide ample time for the investigation and mitigation of any impacts. Sugar Camp is required to monitor the groundwater throughout the life of the mine, up to and including the time of final bond release. IDNR-OMM reserves the right to add monitoring parameters or monitoring locations should the need arise.

Surface Disturbances

Due to the use of casings that would isolate the ventilation shafts from groundwater, the construction and operation of bleeder shaft facilities would not adversely affect groundwater. Other components associated with the bleeder shaft facilities would also not impact groundwater.

Surface disturbance activities are not anticipated to impact groundwater quantity as no consumptive uses of groundwater are planned. As a result of the formation of subsidence fractures, temporary, short-term groundwater quantity impacts could potentially occur in the area of planned subsidence. Alternative A would be subject to Sugar Camp's groundwater monitoring program, which necessitates routine monitoring and compliance. Therefore, minor, temporary impacts to groundwater would occur under Alternative A.

Coal Extraction-Related Effects

While unlikely in the areas where the room-and-pillar method is used, planned subsidence of up to 5.5 feet would occur in areas where longwall mining methods are used. Any subsidence could potentially alter water-bearing strata. Subsidence can either cut off groundwater flow by the compression of rock layers or increase groundwater flow because

the rock layers are fractured, giving water more passages to move through (Owili-Eger 1983). In some cases, the quality and quantity of water in aquifers can increase after mining because of this increased groundwater flow (Booth and Spande 1991).

Although no major aquifers are mapped in the area, a white sandstone has been documented locally and is reportedly capable of producing less than 5,000 gallons per day in domestic wells. Since this formation is not widely used as a domestic water source, the fracturing of rock layers during subsidence would not likely cause a significant change in underground hydrologic patterns. Groundwater quantity is expected to recover to pre-mining levels over time. No significant, detrimental impacts on drinking, domestic and residential water supplies are anticipated.

Per IDNR-OMM requirements, wells would be monitored during subsidence operations and a significant decrease in water quality and/or quantity would be remediated by Sugar Camp, and adequate clean water would be supplied to the parties affected until the remediation is completed.

Cumulative Effects
Cumulatively, Alternative A along with other mining operations within the watersheds that encompass the SBR No. 8 Mine Area are not anticipated to significantly affect groundwater quality or quantity. Moreover, significant cumulative long-term impacts to groundwater would not occur due to implementation of the IDNR-OMM-required groundwater monitoring program and reclamation plan. A cumulative hydrologic impact assessment done by IDNR for the entire UCM Permit No. 382 shadow area and nearby permitted areas found that the mining operations were designed to prevent material damage to the hydrologic balance in the permit areas and surrounding vicinities.

All of the past, present, and RFFAs considered within the geographic area of analysis for cumulative effects to water resources are subject to federal and state agency approvals described in Section 1.3. Surface disturbances associated with the proposed actions likely have not or would not impact groundwater quantity, as no consumptive uses of groundwater are associated with these facilities. Bleeder shaft facilities associated with longwall mining are encased to isolate the shafts from intersecting with groundwater; therefore, their construction and operation have not or would not adversely affect groundwater. RDAs associated with these facilities have been or are subject to NPDES permits and associated monitoring requirements, including that of groundwater wells. Any violation of effluent exceedances would result in noncompliance with the NPDES permit and, if not resolved, would be subject to formal enforcement action. Temporary, moderate impacts have occurred or would occur to groundwater supply as a result of subsidence of portions of the coal extraction areas. Short-term, moderate groundwater quantity impacts from subsidence have occurred or could potentially occur resulting from the formation of subsidence fractures. Nearby well water levels may have been or have the potential to be temporarily impacted by subsidence; however, the potential for this type of impact is low due to the depth of the Herrin No. 6 coal seam and the rapid water level recovery in shallow water wells after subsidence (Booth and Spande 1992). These temporary impacts to groundwater supply and quantity have been or would be mitigated as required by IEPA and IDNR-OMM.

3.3.1.2.3 Alternative B

Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.3.1.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects

The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.3.1.2.4). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A. IDNR-OMM permit requirements should be followed by all new owners and operators.

Cumulative Effects

Cumulatively, Alternative B, along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds, are not anticipated to significantly affect groundwater quality or quantity. Refer to Section 3.3.1.2.2. for cumulative effects as a result of approval of the mine plan. For divested coal reserves, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A.

3.3.1.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.3.1.2.3).

Cumulative Effects

Cumulatively, Alternative C along with other mining operations within the watersheds that encompass the TVA Mineral Rights Area are not anticipated to significantly affect groundwater quality or quantity.

3.3.2 Surface Water and Wetlands

3.3.2.1 Affected Environment

3.3.2.1.1 TVA Mineral Rights Area and SBR No. 8 Mine Area

The TVA Mineral Rights Area and SBR No. 8 Mine Area lie within three watersheds: Rend Lake-Big Muddy River (Hydrologic Unit Code Identification [HUC ID]: 0714010603), Middle Fork Big Muddy River (HUC ID: 0714010604), and Big Creek (HUC ID: 0512011504). The TVA Mineral Rights Area lies within two additional watersheds: Middle Fork Saline River (HUC ID: 0514020402) and North Fork Saline River (HUC ID: 0514020404) (Figure 3-2).

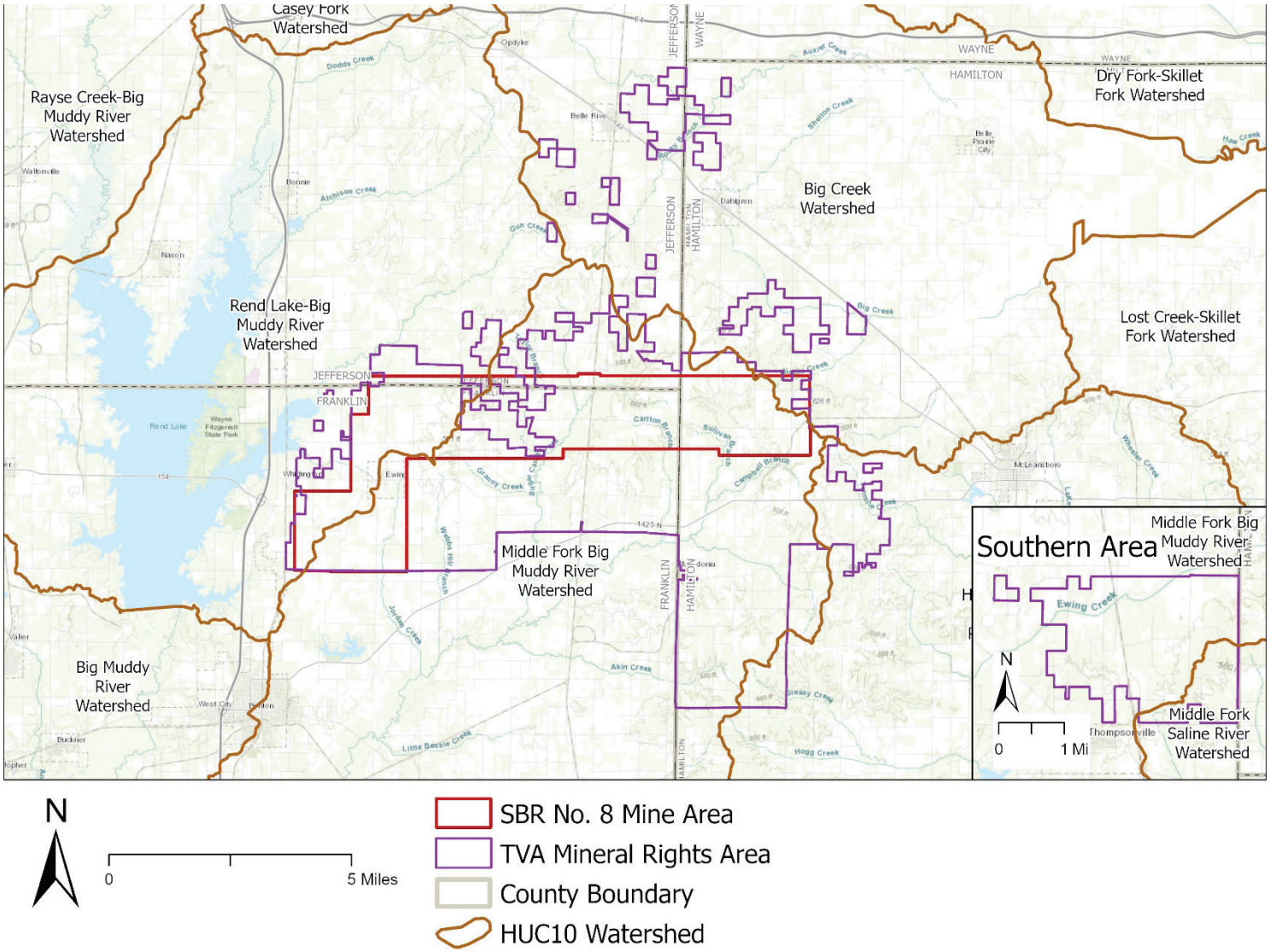


Figure 3-2. Watersheds within the SBR No. 8 Mine Area and the TVA Mineral Rights Area

Surface water is described as water flowing through a defined watercourse (e.g., rivers, streams, or creeks with a defined bed and bank), or stored within a reservoir, pond, or lake. Surface water streams are classified as perennial, intermittent, or ephemeral, depending on the usual level of flow of the water conveyance. The National Hydrography Dataset (NHD) is produced by the United States Geological Survey (USGS) and provides information on the characteristics and extent of streams in the U.S (USGS 2020).

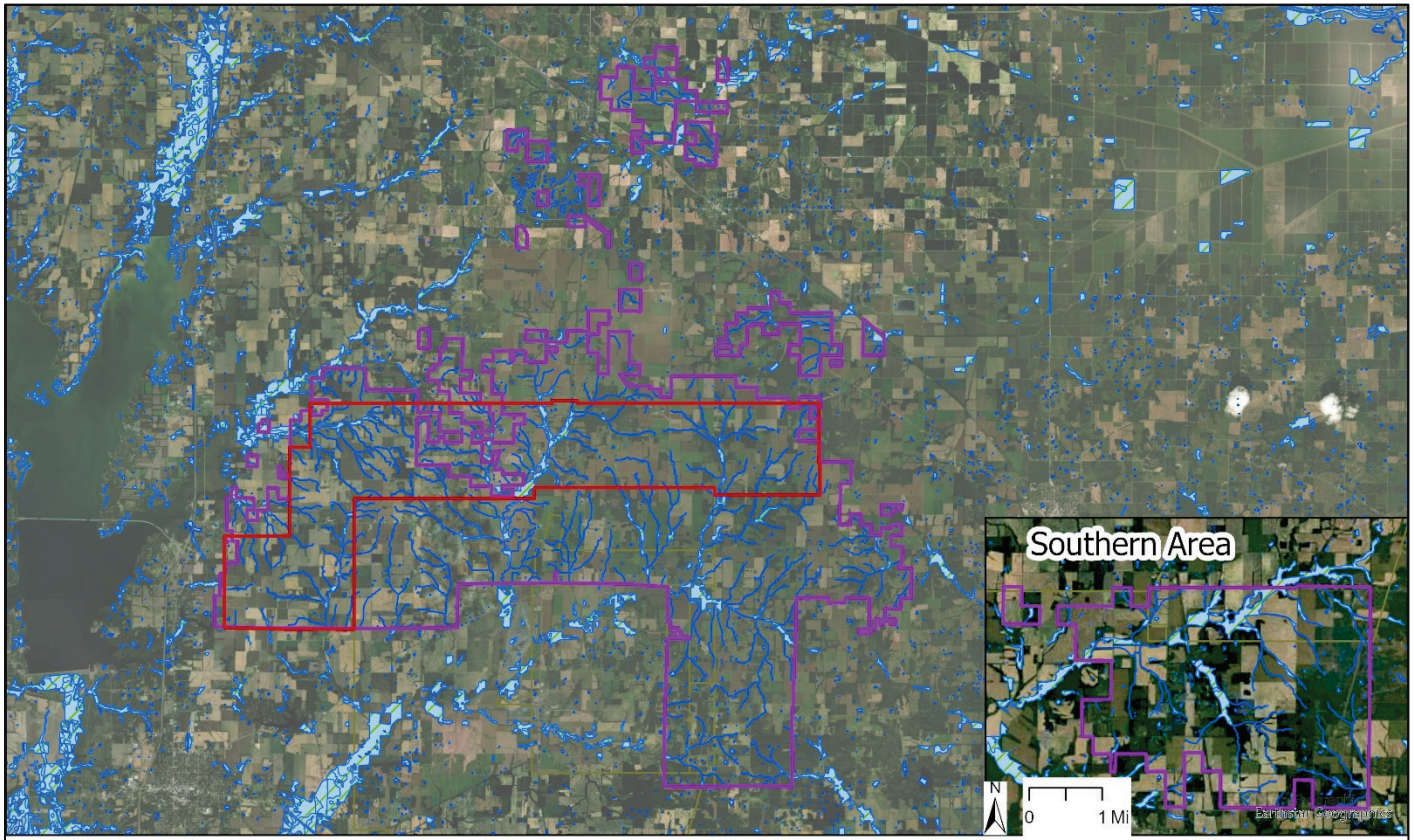
Twenty-two named streams flow through the TVA Mineral Rights Area, 11 of which also flow through the SBR No. 8 Mine Area (Table 3-3 and Figure 3-3). Many unnamed creeks and tributaries flow through both the TVA Mineral Rights Area and the SBR No. 8 Mine Area. According to the NHD, there are approximately 875,351 linear feet of streams in the TVA Mineral Rights Area and approximately 301,196 linear feet of streams in the SBR No. 8 Mine Area. See Section 3.3.5 for named streams on the 303(d) list of impaired waters.

Table 3-3. Named streams within the and SBR No. 8 Mine Area and the TVA Mineral Rights Area

USGS Named Stream	SBR No. 8 Mine Area	TVA Mineral Rights Area
Akin Creek		X
Auxier Creek		X
Big Creek		X
Campbell Branch	X	X
Carlton Branch	X	X
Ewing Creek		X
Goose Creek	X	X
Granny Creek	X	X
Greasy Creek		X
Gun Creek		X
Halltown Creek		X
Hamilton Branch	X	X
Jordan Creek	X	X
Marcum Branch	X	X
Middle Creek	X	X
Middle Fork Big Muddy River		X
Opossum Creek		X
Rocky Branch		X
Sugar Camp Creek	X	X
Sullivan Branch	X	X
Taylor Branch	X	X
Tenmile Creek		X
Webbs Hill Branch		X

Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, mud flats, and natural ponds. EO 11990 (Protection of Wetlands) directs federal agencies to minimize the destruction, loss, or degradation of wetlands and preserve and enhance the natural and beneficial values of wetlands. In addition, activities in wetlands are regulated under the CWA. The National Wetland Inventory (NWI) is produced by the USFWS and provides information on the characteristics, extent, and status of wetlands and deepwater habitats in the U.S. NWI mapping is broad scale, providing approximate locations of wetlands one acre or larger. NWI data was obtained from the USFWS online wetland mapper (USFWS 2019a).

Within the TVA Mineral Rights Area, NWI data indicate that there are approximately 345 acres of ponds, 54 acres of lakes, 1,666 acres of freshwater forested/shrub wetlands, and 101 acres of emergent wetlands (Figure 3-3). Within the SBR No. 8 Mine Area, NWI data indicate that there are approximately 84 acres of ponds, 8 acres of lakes, 530 acres of freshwater forested/shrub wetlands, and 29 acres of emergent wetlands (Figure 3-3).



	TVA Mineral Rights		Shadow Area	
National Hydrography Dataset	**Frequency**	**Feet**	**Frequency**	**Feet**
Streams	709	1,646,280	228	554,484

National Wetland Inventory	**Freqency**	**Acres**	**Frequency**	**Acres**
Freshwater Emergent Wetland	72	170	33	603
Freshwater Pond	533	368	15	31
Freshwater Forested/Shrub Wetland	132	2,576	167	86

Figure 3-3. Surface waters and wetlands within the SBR No. 8 Mine Area and the TVA Mineral Rights Area, per NHD and NWI

3.3.2.1.2 No. 4 Bleeder Shaft

Comprehensive environmental surveys were completed on the No. 4 Bleeder Shaft in fall 2023 (Appendix C). Surveys for surface water at the No. 4 Bleeder Shaft location identified a total of two intermittent streams (1,177 linear feet), nine ephemeral streams (9,523 linear feet), four wet weather conveyances (WWC) (178 linear feet), and one pond (0.329-acre) (Table 3-4 and Figure 3-4). WWCs include erosional ditches and swales. Surveys for wetlands and ponds at the No. 4 Bleeder Shaft location identified a total of one forested wetland (0.146-acre), one farmed emergent wetland (0.006-acre), and one emergent wetland (0.050-acre) (Table 3-5 and Figure 3-4).

Table 3-4. Summary of surface waters present at the No. 4 Bleeder Shaft

Feature	Field ID	Number of Features	Total Extent
Streams			
Intermittent	S001; S002	2	1,177 linear feet
Ephemeral	E001 through E007; E010; E013	9	9,523 linear feet
Wet-Weather Conveyances	E008; E009; E011; E012; E014	4	178 linear feet
	Total	***15***	***10,878 linear feet***
Open Water			
Ponds	P001	1	0.329 acre

Intermittent stream S001 is located in the northeast portion of the Study Area and is separated from E013 due to the railroad; it continues offsite to the north. S001 is an unnamed primary surface water feature that flows north to south. Intermittent stream S002 is located south of the railroad in the eastern forested portion of the Study Area and continues off-site to the south. S002 is a primary surface water feature and is the NHD-named stream Opossum Creek. The dominant substrate of both S001 and S002 is mud.

Ephemeral streams E001, E003, E010, and E013 drain into S002 via culverts. E001 is located north of the railroad. E003 flows into the Study Area north of County Road (CR) 1400 North and continues north along the edge of the crop field, where a culvert connects it to E001. E010 begins at the culvert connecting E001 and E003 and continues linearly along the railroad and CR 350 East to a culvert beneath the road, where it then flows into the forested area and is connected via culvert underneath the railroad to S002. E013 is located near the eastern boundary of the Study Area, at the base of the railroad embankment. It flows south into S002 off-site. E002 and E004 through E007 are hydrologically isolated linear drainage features. E002 is located south of CR 1400 North and continues offsite to the west. E004 is located to the east of the railroad and continues offsite to the south. A large man-made berm separates E004 from E007, which is located along the southern side of the railroad and ends just west of CR 350 East. E005 and E006 are located east of the railroad track on either side of CR 1400 N.

At the time of survey, WWCs were dry and did not exhibit a defined bed and bank. Some WWCs had upland rooted plants growing in the bottom of the channel. These features only flow during wet weather events but can provide a hydrological connection between upstream and downstream waters. WWCs E008 and E009 are located near the southwestern intersection of CR 350 East Rd and the railroad. These WWCs are erosional

rills that flow downslope from the agricultural field to the base of the railroad embankment. E011 is an erosional rill located in the crop field and connects to W002. E011 is hydrologically isolated from any other aquatic features. E012 is hydrologically connected to S001 near the northeastern corner of the Study Area. It continues offsite to the north. E014 is on the north side of the railroad track near the eastern boundary of the Study Area.

The 0.329-acre pond (P001) was located south of the railroad, north of CR 1400 North Rd, and west of CR 350 East Rd. It was identified as palustrine, unconsolidated mud bottom, permanently flooded, diked/impounded (PUB3Hh) (Cowardin et al. 1979) and characterized as open water within a man-made impoundment.

Table 3-5. Summary of wetlands present at the No. 4 Bleeder Shaft

Wetland Type	Field ID	Total Extent (acres)
Forested	W001	0.146
Farmed Emergent	W002	0.006
Emergent	W003	0.050
	Total	***0.202***

The 0.146-acre forested wetland (W001) was located north of the railroad and near the eastern boundary of the Study Area. It was identified as palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E) (Cowardin et al. 1979) and exhibits a vegetated concave surface. Dominant vegetation consists of black willow and common reed. No primary wetland hydrology indicators were observed during the field assessment. Secondary wetland hydrology indicators include drainage patterns and geomorphic position. Soils were sandy, with dark brown and gray and mottled coloration indicative of hydric conditions.

The 0.006-acre wetland (W002) was located within the crop field west of CR 350 East Rd and north of the railroad. It was identified as palustrine, emergent, persistent, farmed (PEM1f) (Cowardin et al. 1979) and characterized by vegetated concave surface within a row crop field. Non-cultivated vegetation included barnyard grass, Indian goosegrass, annual ragweed, roughfruit amaranth, and switchgrass. Primary and secondary wetland hydrology indicators observed during the field assessment include iron deposits, drainage patterns, and geomorphic position. Soils were clayey, with dark brown and gray and mottled coloration indicative of hydric conditions.

The 0.050-acre emergent wetland (W003) was located south of the railroad, north of CR 1400 North Rd, and west of CR 350 East Rd. It was identified as palustrine, emergent, persistent, seasonally flooded/saturated, diked/impounded (PEM1Eh) (Cowardin et al. 1979) and forms a fringe around the impounded pond (P001). Dominant vegetation consists of pussy willow, blunt spikerush, and rice cutgrass. Primary and secondary wetland hydrology indicators observed during the field assessment include iron deposits, crayfish burrows, and geomorphic position. Soils were clayey with dark brown and gray and mottled coloration indicative of hydric conditions.

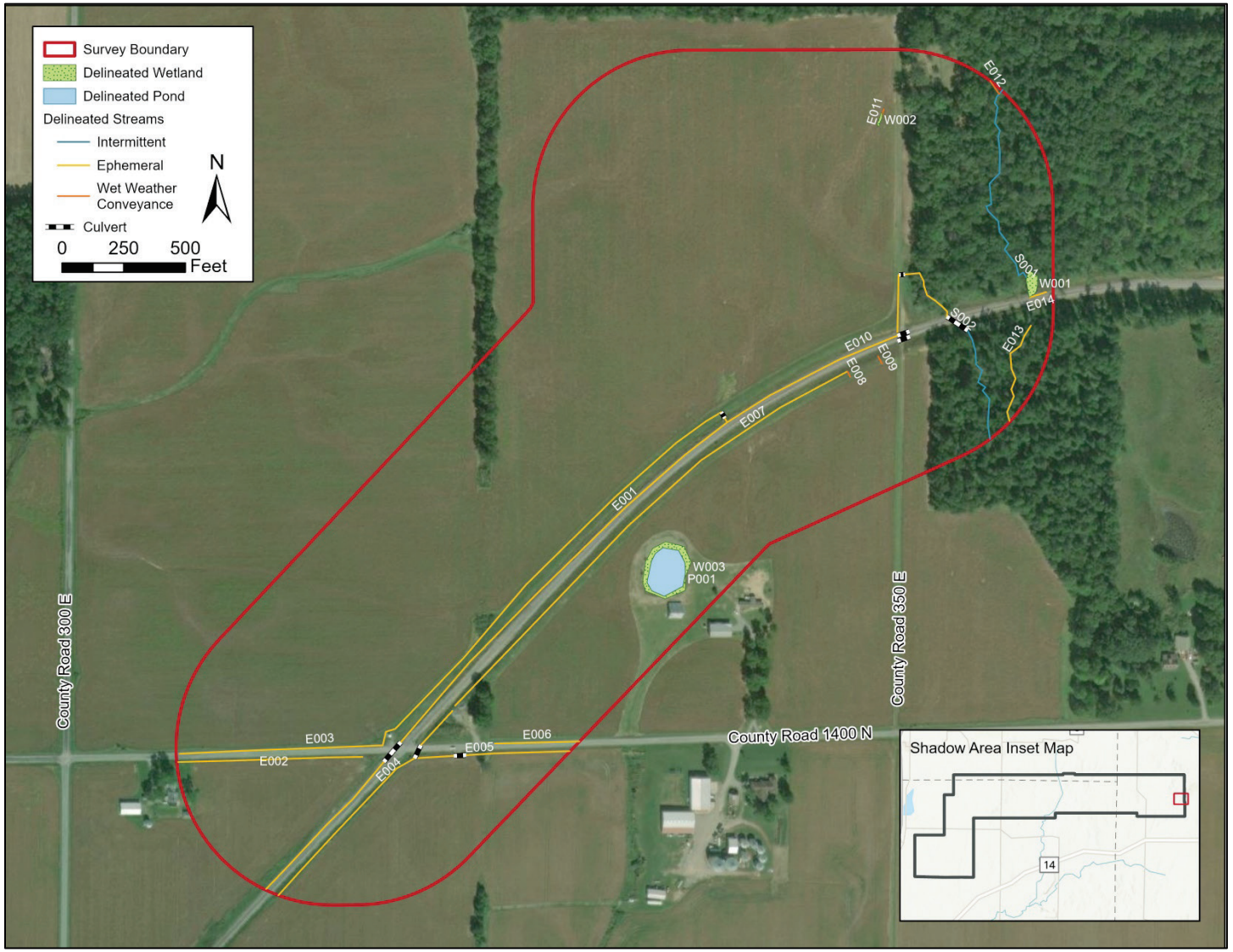


Figure 3-4. Delineated surface waters and wetlands within the No. 4 Bleeder Shaft

3.3.2.2 Environmental Consequences

3.3.2.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to surface waters and wetlands. Sugar Camp has secured or would secure all necessary approvals from appropriate agencies, including, but not limited to, USACE, IEPA, and IDNR-OWR. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these would continue to be minimized or mitigated, per IDNR-OMM permit requirements.

3.3.2.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Approval of the mine plan would result in minor impacts to surface waters and wetlands due to planned surface disturbances and temporary impacts due to planned subsidence in the SBR No. 8 Mine Area, as described below. Any impacts would be minimized or mitigated per IDNR-OMM permit requirements.

Surface Disturbances

The development of the No. 4 Bleeder Shaft may impact up to 10,878 linear feet of watercourses (including intermittent streams, ephemeral streams, and WWCs), 0.202 acre of wetlands, and one 0.329-acre pond. The effects of construction and operation of the remaining five bleeder shaft facilities on surface waters and wetlands would be reviewed by TVA prior to construction, as the proposed construction start date is greater than five years. If surface waters occur at the proposed locations of these facilities, direct impacts to streams would be avoided or mitigated. Any wetlands at present at the bleeder shaft facilities may be permanently impacted. Major impacts to surface water and wetlands are not expected and would be avoided to the maximum extent practicable.

Coal Extraction-Related Effects

As a condition of the subsidence mitigation plan associated with SBR No. 8, Sugar Camp must return water flow patterns to pre-subsidence patterns through stream mitigation activities. Additionally, if a man-made pond were to be affected by subsidence, Sugar Camp would be required to reconstruct the pond to the original configuration.

Subsidence can affect surface water by altering stream elevations and gradients, thus affecting drainage patterns. Sugar Camp is required by IDNR-OMM to repair any drainage changes caused by mining activities. No point sources of pollution or removal of existing surface water features would occur. Existing surface water features may require future modifications for drainage repair; these modifications would undergo further environmental review as required by the State of Illinois and the USACE.

Prior to reclamation, there could be temporary impacts to the approximately 403 acres of NWI-mapped wetlands present within the subsidence area. Potential impacts related to subsidence include changes in hydrology, plant communities, and hydroperiod (i.e., the length of time that there is standing water at a specific location). A study of mining subsidence and its effects on wetlands in southern Illinois by Nawrot et al. (2003) indicated subsidence could produce diverse wetland communities with increased habitat value. The study found that there was an increase in the number of isolated depressional wetlands after subsidence.

Initial changes in groundwater and subsurface flow due to subsidence could create increased temporary wetland vegetation in new areas of standing water (Nawrot et al. 2003). As a part of the IDNR permitting process, drainage must be corrected following subsidence in order to restore the hydrology of the subsided area to IDNR-OMM-approved post-mining topographic conditions. After landscape re-contouring, the flow would largely be restored to pre-mining conditions, and the wetlands created by subsidence would be eliminated in accordance with IDNR-OMM permit requirements. Based on predicted subsidence, areas that would be likely to pond and locations where drainage corrections would be necessary (depressed areas) are restricted to the eastern portion of the SBR No. 8 Mine Area (Figure 3-5). Once hydrology is restored, no permanent impacts would remain and overall impacts to surface waters and wetlands from subsidence would be insignificant.

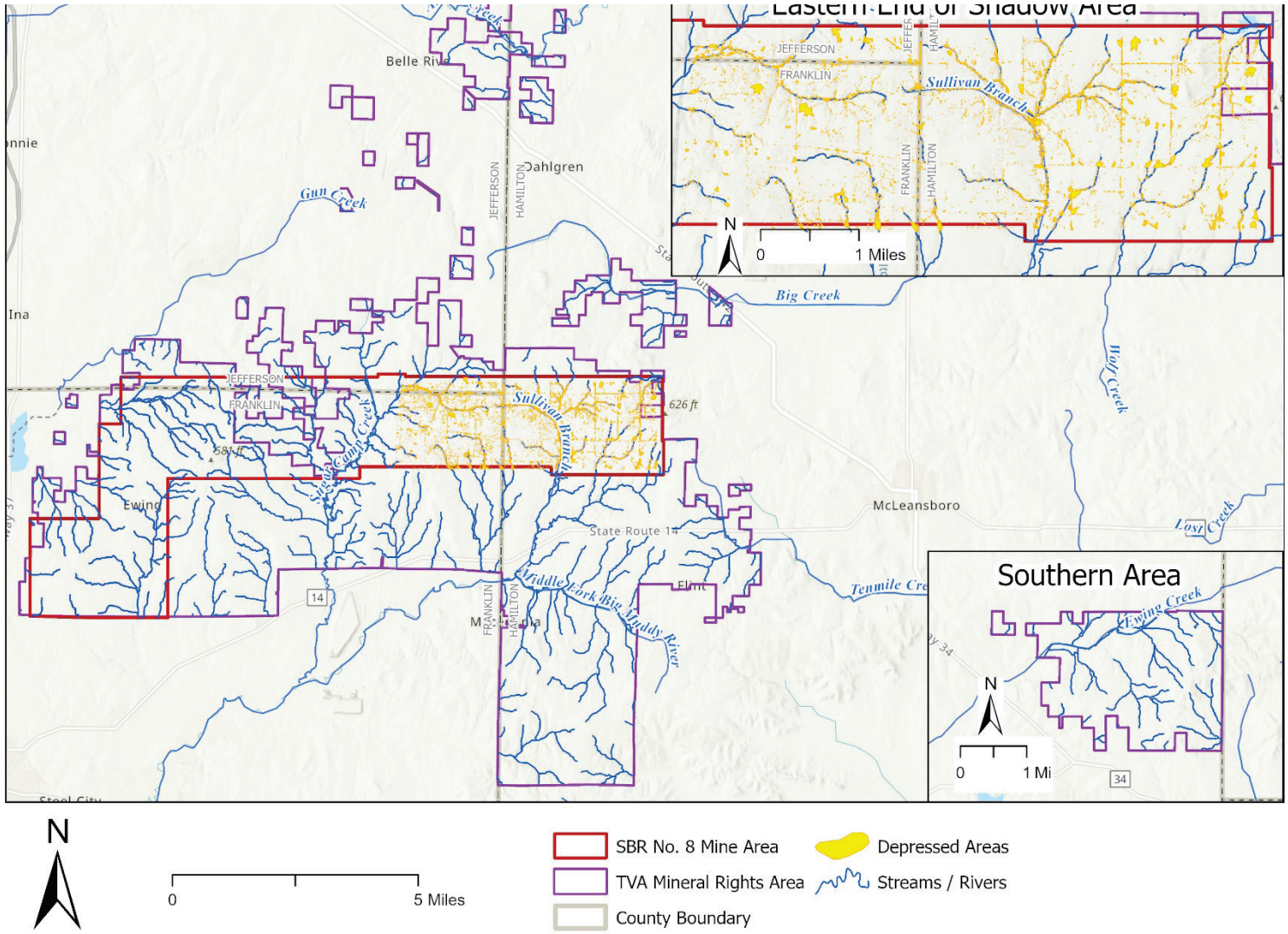


Figure 3-5. Depressed areas within the SBR No. 8 Mine Area requiring drainage correction

Cumulative Effects
Cumulatively, Alternative A along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds would not result in significant cumulative impacts to surface waters and wetlands due to avoidance to the maximum extent practicable. Any unavoidable impacts to wetlands would be minimized or mitigated, per IDNR-OMM permit requirements. Cumulative impacts to Rend Lake as a result of water withdrawal for the existing coal preparation plant, combined with Rend Lake withdrawal from other mine operations, if any, are anticipated to be minimal over the life of the Project and would not significantly change daily or annually.

During siting of surface facilities, permanent impacts to streams and wetlands associated with considered actions have been or would be avoided to the maximum extent practicable. Any impacts to Waters of the U.S. (WOTUS) would be regulated by CWA Sections 404 and 401 and the Project would be subject to the terms and conditions of USACE 404 permits and IEPA 401 WQCs. Any impacts to WOTUS due to subsidence are also regulated by the subsidence mitigation plan as required and approved by IDNR-OMM.

Overall, cumulative effects would result in moderate temporary impacts to surface waters and wetlands have occurred or would occur in subsided areas. However, IDNR-OMM requires adherence to a subsidence mitigation plan, which includes the requirement to repair any drainage changes, and like other mining-related surface effects, subsidence-related impacts to WOTUS would be subject to CWA Section 404 and 401 permits and would be mitigated as required by these permits.

3.3.2.2.3 Alternative B
Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.3.2.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.3.2.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A (see Section 3.3.2.2.2). IDNR-OMM and USACE permit requirements should be followed by all new owners and operators.

Cumulative Effects
Cumulatively, Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and TVA Mineral Rights watersheds would not result in significant cumulative impacts in association with the divestment of TVA Mineral Rights Area and other mining actions due to avoidance of surface water and wetlands to the maximum extent practicable. During siting of surface facilities, permanent impacts to streams and wetlands associated with considered actions would be avoided to the maximum extent practicable. Unavoidable direct impacts would be subject to CWA Section 404 and 401 permits and mitigation, if required. Overall, cumulative effects would result in moderate, temporary impacts to surface waters and wetlands would occur in subsided areas. However, IDNR-OMM requires adherence to a subsidence mitigation plan, which includes the requirement to repair any drainage changes, and like other mining-related

surface effects, subsidence-related impacts to WOTUS would be subject to CWA Section 404 and 401 permits and would be mitigated as required by these permits.

3.3.2.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.3.2.2.3).

Cumulative Effects

Cumulatively, Alternative C along with the other actions as described in Section 3.1 for the TVA Mineral Rights watersheds are not anticipated to significantly affect surface waters and wetlands. Refer to Section 3.3.2.2.3 for cumulative effects as a result of divestment of the TVA Mineral Rights Area.

3.3.3 Floodplains

3.3.3.1 Affected Environment

Floodplains are lands along streams and rivers that are subject to periodic flooding. The area subject to a one-percent chance of flooding in any given year is called the 100-year or one-percent-annual-chance floodplain. EO 11988 requires federal agencies to evaluate the potential effects of proposed actions within the 100-year floodplain on natural and beneficial floodplain values, along with alternatives that would reduce or eliminate such effects. In 1968, Congress created the National Flood Insurance Program (NFIP), a voluntary program based on a mutual agreement between the federal government and the local community to slow disaster relief costs and reduce the loss of life and property caused by flooding. To join the NFIP, a community must adopt and enforce local floodplain management regulations. The IDNR Office of Water Resources is the state coordinating agency for the NFIP. Jefferson and Franklin counties participate in the NFIP and have floodplain management regulations (Ordinance 2010-01 and Ordinance 2009-005, respectively). Hamilton County was suspended from the NFIP in 2000 (FEMA 2024).

One-hundred-year floodplains are mapped on the SBR No. 8 Mine Area and TVA Mineral Rights Area in Franklin, Hamilton, and Jefferson counties (Figure 3-6). The mapped floodplain areas are associated with Akin Creek, Auxier Creek, Campbell Branch, Carlton Branch, Ewing Creek, Goose Creek, Granny Creek, Gun Creek, Hamilton Branch, Jordan Creek, Middle Fork Muddy River, Rocky Branch, Sugar Camp Creek, and Sullivan Branch (FEMA 2021).

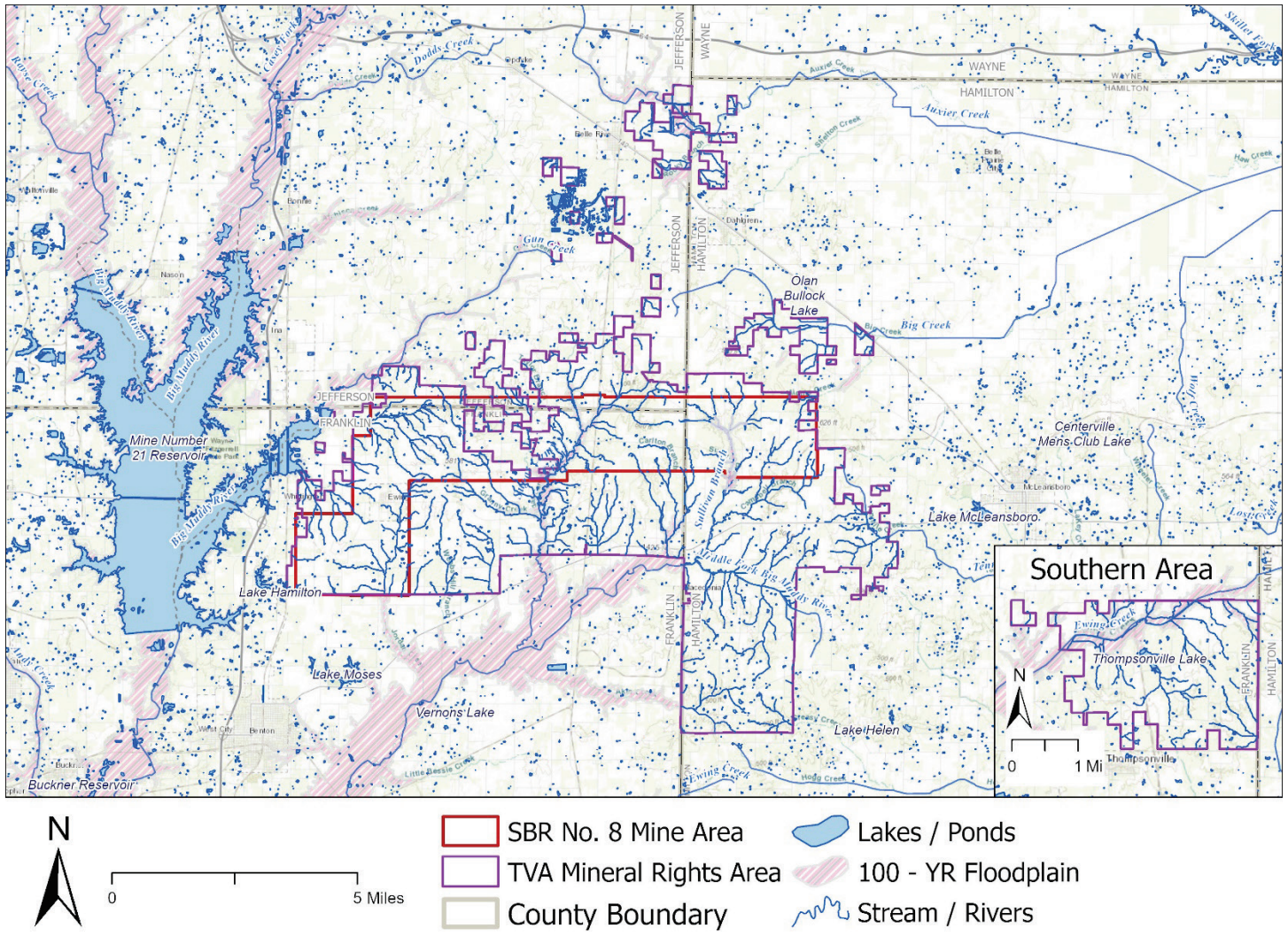


Figure 3-6. Floodplains within the SBR No. 8 Mine Area and the TVA Mineral Rights Area

3.3.3.2 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 11998, Floodplain Management). 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, or comply with local floodplain management regulations, unless there is no practicable alternative.

3.3.3.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to floodplains. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated, per IDNR-OMM permit requirements (refer to Section 1.3 for previous environmental reviews that analyzed impacts from previously approved mining of TVA-owned coal).

3.3.3.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Subsidence from coal extraction could temporarily increase the size of floodplains and flood depths and alter drainage patterns; however, surface water drainage would be restored to IDNR-OMM-approved conditions following cessation of mining, which would be consistent with EO 11988. None of the six bleeder shaft sites are within 100-year floodplains, which is consistent with EO 11988, and there would be no significant impacts to floodplains and their natural and beneficial values.

Surface Disturbances

Surface disturbances would include the construction of six bleeder shafts and use of an existing coal preparation plant. As proposed, the locations of the six bleeder shaft facilities are not currently within 100-year floodplains (Figure 3-7). Because bleeder shaft facilities are not one of the repetitive actions evaluated in the *Class Review of Repetitive Actions in the 100-Year Floodplain* (TVA 1981), the Floodplains No Practicable Alternative analysis would need to be completed if any bleeder shaft facilities are proposed to be constructed in 100-year floodplains.

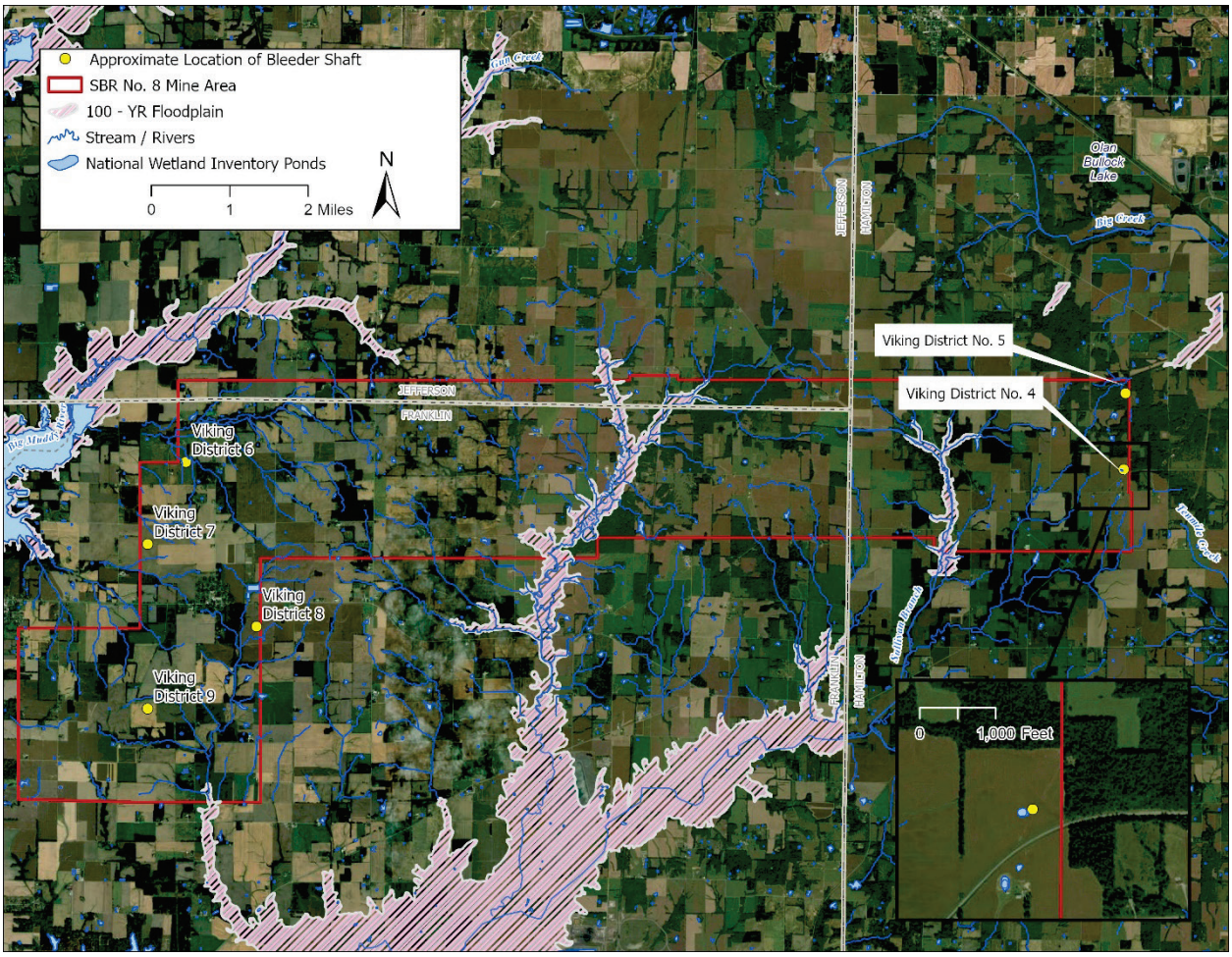


Figure 3-7. Floodplains within the SBR No. 8 Mine Area and the TVA Mineral Rights Area in relation to bleeder shaft facilities

Coal Extraction-Related Effects

At the completion of longwall mining, subsidence would occur within the floodplains of Jordan Creek, Taylor Branch, Sugar Camp Creek, Goose Creek, and several unnamed tributaries within the SBR No. 8 Mine Area. Prior to reclamation, subsidence from underground mining could temporarily increase the size of floodplains due to the decrease in surface elevation and alteration of drainage patterns. In addition, flood depths in existing floodplain areas could temporarily increase. Per IDNR-OMM requirements, Sugar Camp must correct any drainage changes caused by subsidence and repair any damage that may be caused by subsidence and subsidence-induced flooding. Construction of berms and/or dredging in advance of planned subsidence would protect land, dwellings, and other structures within potentially flooded areas per IDNR-OMM permit requirements.

Cumulative Effects

Cumulatively, Alternative A along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds is not anticipated to significantly affect the 100-year floodplain areas. During the siting of surface facilities, Sugar Camp and other mine permit applicants evaluate the potential effects of proposed activities within the 100-year floodplain. Subsidence-induced flooding and drainage changes in floodplains require correction by IDNR-OMM. Thus, significant long-term, cumulative impacts to floodplains

would not occur with implementation of Alternative A due to the application of corrective measures.

3.3.3.2.3 Alternative B

Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.3.4.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects

The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.3.3.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A, and IDNR-OMM permit requirements would be followed by all new owners and operators.

Cumulative Effects

Cumulatively, Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds are not anticipated to significantly affect the 100-year floodplain areas. Subsidence occurring after mining activities above longwall mining areas may affect the surface, causing the floodplain and its associated drainage patterns to increase in size and depth. Per IDNR-OMM requirements, mining operators must correct any drainage changes caused by subsidence and repair any damage that may be caused by subsidence and subsidence-induced flooding.

3.3.3.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.3.3.2.3).

Cumulative Effects

Cumulatively, Alternative C along with the other actions as described in Section 3.1 for the TVA Mineral Rights watersheds are not anticipated to significantly affect the 100-year floodplain areas. Subsidence occurring after mining activities above longwall mining areas may affect the surface, causing the floodplain and its associated drainage patterns to increase in size and depth. Per IDNR-OMM requirements, Sugar Camp and other mining operators must correct any drainage changes caused by subsidence and repair any damage that may be caused by subsidence and subsidence-induced flooding.

3.3.4 Water Quality

3.3.4.1 Affected Environment

The CWA requires that states set water quality standards for all contaminants in surface waters. These standards are typically based on criteria recommended by USEPA. The CWA also regulates the discharge of pollutants in surface waters. Section 303(d) of CWA requires 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. Additionally, IDNR-OMM works closely with the IEPA

Mine Pollution Control Unit to address environmental matters concerning mine operations, ensure permit requirements are met, and control pollution from mining activities.

IEPA has established water quality standards and designated uses for streams and lakes across the state and issues biennial reports on the condition of surface water in the state not meeting these standards and uses. Within the SBR No. 8 Mine Area and TVA Mineral Rights Area, Sugar Camp Creek is listed as impaired on the 2020/2022 303(d) list due to dissolved oxygen. Within the TVA Mineral Rights Area, Akin Creek, and Greasy Creek are listed as impaired on the 2020/2022 303(d) list due to dissolved oxygen, and Middle Fork Big Muddy River is listed due to mercury and sedimentation/siltation (IEPA 2022).

Sugar Camp holds an individual NPDES permit issued by IEPA to discharge water from 13 existing sedimentation pond outfalls (Figure 3-8) associated with the existing RDAs and one existing sanitary wastewater discharge (NPDES Permit No. IL0078565) (Appendix B). The NPDES permit covers discharge limitations, monitoring, and reporting requirements and details specific conditions for each outfall. The existing NPDES permit only authorizes the waste management facility to discharge alkaline mine drainage. Discharges of other contaminants are not authorized and would be considered a violation of this permit. IEPA is the regulatory agency responsible for ensuring that Sugar Camp is complying with its individual NPDES permit. The permit also requires monitoring and reporting requirements for 21 groundwater monitoring wells associated with the existing RDAs. No additional outfalls are proposed for SBR No. 8.

In August 2021, Sugar Camp used firefighting foams containing per- and polyfluoroalkyl substances (PFAS) to address an underground mine fire in one of two active longwall mines. To prevent flooding of the mines, water is continuously pumped from the mine into permitted onsite surface impoundments and later discharged via permitted outfalls into nearby waterways. After Sugar Camp used the firefighting foam, RO-treated water containing PFAS was later discharged at permitted Outfall 001 into a tributary to Middle Fork Big Muddy River. The NPDES permit does not authorize discharge of PFAS and/or firefighting foam containing PFAS from any permitted outfalls. Therefore, this discharge of PFAS into a waterway was in violation of provisions and conditions of the NPDES permit. Water sampling in July 2022 indicated presence of PFAS in a tributary to Akin Creek as well as in Sugar Camp's impoundments and permitted outfall discharges. In July 2022, the Illinois Attorney General filed a lawsuit against Sugar Camp over unauthorized discharge of PFAS and issued an interim order requiring surface water testing and installation of water treatment systems to remove PFAS (Docket #22-CH-2). According to the order, Sugar Camp is required to test the mine's sedimentation ponds for PFAS and to install new treatment systems to remove PFAS from the mine's wastewater. The order restricts Sugar Camp's transfer or discharge of water from ponds contaminated with PFAS and requires Sugar Camp to test discharged wastewater for PFAS. The state reserved the right to seek additional remedial actions by Sugar Camp beyond this interim order. The use of firefighting foams containing PFAS was discontinued by Sugar Camp in late 2021. According to Sugar Camp, filtration systems for the removal of PFAS were installed in 2022 and have operated continuously since then. In response to the Attorney General's order, water sampling has been conducted quarterly by Geosyntec since January 2023. PFAS concentrations in wastewater ponds have decreased since January 2023. IEPA has not published regulatory limits for PFAS in surface waters or drinking waters.

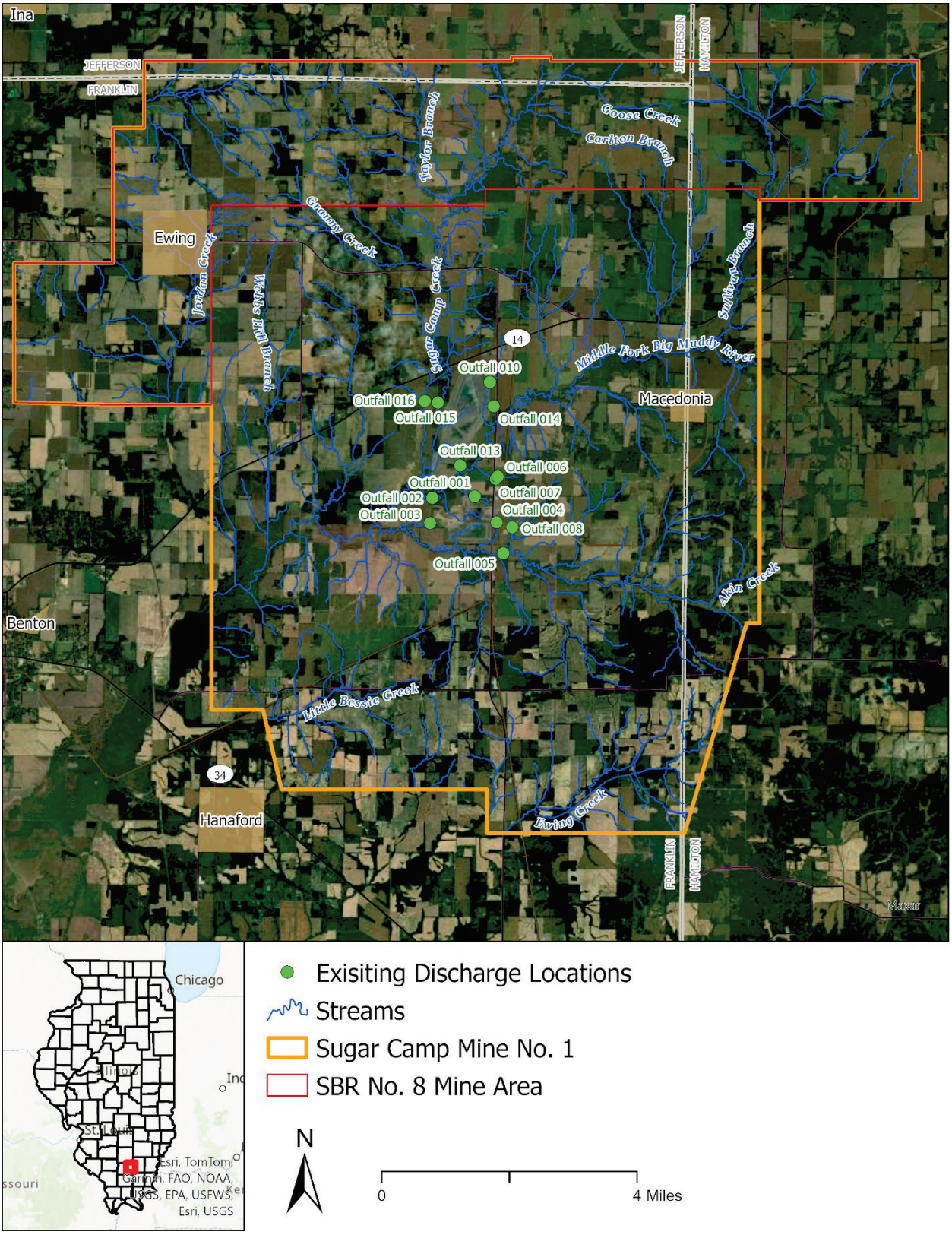


Figure 3-8. Existing discharge locations associated with sedimentation ponds within Sugar Camp Mine No. 1

3.3.4.2 Environmental Consequences

3.3.4.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts to water quality associated with the mining of additional TVA-owned coal, including from discharges resulting from its processing and refuse disposal, would occur. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be mitigated, per IDNR-OMM permit requirements.

The mining and processing of previously approved TVA-owned coal and privately owned coal would continue to operate and discharge water via the one outfall permitted by the NPDES permit and as monitored by IEPA. In considering the previous SBR No. 6 permit application, IDNR-OMM concluded that the surface and groundwater monitoring programs set forth in the NPDES permit held by Sugar Camp were designed to sufficiently address water quality impacts. IDNR-OMM further concluded that mining operations were designed to prevent material damage to the hydrologic balance in the permit areas and the surrounding area. Overall processing capacity of the existing coal preparation plant and associated permitted discharges that are covered under the current NPDES permit would not increase under the No Action Alternative. Thus, water quality impacts associated with the current mining and processing of previously approved TVA-owned coal and privately owned coal would continue to be monitored and subject to the NPDES reporting requirements as well as PFAS sampling in compliance with state requirements, including the Attorney General order. Any violation of effluent limitations would result in noncompliance with the NPDES permit and would be subject to formal enforcement action. As of October 2022, all previously reported effluent exceedances had been abated.

3.3.4.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. This may result in temporary impacts to water quality due to surface disturbances, mining operations, and planned subsidence in the SBR No. 8 Mine Area and adjacent areas.

Ongoing water quality sampling at existing outfalls in Sugar Camp Mine No. 1 facilities would continue as specified in the NPDES permit. Conditions of the permit require that monitoring wells be monitored for potential effects to groundwater from the 13 permitted outfall locations and the one permitted sanitary discharge location. When a release of water from a permitted discharge point registers one or more parameters above the water quality standard, mine personnel correct the non-compliant situation and also provide applicable reports to IEPA. Any violation of effluent limitations would result in noncompliance with the NPDES permit and would be subject to formal enforcement action. No new outfall locations are planned as a result of the Proposed Action.

Surface Disturbances

Aquatic resource surveys were completed on the No. 4 Bleeder Shaft in fall 2023 and surface waters were delineated (refer to Section 3.3.2.1.2). Construction and operations activities in the No. 4 Bleeder Shaft have the potential to affect surface water quality via stormwater runoff. Erosion and sediment loading leaving these areas could affect the quality of small streams (i.e., unnamed tributary of Campbell Branch and subsequently Campbell Branch). However, with proper sediment and erosion controls, sediment loading and the introduction of pollutants to the receiving waters would be minimized. During the

initial construction, sediment would be managed through the use of erosion and sediment control BMPs, as required by the NPDES permit. Sediment would be managed with erosion control practices (e.g., seeding, straw, mulch, or vegetative cover) as well as fugitive dust minimization (e.g., wetting roads prior to heavy use). Runoff would be managed using sediment control practices (e.g., silt fence, wattles, or hay bales) as well as water quality protection measures (e.g., sedimentation ponds or establishment of riparian zone buffer zones) as necessary. Embankments or cut and fill slopes would be permanently seeded and stabilized therefore runoff would be minimal during the life of mining operations. Thus, effects to surface water quality due to construction activities related to new surface disturbances would be mitigated and therefore minor.

Sugar Camp has established a surface water quality monitoring program as part of the Underground Coal Mine (UCM) Permit No. 382 to provide sufficient lead time for notification of any potential inadvertent impacts, as well as to provide ample time for investigation and mitigation of any impacts prior to reaching off-site surface waters. The monitoring program is dynamic; IDNR reserves the right to add monitoring parameters and locations should the need arise. IDNR-OMM's hydrogeologic assessment concluded that the proposed operations within the SBR No. 8 Mine Area would not have negative impacts on surface water regimes.

As part of the Illinois Attorney General's interim order issued in July 2022, Sugar Camp was required to sample two RDAs and ten ponds for PFAS concentrations above minimum reporting levels, given the chosen method and laboratory. Sugar Camp submitted, for review and approval, a sampling plan that included a timeline for implementation, the laboratory that will analyze the samples, the methods used for analysis, the PFAS analytes to be analyzed, and the minimum reporting levels for those analytes to the Illinois Attorney General. Sampling may cease when the average concentration of the each of the PFAS analytes are below the monitoring criteria. Baseline sampling occurred in May 2023, at which time of baseline sampling, PFAS were detected above reporting levels in one RDA and one pond. Quarterly sampling in these locations has continued.

Coal Extraction-Related Effects

Mining can affect surface water quality by increasing sedimentation, nutrient and pesticide loading, and acidic drainage (caused by increasing sedimentation, nutrient loads, manganese, or total dissolved solids from the mined material and reclamation activities). According to Sugar Camp's SBR No. 8 Permit Application, coal extraction can be expected to cause measurable surface subsidence. Although changes in the surface elevation would occur, adverse impacts to the quality of waters in the SBR No. 8 Mine Area are not anticipated. Per IDNR-OMM requirements, surface water and groundwater quality would be routinely monitored, and any impacts to water quality would be corrected by Sugar Camp. Adequate clean water would be supplied to the parties affected until corrected.

The proposed longwall mining in the SBR No. 8 Mine Area are laid out in an east-west direction while most streams in the SBR No. 8 Mine Area generally flow from north to south and/or south to north toward the three major surface water features in the adjacent area (Middle Fork Big Muddy River, Akin Creek, and Rend Lake), which generally flow in a northeast to southwest and/or southeast to northwest direction respectively. The subsidence troughs would generally be oriented either perpendicular to or diagonal to the direction of stream flow in the SBR No. 8 Mine Area.

Cumulative Effects
Alternative A along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds would not result in significant cumulative impacts to water quality due to IDNR-OMM and NPDES permit requirements including groundwater monitoring programs, water quality sampling and treatment activities, and reclamation plans. Unavoidable and permanent impacts to streams and wetlands are subject to CWA Section 404 and 401 permits and would be mitigated, as required. BMPs would continue to be employed to minimize the potential for cumulative impacts to the Rend Lake-Big Muddy River, Middle Fork Big Muddy River, and Big Creek watersheds. Overall, permanent impacts to water resources associated with the mining of coal for the Proposed Action and other actions would continue to be avoided or mitigated, per IDNR-OMM permit requirements.

3.3.4.2.3 Alternative B
Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.3.4.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.3.4.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A. IDNR-OMM and NPDES permit requirements should be followed by all new owners and operators including groundwater monitoring programs, water quality sampling and treatment activities, and reclamation plans.

Cumulative Effects
Cumulatively, Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds would not result in significant impacts to water quality due to compliance with IDNR-OMM and NPDES permit requirements including groundwater monitoring programs, water quality sampling and treatment activities, and reclamation plans. Unavoidable and permanent impacts to streams and wetlands are subject to CWA Section 404 and 401 permits and would be mitigated, as required. BMPs would continue to be employed to minimize the potential for cumulative impacts to the Rend Lake-Big Muddy River, Big Creek, Middle Fork Saline River, and the North Fork Saline River watersheds. Overall, permanent impacts to water resources associated with the mining of coal would continue to be avoided or mitigated, per IDNR-OMM permit requirements.

3.3.4.2.4 Alternative C
Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.3.4.2.3).

Cumulative Effects
Cumulatively, Alternative C along with the other actions as described in Section 3.1 for the TVA Mineral Rights watersheds are not anticipated to significantly affect water quality.

Refer to Section 3.3.4.2.3 for cumulative effects as a result of divestment of the TVA Mineral Rights Area.

3.3.5 Water Supply

3.3.5.1 Affected Environment

The TVA Mineral Rights Area and the SBR No. 8 Mine Area are served by public utility water by the Macedonia Water System, the Ewing-Ina Water Commission, Akin Water District, Benton Water System, Ina Water System, Belle Rive Water System, Dahlgren Water System, Hamilton County Water District, and West City Water System. The source of the water supply for these water districts is Rend Lake Inter-City Water System located approximately 2.7 miles west of the TVA Mineral Rights Area and SBR No. 8 Mine Area. The other known public water supply source within 10 miles of the TVA Mineral Rights Area is the Mt. Vernon Water District. Public water supply lines are located within the SBR No. 8 Mine Area, as discussed in Section 3.9.

Table 3-6 lists the wells and cisterns located within the SBR No. 8 Mine Area and the TVA Mineral Rights Area. Their locations are shown in Figure 3-9.

Table 3-6. Water usage in the SBR No. 8 Mine Area and the TVA Mineral Rights Area

Type	Frequency	
	SBR No. 8 Mine Area	TVA Mineral Rights Area
Domestic wells (drinking or household use)	31	66
Wells (purposes other than drinking or household use)	5	19
Wells (no longer used)	0	3
Cisterns (purposes other than drinking or household use)	2	2

Source: Foresight Energy 2023

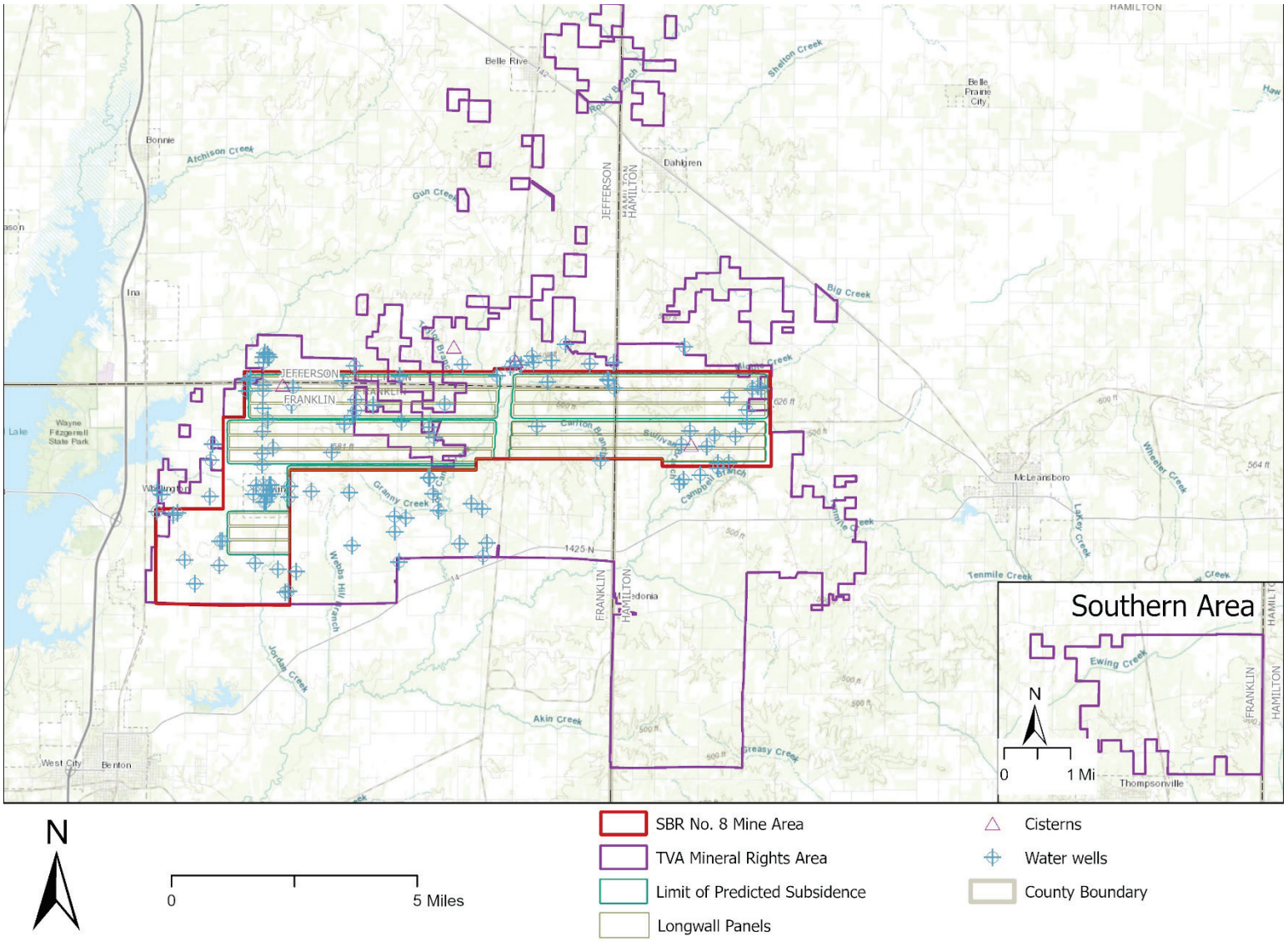


Figure 3-9. Wells and cisterns within the SBR No. 8 Mine Area and the TVA Mineral Rights Area

3.3.5.2 Environmental Consequences

3.3.5.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to area water supplies. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated, per IDNR-OMM permit requirements.

The mining and processing of previously approved TVA-owned coal and privately owned coal would continue to utilize water supplied from Rend Lake. Additionally, Sugar Camp would monitor wells to detect decreases in water supply. Sugar Camp would remediate adverse effects to the water supply sources in their permitted mining areas. This remediation could include supplying residents and businesses with adequate clean water.

3.3.5.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. This may result in temporary impacts to water supplies due to planned subsidence. Potential effects to water supplies or availability would be mitigated, per IDNR-OMM requirements.

Surface Disturbances

No effects to water supplies would occur from surface disturbances related to the construction and operation of the bleeder shaft facilities. The existing coal preparation plant utilizes water supplied mostly from mine dewatering activities, which is added to the sediment ponds, utilized for the coal preparation plant, and recirculated to be used again. Rend Lake serves as the major municipal supply for southern Illinois and provides industrial water supply for coal mines (USACE 2021). However, the use of water supplied from Rend Lake is anticipated to be minimal as underground coal mines in Illinois typically produce enough water to meet preparation plant needs. As the coal preparation plant is likely to operate for a longer period of time but not increase in treatment capacity, water withdrawals from Rend Lake may occur over more years but would not significantly change daily or annually and would only occur for supplemental water needs.

Coal Extraction-Related Effects

Subsidence could cause either an increased or decreased flow to water wells, depending on how the rock layers fracture. A bedrock aquifer located 200 to 360 feet below ground surface is utilized as a water source for domestic and farm use in the area. These wells pump water from the overburden area that would be fractured by the planned subsidence.

The water level in the SBR No. 8 Mine Area wells may be impacted by subsidence, but the chance of this type of impact is low because of the depth of the Herrin No. 6 coal seam and the rapid water level recovery in shallow water wells after subsidence (Booth and Spande 1992). Per IDNR-OMM permit requirements, Sugar Camp would be required to promptly replace any drinking, domestic, or residential water supply that becomes contaminated or interrupted by mining activities (62 IAC 1817.41(j)). Wells that do not have a specific agreement already in place to address post-subsidence water supply issues must be monitored by Sugar Camp to obtain adequate seasonal data sufficiently in advance of potential impacts due to subsidence. Per the UCM application process, Sugar Camp signed an affidavit confirming that all documents and rights bestowed to legally conduct subsidence would be provided by IDNR-OMM. This would include any missing agreements for water wells and the associated sampling.

Cumulative Effects
The cumulative effects on water supply of Alternative A along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds would be temporary due to implementation of IDNR-OMM-required groundwater monitoring and remediation of any decreases in water supply. Cumulative impacts to Rend Lake as a result of water withdrawal for supplemental makeup water for the existing coal preparation plant, combined with any other mine operation withdrawal, are anticipated to be minimal over the life of the Project and would not significantly change daily or annually. A cumulative hydrologic impact assessment done by IDNR for the entire UCM Permit No. 382 shadow area and nearby permitted areas found that the mining operations were designed to prevent material damage to the hydrologic balance in the permit areas and surrounding vicinities.

3.3.5.2.3 Alternative B
Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.3.5.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.3.5.2.1). If the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A. IDNR-OMM permit requirements should be followed by all new owners and operators.

Cumulative Effects
Cumulatively, Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and TVA Mineral Rights watersheds would be temporary due to implementation of IDNR-OMM-required groundwater monitoring and remediation of any decreases in water supply. Cumulative impacts to Rend Lake as a result of water withdrawal for supplemental makeup water for the future mining activities due to divestment of the remaining TVA Mineral Rights Area, combined with any other mine operation withdrawal, should be properly evaluated. A cumulative hydrologic impact assessment may be conducted by IDNR for future mining operations to assess if mining activities were designed to prevent material damage to the hydrologic balance in the permit areas and surrounding vicinities.

3.3.5.2.4 Alternative C
Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.3.5.2.3).

Cumulative Effects
Cumulatively, Alternative C along with the other actions as described in Section 3.1 for the TVA Mineral Rights watersheds would be temporary due to implementation of IDNR-OMM-required groundwater monitoring and remediation of any decreases in water supply for mining activities. Cumulative impacts to Rend Lake as a result of water withdrawal for supplemental makeup water for the future mining activities due to divestment of TVA Mineral Rights Area, combined with any other mine operation withdrawal, should be properly evaluated. A cumulative hydrologic impact assessment may be conducted by

IDNR for future mining operations to assess if mining activities were designed to prevent material damage to the hydrologic balance in the permit areas and surrounding vicinities.

3.4 Air Quality and Greenhouse Gas Emissions

3.4.1 Air Quality

3.4.1.1 Affected Environment

As required by the Clean Air Act (CAA) and its amendments, USEPA has established primary and secondary National Ambient Air Quality Standards (NAAQS) for six principal air pollutants, which are called “criteria” pollutants (Table 3-7). Two size classes are recognized for the pollutant particulate matter: including inhalable particulate matter [particulate matter with an aerodynamic diameter below 10 micrometers (µm), or PM_{10}] and fine inhalable particulate matter [particulate matter with an aerodynamic diameter below 2.5 µm, or $PM_{2.5}$]. Primary standards set limits to protect public health, including the health of sensitive populations, such as asthmatics, children, and the elderly. The secondary standards are set to protect against effects on public welfare, including damage to structures, crops, and ecosystems. The primary and secondary NAAQS are provided in Table 3-7. Illinois has adopted the NAAQS in their entirety without changes.

Table 3-7. National Ambient Air Quality Standards

Pollutant	Primary (P) / Secondary (S)	Averaging Time	Level[a]	Form
Carbon monoxide (CO)	P	8 hours	9 ppm	Not to be exceeded more than once per year
		1 hour	35 ppm	
Lead (Pb)	P / S	Rolling 3-month average	0.15 µg/m3 b	Not to be exceeded
Nitrogen dioxide (NO2)	P	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	P / S	Annual	53 ppb c	Annual Mean
Ozone (O3)	P / S	8 hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particulate matter (PM2.5)	P	Annual	12.0 µg/m3	annual mean, averaged over 3 years
	S	Annual	15.0 µg/m3	annual mean, averaged over 3 years
	P / S	24-hours	35 µg/m3	98th percentile, averaged over 3 years
PM10	P / S	24-hours	150 µg/m3	Not to be exceeded more than once per year on average over 3 years
Sulfur dioxide (SO2)	P	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	S	3-hours	0.5 ppm	Not to be exceeded more than once per year

Source: USEPA 2023a.

[a]ppm = parts per million; ppb = parts per billion

[b]In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.

[c]The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

The CAA requires USEPA to determine whether an area is in attainment (regions where a given pollutant's concentration is at or below the established NAAQS) or nonattainment (regions where a given pollutant's concentration is above the established NAAQS). These designations are based on air quality data collected from monitors located in urban and rural settings as well as other information such as dispersion modeling. Franklin, Hamilton, and Jefferson counties are currently designated as in attainment for all NAAQS (USEPA 2023a). There is one air monitoring station in Hamilton County which monitors for ozone and $PM_{2.5}$. The ozone Air Quality Design Values, i,e, values used for determining compliance, for the 3-year periods between 2017 and 2021 for this monitor were 0.065-0.066 ppm, compared to the ambient standard of 0.070 ppm. The $PM_{2.5}$ 24-hour Air Quality Design Values for the same 3-year periods ranged from 17.9 µg/m^3 to 18.3 µg/m^3, compared to the ambient standard of 35 µg/m^3. The $PM_{2.5}$ annual Air Quality Design Values

for the same 3-year periods were 8.6-8.8 µg/m^3, compared to the ambient standard of 12.0 µg/m^3 (USEPA 2023g).

3.4.1.2 Environmental Consequences

3.4.1.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Therefore, the direct and indirect emissions of air pollutants associated with the proposed mining of the approximately 253 million tons of TVA-owned coal as part of SBR No. 8 would not occur. However, since it is assumed all of the coal currently approved for mining within TVA's Mineral Rights Area would be mined, there would be direct and indirect emissions of air pollutants for the mining of 11,510 unmined acres or approximately 166 million more tons of coal. It is assumed this coal would be mined over years 2025 through 2050 and be burned in both U.S. power plants and in power plants in other countries. It is also assumed the other 58,500 acres of unmined coal within TVA's Mineral Rights Area would not be mined.

The methodology for calculating direct and indirect air emissions from the No Action Alternative follows those methods described below under Alternative A for the coal processing plant, coal transport to U.S. power plants, and coal combustion in U.S. power plants. The results of those calculations are presented in Table 3-8.

Table 3-8. No Action Alternative—Estimated direct and indirect air pollutant emissions from approved mining in TVA Mineral Rights Area, 2025-2050 (tons per year)

Pollutant	Emissions by Source				2020 National Emissions Inventory (NEI)[2,3]	% of Total NEI[2]
	Direct[1]	Transportation	Combustion[2]	Total[2]		
NO_x	NA	209	5,318-105,423	5,527-105,632	7,815,649	0.07-1.35
CO	NA	114	12,155-57,503	12,269-57,617	62,437,453	0.02-0.09
PM_{10}	20	4	1,367-58,619	1,392-58,643	16,782,420	0.01-0.35
$PM_{2.5}$	5	4	1,367-42,840	1,377-42,849	5,822,156	0.02-0.74
VOC	NA	7	258-4,153	266-4,160	16,630,280	0.002-0.03
SO_2	NA	0.3	7,597-324,128	7,597-324,128	1,844,560	0.41-17.57
Hydrogen chloride	NA	NA	192-3,834	192-3,834	Not reported	NA
Hydrogen fluoride	NA	NA	30-479	30-479	Not reported	NA
Mercury	NA	NA	0.1-1.2	0.1-1.2	52[4]	0.23-2.34

Notes: NA = not available.
[1]Coal processing plant for the mine.
[2]Range based on varying emissions level.
[3]Source: USEPA 2023h.
[4]Mercury National Emissions Inventory data was only available for 2014

Table 3-8 also provides the corresponding emissions level of these pollutants at the national level (where available) for 2020, from the most recently completed 3-year National Emissions Inventory (NEI) release (USEPA 2023h). Comparing the direct and indirect emissions of these pollutants from the No Action Alternative to the corresponding emissions

of the same pollutants at the national level provides a reasonable proxy for assessing potential downstream air quality impacts at a regional or larger scale. The direct and indirect emissions of each criteria pollutant and select Hazardous Air Pollutants (HAPs) as a result of coal mining and the downstream combustion of the extracted coal is estimated to be between 0.002 and 2.34 percent of the total 2020 U.S. emissions of all pollutants, except sulfur dioxide (SO_2). These low percentages indicate a less than significant air quality impact for these pollutants. Additionally, these emissions would be widely distributed over large regional areas due to transport and combustion of coal in multiple states and potential distribution to multiple countries. The upper bound SO_2 emissions were estimated at 17.57 percent of total U.S. SO_2 emissions in 2020 and the lower bound is 0.41 percent. This upper bound assumes all mined coal is burned in either U.S. power plants or overseas plants with both having few, if any, emissions controls, which is conservative. Considering the likelihood of up to 50 percent of coal production being distributed to other countries based on 2022 USEIA coal data, all of the percentages of U.S. total emissions in

Table 3-8 would effectively be lower and potentially significantly lower. A mitigation option to ensure less than significant air quality impacts would be to ship the coal to those power plants that have SO_2 emissions controls, and to a lesser extent, nitric oxide and nitrogen dioxide (together, NOx), and mercury emissions controls. Most U.S. coal power plants already have such controls.

The downstream combustion of the mined coal in the U.S. is, and would continue to be, subject to applicable regulations under CAA and corresponding state statutes and regulations addressing air quality. This includes New Source Performance Standards, Mercury and Air Toxics Standards, Regional Haze rules, and standards developed under respective State Implementation Plans (SIPs) to achieve and maintain the NAAQS, including state/local air permitting requirements.

3.4.1.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. With approval of the mining plan, an estimated 253 million tons of TVA-owned coal would be mined over the period of 2025 through 2050, which is assumed to be an average annual production of approximately 9.73 million tons. Regarding cumulative effects, mining of privately owned and previously approved TVA coal would occur simultaneously, along with other mining operations within a 20-mile radius of Sugar Camp Mine No. 1. Together, these actions would result in a cumulative total of approximately 836 million tons of processed coal over the period 2025 through 2050.

Direct impacts to air quality from mining of the underground coal would continue in amounts similar to those currently experienced; several indirect impacts to air quality would also continue to occur. The main direct source of criteria pollutant emissions associated with the mining operations is the operation of the coal preparation plant as most of the underground mining equipment and transport of coal to the processing plant is either powered by electricity/battery or their emissions are minimal. Based on the most complete USEPA emissions inventory database (USEPA 2019a), the coal preparation plant emitted a total of 40.65 tons of PM_{10} and 10.814 tons of PM_{10} in 2017 (no other criteria pollutant emissions were reported). In that year the mine produced 12,812,197 tons of processed coal (USEIA 2023), which results in emission factors of 0.0063 lb PM_{10}/ton processed coal produced and 0.0017 lb $PM_{2.5}$/ton processed coal produced. Using these emission factors, the direct PM_{10} and $PM_{2.5}$ emissions associated with Alternative A are approximately 31 tons per year and 8 tons per year, respectively.

Construction activities under Alternative A would consist of constructing up to six bleeder shafts for accessing and venting underground mining areas for SBR No. 8. Only one bleeder shaft would be constructed in the first 5 years, with the others constructed as needed. These activities would generate air emissions mainly from combustion of diesel fuel for construction equipment and fugitive dust from land disturbance; however, they would be temporary and minor in comparison to emissions from the mining operations, coal transport, and eventual coal burning in power plants. Therefore, these construction activity emissions are not calculated.

Subsidence of some surface land above the SBR No. 8 underground mining area could occur over the project life of Alternative A. This may require land restoration/ reclamation and building renovation/reinforcement of negatively impacted structures above the mined areas. Most of these activities are expected to impact residential and agricultural property. The nature and extent of construction activities that could occur are highly speculative, temporary, and would be expected to generate minor emissions in comparison to the mining operations, coal transport, and eventual coal burning in power plants. Therefore, these subsidence activity emissions are not calculated.

Under Alternative A, the potential downstream consumers of this coal would burn it to generate electricity or for other industrial purposes resulting in indirect emissions of criteria pollutants and HAPs, as defined and regulated by USEPA. Transportation and handling of the coal to and by the end users would also continue to generate emissions of air pollutants.

From 2019 through 2022, approximately 50 to 61 percent of the coal produced by the Sugar Camp was shipped to power plants located in the United States including facilities in Florida, Georgia, Indiana, Kentucky, and West Virginia, with the remainder delivered to various global commodities firms (USEIA 2023). Some of the coal delivered to the commodities firms was likely exported from the U.S. However, any or all of the mined coal could be used by any combination of these facilities, other domestic facilities, or any international power plant or other user.

The indirect emissions resulting from transportation of the coal to end users were estimated based on information obtained from USEIA (2019 to 2022) regarding coal shipments from the Sugar Camp to domestic power plants in 2019 through 2022, estimated rail distances to those sites in 2022 (USDOT 2023), and rail locomotive emission factors developed by USEPA and state air protection agencies, coordinated through the Eastern Regional Technical Advisory Committee (Bergin et al. 2011). Although some shipments could be by barge and truck or some combination, since most shipments are by rail, it was assumed all shipments occur by rail for this analysis. The ultimate destination and shipment methods for the remainder of the coal mined in 2019 to 2022 (i.e., purchased by commodities firms) is unknown and beyond the control of TVA. Any attempt to quantify the amount of this coal, if any, that is exported abroad, and the travel distances/methods, would be highly speculative and add no value to the environmental review. To account for the transportation-related indirect emissions, information for the 2022 domestically shipped coal was used to estimate transportation-related emissions of that portion of the coal mined, as there are data to estimate such emissions. The percent of total Sugar Camp coal production transported to each domestic power plant in 2022 was used for estimating rail shipment quantities to each domestic power plant based on total annual coal production under each alternative. These same percentages were assumed for coal transported to domestic power plants for all mines considered under the cumulative effects analyses for each alternative.

To analyze potential indirect emissions resulting from combustion of the mined coal, a range was developed for the indirect emissions to account for the variety of boiler and control equipment configurations in which the mined coal may be combusted. This range has a lower bound based on combustion of the coal in a modern, highly controlled facility (i.e., new and domestic) and an upper bound based on combustion of the coal in a boiler equipped with control equipment required to comply with 40 CFR 60, Subpart Da and USEPA's *AP-42: Compilation of Air Emissions Factors from Stationary Sources* (USEPA 1998). Emissions associated with coal combusted in foreign boilers or other combustion devices are assumed to be adequately represented by the upper bound values.

The range of direct and indirect criteria and select HAP (i.e., mercury, hydrogen chloride and hydrogen fluoride) emissions resulting from the coal processing plant, transportation, and downstream combustion of the average of approximately 9.73 million tons per year of TVA-owned coal extracted from the SBR No. 8 Mine Area are quantified in Table 3-9.

Table 3-9. Alternative A—Estimated direct and indirect air pollutant emissions, 2025-2050 (tons per year)

Pollutant	Emissions by Source				2020 National Emissions Inventory (NEI)[2,3]	% of Total NEI[2]
	Direct[1]	Transportation	Combustion[2]	Total[2]		
NOx	NA	318	8,095-160,482	8,413-160,800	7,815,649	0.11-2.06
CO	NA	174	18,503-87,536	18,677-87,709	62,437,453	0.03-0.14
PM_{10}	31	6	2,082-89,234	2,119-89,271	16,782,420	0.01-0.53
$PM_{2.5}$	8	6	2,082-65,213	2,096-65,228	5,822,156	0.04-1.12
VOC	NA	11	393-6,322	404-6,333	16,630,280	0.002-0.04
SO_2	NA	0.4	11,564-493,410	11,565-493,410	1,844,560	0.63-26.75
Hydrogen chloride	NA	NA	292-5,836	292-5,836	Not reported	NA
Hydrogen fluoride	NA	NA	46-730	46-730	Not reported	NA
Mercury	NA	NA	0.2-1.9	0.2-1.9	52	0.36-3.56

Notes: NA = not available.
[1]Coal processing plant for the mine.
[2]Range based on varying emissions level.
[3]Source: USEPA 2023h.
[4]Mercury National Emissions Inventory data was only available for 2014.

Table 3-9 also provides the corresponding emissions levels of these pollutants at the national level (where available) for 2020 (USEPA 2023h), the most recently completed 3-year NEI release. Comparing the direct and indirect emissions of these pollutants from Alternative A to the corresponding emissions of the same pollutants at the national level provides a reasonable proxy for assessing potential downstream air quality impacts at a regional or larger scale. The direct and indirect emissions of each criteria pollutant and select HAPs as a result of coal mining and the downstream combustion of the extracted coal is estimated to be between 0.002 and 3.56 percent of the total 2020 U.S. emissions of all pollutants, except SO2. These low percentages indicate a less than significant air quality

impact for these pollutants. Additionally, these emissions would be widely distributed over large regional areas due to transport and combustion of coal in multiple states. The upper bound SO2 emissions were estimated at 26.75 percent of total U.S. SO2 emissions in 2020 and the lower bound is 0.63 percent. This upper bound assumes all mined coal is burned in either U.S. power plants or overseas plants with few, if any, emissions controls, which is conservative. Considering the likelihood of up to 50 percent of coal production being distributed to other countries based on 2022 USEIA coal data, all of the percentages of U.S. total emissions in Table 3-9 would effectively be lower and potentially significantly lower. A mitigation option would be to ship the coal to those power plants that have SO2 emissions controls, and to a lesser extent, NOx and mercury emissions controls. Most U.S. coal power plants already have such controls.

The downstream combustion of the mined coal in the U.S. is, and would continue to be, subject to applicable regulations under CAA and corresponding state statutes and regulations addressing air quality. This includes New Source Performance Standards, Mercury and Air Toxics Standards, Regional Haze rules, and standards developed under respective SIPs to achieve and maintain the NAAQS, including state/local air permitting requirements.

Cumulative Effects

Table 3-10 summarizes the anticipated cumulative amount of coal mined during the 26-year life span of the Project, along with the amount of coal expected to be extracted by the active mining operations located within 20 miles of the project, including the private/TVA-approved coal associated with the No Action Alternative.

Table 3-10. Alternative A—Cumulative coal extracted during project life (tons per year)

Mine Entity[1]	MSHA ID	Coal Extracted (ton)	
		Annual[1]	Cumulative[2]
Sugar Camp Energy Mine No. 1, Alternative A (SBR No. 8)	1103189	--	252,881,000
Sugar Camp Energy Mine No. 1, Previously Approved Actions			166,211,195
IL Coal Recovery LLC Old Ed No. 21	1100588	66,141[3]	1,719,666
IL Land Resources Inc. Galatia	1102752	1,549,044	40,275,144
Williamson Energy, Mach #1 Mine	1103141	7,715,724	200,608,824
Hamilton County Coal, Mine No. 1	1103203	6,713,341	174,546,866

Source: USEPA 2023.

[1]Maximum annual mine production from the most recent four-year period (2019 to 2022).

[2]Total coal that would be mined during the 26-year life of the Project and assumes all non-Sugar Camp mines can produce for this period.

[3]The annual coal production rate for the Old Ed No. 21 mine is based solely on 2022 data as the mine did not produce between 2017 and 2021.

Cumulatively, the direct and indirect emissions of carbon monoxide (CO), PM_{10}, $PM_{2.5}$, and volatile organic compounds (VOC) as a result of mining and the downstream combustion of the extracted coal from Alternative A, combined with the coal extracted by the active mining operations within 20 miles of the Project, are estimated to be between 0.008 and 3.7 percent of the total U.S. emissions of those pollutants in 2020 projected for the life span of Alternative A. This comparison provides a reasonable proxy for assessing potential

downstream air quality impacts at a regional or larger scale. These low percentages indicate a less than significant air quality impact for these pollutants. Additionally, these emissions would be widely distributed over large regional areas due to transport and combustion of coal in multiple states.

Cumulatively, the direct and indirect emissions of NOx, SO_2, and mercury due to mining and the downstream combustion of the extracted coal from Alternative A, combined with the coal extracted by the active mining operations within 20 miles of the Project, are estimated to be between 0.36 and 6.8 percent, 2.07 and 88.45 percent, and 1.18 and 11.77 percent, respectively, of the total U.S. emissions of those pollutants in 2020 projected for the life span of Alternative A. The upper bound percentages assume all mined coal is burned in either U.S. power plants or overseas power plants with both having few, if any, emissions controls, which is conservative. Considering the likelihood of up to 50 percent of coal production being distributed to other countries based on 2022 USEIA coal data, all of the percentages of U.S. total emissions described above would effectively be lower and potentially significantly lower. A mitigation option would be to ship the coal to those power plants that have SO_2 emissions controls, and to a lesser extent, NOx and mercury emissions controls. Most U.S. coal power plants already have such controls.

Table 3-11 below provides the Alternative A cumulative analysis emissions results and their percent of the 2020 NEI.

Table 3-11. Alternative A—Cumulative estimated direct and indirect air pollutant emissions, 2025-2050 (tons per year)

Pollutant	Emissions by Source				2020 National Emissions Inventory (NEI)[2,3]	% of Total NEI[2]
	Direct[1]	Transportation	Combustion[2]	Total[2]		
NO_x	NA	1,052	26,767-530,635	27,818-531,687	7,815,649	0.36-6.80
CO	NA	574	61,181-289,437	61,754-290,011	62,437,453	0.10-0.46
PM_{10}	101	21	6,883-295,054	7,005-295,176	16,782,420	0.04-1.76
$PM_{2.5}$	27	21	6,883-215,629	6,931-215,677	5,822,156	0.12-3.70
VOC	NA	37	1,300-20,904	1,337-20,941	16,630,280	0.008-0.13
SO_2	NA	1.4	38,238-1,631,463	38,239-1,631,464	1,844,560	2.07-88.45
Hydrogen chloride	NA	NA	965-19,296	965-19,296	Not reported	NA
Hydrogen fluoride	NA	NA	153-2,412	153-2,412	Not reported	NA
Mercury	NA	NA	0.6-6.1	0.6-6.1	52[4]	1.18-11.77

Notes: NA = Not Available
[1]Coal processing plant for the mine.
[2]Range based on varying emissions level.
[3]Source: USEPA 2023h
[4]Mercury National Emissions Inventory data was only available for 2014.

3.4.1.2.3 Alternative B

Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. As indicated under Alternative A, an estimated 253 million tons of TVA-owned coal within SBR No. 8 would be mined from 2025 through 2050, which is assumed to be an average annual production of approximately 9.73 million tons. Additionally, it is assumed the remaining unmined divested area with more than 427 million tons of recoverable coal would simultaneously be mined at the same annual rate from 2051 through 2068. Cumulatively, mining of privately-owned and previously approved TVA-owned coal would occur simultaneously, along with other mining operations within a 20-mile radius of Sugar Camp. Together, these actions would result in a cumulative total of approximately 1,087 million tons of processed coal between 2025 and 2050, and an additional 175 million tons between 2051 and 2068. Refer to Table 3-10 for the annual rate of coal production and cumulative amounts from other mines within 20 miles of Sugar Camp.

As TVA does not have estimates for the recoverable amounts of oil and gas in the remaining TVA Mineral Rights Area, the air quality effects of extracting, transporting, and combusting the TVA oil and gas, after divestment, are not predictable at this time and have not been quantified.

Approval of Mining Plan and Divestment of the TVA Mineral Rights Area Effects

The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in Alternative A (Section 3.4.1.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques for the divested area would be the same as described for Alternative A: long-wall mining. Additionally, the same coal processing plant would be utilized as under Alternative A and it is assumed a similar coal processing plant with the same rate of particulate and coal mine methane emissions, i.e., pounds or cubic feet of emissions per ton of coal production, would be used for the unmined divested area. A similar level of construction activity and subsidence air quality impacts as described under Alternative A would occur. The same coal transport and coal combustion emissions calculation methodologies described under Alternative A would apply to Alternative B.

The Alternative B range of direct and indirect criteria and select HAP (i.e., mercury, hydrogen chloride and hydrogen fluoride) emissions resulting from the coal processing plants, transportation, and downstream combustion between 2025 and 2050 of approximately 9.73 million tons per year from SBR No. 8 and the same tons per year from the unmined divested area, are quantified in Table 3-12. The same type of emissions information for the period 2051 through 2068 due to mining, processing, transporting, and combustion of 9.73 million tons per year of coal under Alternative B is quantified in Table 3-13.

Table 3-12. Alternative B—Estimated direct and indirect air pollutant emissions, 2025-2050 (tons per year)

Pollutant	Emissions by Source				2020 National Emissions Inventory (NEI)[2,3]	% of Total NEI[2]
	Direct[1]	Transportation	Combustion[2]	Total[2]		
NO_x	NA	636	16,190-320,964	16,827-321,601	7,815,649	0.22-4.11
CO	NA	347	37,006-175,071	37,353-175,419	62,437,453	0.06-0.28
PM_{10}	61	13	4,163-178,468	4,237-178,542	16,782,420	0.03-1.06
$PM_{2.5}$	17	13	4,163-130,427	4,192-130,456	5,822,156	0.07-2.24
VOC	NA	23	786-12,644	809-12,667	16,630,280	0.005-0.08
SO_2	NA	0.8	23,129-986,819	23,128-986,820	1,844,560	1.25-53.5
Hydrogen chloride	NA	NA	584-11,671	584-11,671	Not reported	NA
Hydrogen fluoride	NA	NA	93-1,459	93-1,459	Not reported	NA
Mercury	NA	NA	0.4-3.7	0.4-3.7	52[4]	0.71-7.12

Notes: NA = not available.
[1]Coal processing plant for the mine.
[2]Range based on varying emissions level.
[3]Source: USEPA 2023h.
[4]Mercury National Emissions Inventory data was only available for 2014.

Table 3-13. Alternative B—Estimated direct and indirect air pollutant emissions, 2051-2068 (tons per year)

Pollutant	Emissions by Source				2020 National Emissions Inventory (NEI)[2,3]	% of Total NEI[2]
	Direct[1]	Transportation	Combustion[2]	Total[2]		
NO_x	NA	318	8,095-160,482	8,413-160,800	7,815,649	0.11-2.06
CO	NA	174	18,503-87,536	18,677-87,709	62,437,453	0.03-0.14
PM_{10}	31	6	2,082-89,234	2,119-89,271	16,782,420	0.01-0.53
$PM_{2.5}$	8	6	2,082-65,213	2,096-65,228	5,822,156	0.04-1.12
VOC	NA	11	393-6,322	404-6,333	16,630,280	0.002-0.04
SO_2	NA	0.4	11,564-493,410	11,565-493,410	1,844,560	0.63-26.75
Hydrogen chloride	NA	NA	292-5,836	292-5,836	Not reported	NA
Hydrogen fluoride	NA	NA	46-730	46-730	Not reported	NA
Mercury	NA	NA	0.2-1.9	0.2-1.9	52[4]	0.36-3.56

Notes: NA = not available.
[1]Coal processing plant for the mine.
[2]Range based on varying emissions level.
[3]Source: USEPA 2023h.
[4]Mercury National Emissions Inventory data was only available for 2014.

Table 3-12 provides the corresponding emissions levels of criteria and HAP pollutants at the national level (where available) for 2020 (USEPA 2023h). Comparing the direct and indirect emissions of these pollutants from Alternative B (2025-2050) to the corresponding emissions of the same pollutants at the national level provides a reasonable proxy for assessing potential downstream air quality impacts at a regional or larger scale. The direct and indirect emissions of CO, PM_{10}, $PM_{2.5}$, and VOC as a result of 2025-2050 coal mining and the downstream combustion of the extracted coal is estimated to be between 0.005 and 2.24 percent of the total 2020 U.S. emissions of these pollutants projected for the life span of Alternative B. These low percentages indicate a less than significant air quality impact for these pollutants. Additionally, these emissions would be widely distributed over large regional areas due to transport and combustion of coal in multiple states.

The direct and indirect emissions of NOx, SO_2, and mercury due to mining and the downstream combustion of the extracted coal from Alternative B are estimated to be between 0.22 and 4.11 percent, 1.25 and 53.5 percent, and 0.71 and 7.12 percent, respectively, of the total U.S. emissions of those pollutants in 2020 projected for the 2025-2050 period of Alternative B. The upper bound percentages assume all mined coal is burned in either U.S. power plants or overseas plants with both having few, if any, emissions controls, which is conservative. Considering the likelihood of up to 50 percent of coal production being distributed to other countries based on 2022 USEIA coal data, all of the percentages of U.S. total emissions described above would effectively be lower and potentially significantly lower. A mitigation option would be to ship the coal to those power

plants that have SO_2 emissions controls, and to a lesser extent, NOx and mercury emissions controls. Most U.S. coal power plants already have such controls.

Table 3-13 provides the corresponding emissions levels of criteria and HAP pollutants at the national level (where available) for 2020 (USEPA 2023h), the most recently completed 3-year NEI release. The direct and indirect emissions of each criteria pollutant and select HAPs as a result of 2051-2068 coal mining and the downstream combustion of the extracted coal is estimated to be between 0.002 and 3.56 percent of the total 2020 U.S. emissions of all pollutants, except SO_2. These low percentages indicate a less than significant air quality impact for these pollutants. Additionally, these emissions would be widely distributed over large regional areas due to transport and combustion of coal in multiple states. The upper bound SO_2 emissions were estimated at 26.75 percent of total U.S. SO_2 emissions in 2020 and the lower bound is 0.63 percent. This upper bound assumes all mined coal is burned in either U.S. power plants or overseas plants with both having little, if any, emissions controls, which is conservative. Considering the likelihood of up to 50 percent of coal production being distributed to other countries based on 2022 USEIA coal data, all of the percentages of U.S. total emissions in Table 3-13 would effectively be lower and potentially significantly lower. A mitigation option would be to ship the coal to those power plants that have SO_2 emissions controls, and to a lesser extent, NOx and mercury emissions controls. Most U.S. coal power plants already have such controls.

For both 2025-2050 and 2051-2068, the downstream combustion of the mined coal in the U.S. is, and would continue to be, subject to applicable regulations under CAA and corresponding state statutes and regulations addressing air quality. This includes New Source Performance Standards, Mercury and Air Toxics Standards, Regional Haze rules, and standards developed under respective SIPs to achieve and maintain the NAAQS, including state/local air permitting requirements.

Cumulative Effects

The active mines and associated areas listed in Table 3-10 above under Alternative A and the additional unmined divested area containing more than 427 million tons of recoverable coal represent the anticipated cumulative amount of coal mined during the period of 2025-2068 under Alternative B; approximately 1,262 million tons.

Cumulatively, the direct and indirect emissions of CO, PM_{10}, and VOC as a result of mining and the downstream combustion of the extracted coal from Alternative B, combined with the coal extracted by the active mining operations within 20 miles of the Project, are estimated to be between 0.01 percent and 2.7 percent of the total U.S. emissions of those pollutants in 2020 projected for the worst-case years of 2025-2050 during Alternative B. This comparison provides a reasonable proxy for assessing potential downstream air quality impacts at a regional or larger scale. These low percentages indicate a less than significant air quality impact for these pollutants. Additionally, these emissions would be widely distributed over large regional areas due to transport and combustion of coal in multiple states.

Cumulatively, the direct and indirect emissions of NOx, $PM_{2.5}$, SO_2, and mercury due to mining and the downstream combustion of the extracted coal from Alternative B, combined with the coal extracted by the active mining operations within 20 miles of the Project, are estimated to be between 0.46 and 8.85 percent, 0.15 and 4.82 percent, 2.7 and 115 percent, and 1.53 and 15.3 percent, respectively, of the total U.S. emissions of those

pollutants in 2020 projected for the worst-case years of 2025-2050 during Alternative B. The upper bound percentages assume all mined coal is burned in either U.S. power plants or overseas plants with both having few, if any, emissions controls, which is conservative. Considering the likelihood of up to 50 percent of coal production being distributed to other countries based on 2022 USEIA coal data, all of the percentages of U.S. total emissions described above would effectively be lower and potentially significantly lower. A mitigation option would be to ship the coal to those power plants that have SO_2, NOx, and mercury emissions controls. Most U.S. coal power plants already have such controls. As indicated above, the downstream combustion of the mined coal would continue to be subject to multiple CAA and state air quality regulations and be subject to permitting requirements to achieve and maintain the NAAQS. Table 3-14 and Table 3-15 below provide the Alternative B cumulative analysis emissions results and their percent of the 2020 NEI for the periods of 2025-2050 and 2051-2068, respectively.

Table 3-14. Alternative B—Cumulative estimated direct and indirect air pollutant emissions, 2025-2050 (tons per year)

Pollutant	Emissions by Source				2020 National Emissions Inventory (NEI)[2,3]	% of Total NEI[2]
	Direct[1]	Transportation	Combustion[2]	Total[2]		
NO_x	NA	1,370	34,862-691,118	36,232-692,488	7,815,649	0.46-8.86
CO	NA	747	79,684-376,973	80,431-377,721	62,437,453	0.13-0.60
PM_{10}	132	27	8,964-384,288	9,123-384,447	16,782,420	0.05-2.29
$PM_{2.5}$	36	27	8,964-280,842	9,027-280,905	5,822,156	0.16-4.82
VOC	NA	48	1,693-27,226	1,742-27,274	16,630,280	0.01-0.16
SO_2	NA	1.8	49,802-2,124,872	49,804-2,124,874	1,844,560	2.70-115.20
Hydrogen chloride	NA	NA	1,256-25,132	1,256-25,132	Not reported	NA
Hydrogen fluoride	NA	NA	199-3,141	199-3,141	Not reported	NA
Mercury	NA	NA	0.8-8.0	0.8-8.0	52[4]	1.53-15.32

Notes: NA = not available.
[1]Coal processing plant for the mine.
[2]Range based on varying emissions level.
[3]Source: USEPA 2023h.
[4]Mercury National Emissions Inventory data was only available for 2014.

Table 3-15. Alternative B—Cumulative estimated direct and indirect air pollutant emissions, 2051-2068 (tons per year)

Pollutant	Emissions by Source				2020 National Emissions Inventory (NEI)[2,3]	% of Total NEI[2]
	Direct[1]	Transportation	Combustion[2]	Total[2]		
NO_x	NA	318	8,095-160,482	8,413-160,800	7,815,649	0.11-2.06
CO	NA	174	18,503-87,536	18,677-87,709	62,437,453	0.03-0.14
PM_{10}	31	6	2,082-89,234	2,119-89,271	16,782,420	0.01-0.53
$PM_{2.5}$	8	6	2,082-65,213	2,096-65,228	5,822,156	0.04-1.12
VOC	NA	11	393-6,322	404-6,333	16,630,280	0.002-0.04
SO_2	NA	0.4	11,564-493,410	11,565-493,410	1,844,560	0.63-26.75
Hydrogen chloride	NA	NA	292-5,836	292-5,836	Not reported	NA
Hydrogen fluoride	NA	NA	46-730	46-730	Not reported	NA
Mercury	NA	NA	0.2-1.9	0.2-1.9	52[4]	0.36-3.56

Notes: NA = not available.
[1]Coal processing plant for the mine.
[2]Range based on varying emissions level.
[3]Source: USEPA 2023h.
[4]Mercury National Emissions Inventory data was only available for 2014.

3.4.1.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. This analysis assumes the mining, processing, transporting, and combustion of a total of approximately 680 million tons of recoverable coal over the period of 2025 through 2068 from the unmined divested area. This is the same amount of coal and time period as under Alternative B. The air quality impacts under Alternative C are the same as described under Alternative B, including cumulative effects. However, if the purchasing entity did not mine any coal, the air quality impacts under Alternative C would be the same as the No Action Alternative.

3.4.2 Greenhouse Gases and Climate

3.4.2.1 Affected Environment

GHGs are chemical compounds in the atmosphere that trap a portion of the outgoing longwave radiation, thus affecting the Earth's energy balance. For purposes of quantifying their emissions and potential effects, various GHGs are frequently converted to a carbon dioxide equivalent (CO_2e) basis using a GHG-specific multiplier called the global warming potential (GWP). The GWP for a particular greenhouse gas is the estimated ratio of surface warming caused by one unit mass of the greenhouse gas to that of one unit mass of carbon dioxide (CO_2) over a specified time period, typically 100 years. The analyses in this EIS are based on GWPs of 25 for methane (CH_4) and 298 for nitrous oxide (N_2O) (USEPA 2023e). One source of methane is coalification (the formation of coal in the earth). After the methane is formed, much of it remains within coal seams until the coal encasing the methane is fractured and exposed. Coal mining releases this methane, referred to as coal

mine methane (CMM) as opposed to the methane that remains in the seam, referred to as coal bed methane (CBM) (USEPA 2023c). Although the methane contained in coal is formed naturally, the CMM is 50 percent considered a man-made source because the methane would have remained within the coal seam if it had not been exposed by mining. While CMM is a large source of man-made methane emissions in the United States, USEPA estimates that CMM emissions decreased by 40 percent between 1990 and 2015 (USEPA 2023c). Coal combustion accounts for approximately 80 to 90 percent of the GHG emissions associated with the life cycle of coal, while the mining, preparation, and transport of coal accounts for the remaining GHG emissions.

In 2009, USEPA implemented the greenhouse gas reporting program (GHGRP) that applies to large GHG emission sources. The goal of the rule is to collect accurate and comprehensive emissions data to inform policy makers, and to potentially assist in developing a cap-and-trade system. The GHGRP applies to certain specifically listed source types, any facility in a listed source category whose GHG emissions exceed 25,000 metric tons of CO_2e ($MTCO_2e$) per year, and certain listed fuel suppliers. The GHGRP applies to underground coal mines that liberate more than 36,500,000 actual cubic feet of methane per year. If a facility's emissions are greater than this threshold in calendar year 2010 or beyond, then it must begin monitoring, recording and reporting the GHG emissions annually beginning January 1, 2011. The existing Sugar Camp Mine No. 1 is currently subject to the GHGRP.

GHG emissions have the potential to affect both global and regional climate. Changes in climate can affect the extent of atmospheric dispersion and photochemical production of air pollutants. For example, higher temperatures tend to increase the photochemical production of ozone.

Based on climate data from Mt. Vernon, approximately 20 miles north of the SBR No. 8 Mine Area, the coldest month is January, with average maximum and minimum temperatures of approximately 38 degrees Fahrenheit (°F) and 21°F, respectively. The warmest month is typically July, with average maximum and minimum temperatures of approximately 86°F and 67°F, respectively. Annual precipitation averages 43.4 inches per year, with April and May tending to have the highest monthly precipitation (National Oceanic and Atmospheric Administration [NOAA] 2021. Average annual snowfall is around 14 inches per year at Mt. Vernon. On average, approximately 54 tornados occur in Illinois in a year (Illinois State Climatologist 2022a).

Figure 3-10 is a chart of annual average temperatures over the 124-year period of record (1896 through 2016) for Mt. Vernon based on the NOAA database maintained by the Iowa Environmental Mesonet (IEM 2020). The trend line on the chart, as indicated by the embedded line slope equation, shows a decrease of approximately 2°F in average temperature over the period of record. Annual average precipitation has increased over the period of record by approximately 10 percent, based on data reported for Mt. Vernon (IEM 2020).

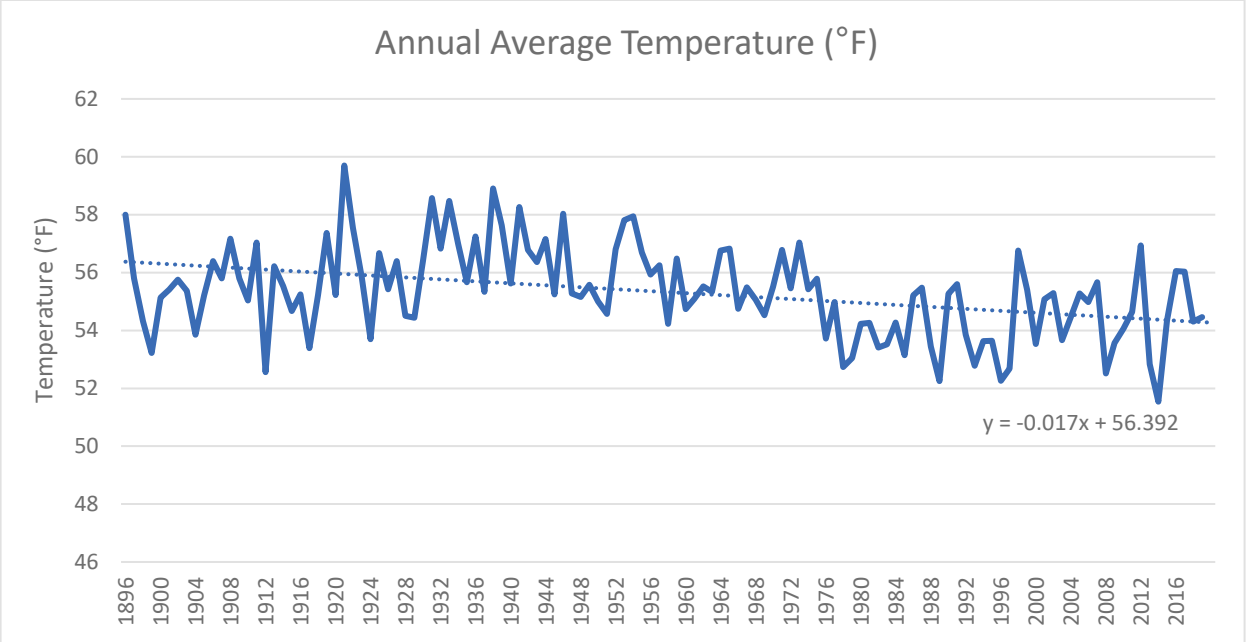


Figure 3-10. Annual Average Temperature[1] for Mt. Vernon, Illinois over 124-Year Record

[1]Source: IEM 2020

Statewide, the average annual temperature has increased by about 1°F since the beginning of the twentieth century (Frankson et al. 2017, Angel 2020). Most of this increase has been during the winter and spring, when average temperatures have increased 2°F. Average summer temperatures have shown little change and the number of very hot summer days has decreased, as have very cold winter nights. Statewide annual precipitation has varied widely but has been above average since 1990.

TVA considered direct, indirect, and cumulative effects of GHG emissions through estimating those emissions from each alternative and converting them into social costs. The social cost dollar per ton rates and 3 percent financial discount rate from the Biden Administration's Interagency Working Group, Technical Support Document for estimating GHG social costs (IWG 2021) were used to develop nominal social costs of GHGs for the expected life cycle of coal mining, transportation, and combustion under each alternative. Additionally, due to various organizations and presidential administrations developing different GHG social cost rates, to provide a range of GHG social costs, TVA has also used a 3 percent financial discount rate and GHG social cost rates developed under the Trump Administration (Government Accountability Office [GAO] 2020).

There is no scientifically established correlation of the magnitude of GHG emissions to the magnitude of climate effects (e.g., how much of the following: sea level rise, increased severity of storms, increased temperatures, and increased wildfires) at specific locations on earth. The level of GHG emissions and associated social cost metric provides a way of comparing climate effects from each alternative for informing decision makers and aiding in their evaluation of each alternative in this EIS.

3.4.2.2 Environmental Consequences

3.4.2.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Therefore, the direct emissions of GHGs associated with the proposed mining of the approximately 253 million tons of TVA-owned coal would not occur. Similarly, the associated indirect emissions of GHGs from the transportation and combustion of the coal would also not occur. Direct and indirect emissions of GHGs from the ongoing extraction of approximately 166 million tons of unprocessed TVA coal previously approved for mining and privately-owned coal would continue under terms of the mining permit issued by IDNR-OMM. These activities under the No Action Alternative would generate an estimated total of approximately 120 million metric tons of CO_2e from the period of 2025-2050. Annual emissions of CO_2e during the worst-case period of 2025-2029 would represent an estimated 0.5 percent of U.S. GHGRP emissions in 2021, 0.2 percent of the U.S. total GHG inventory for 2021, and 0.03 percent of the estimated 50.1 billion $MTCO_2e$ of total U.S. GHG emissions for 2021 (USEPA 2023i, Rivera et al. 2023). The period of 2030-2050 would generate less GHG emissions as TVA has assumed a USEPA May 11, 2023, proposed GHG Standards and Guidelines for Fossil-Fueled Power Plants rule requiring 90 percent reduction of GHG emissions from coal-fired units would take effect in 2030 (USEPA 2023j).

The majority of the energy that would have been produced by the TVA-owned coal would most likely be replaced by alternate energy sources, including privately owned and TVA-approved coal from the mine as well as coal from other production areas. While the production and consumption of those replacement energy sources would have associated GHG emissions, the emissions from the replacement sources of energy are unknown because they would not be under TVA's control. For the purposes of analysis, TVA assumes that the No Action Alternative could result in actions to be taken by Sugar Camp and other entities, ranging from complete replacement of the coal mined from the SBR No. 8 Mine Area to no replacement. However, over the long term an increasing proportion of the replacement sources of energy would likely be comprised of lower GHG-emitting sources, given the continuing shift by electric utilities towards such energy sources. TVA anticipates that GHG emissions would be less under the No Action Alternative than under the proposed Action Alternatives, except for Alternative C if the purchasing entity chooses not to mine the coal, because coal combustion is typically more carbon intensive than other forms of fossil fuels, or non-fossil energy sources.

3.4.2.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. With approval of the mining plan, an estimated 253 million tons of TVA-owned coal would be mined over the period of 2025 through 2050 with an anticipated average annual production of approximately 9.73 million tons. Mining of privately owned coal and previously approved TVA coal would occur simultaneously, with a cumulative total of approximately 836 million tons of processed coal mined within a 20-mile radius of Sugar Camp Mine No. 1 during the study period. This would result in emissions of GHGs from the coal extraction, transportation of the coal to end users, and the eventual combustion of the extracted coal.

The following emissions analysis provides an estimate of GHG emissions as (1) a percentage of GHG emissions reported through the GHGRP; (2) a percentage of total U.S. GHG emissions; and (3) a percentage of total global GHG emissions. This proportionate

estimate of GHG emissions provides one measure of assessing potential climate change impacts. The current state of climate science does not allow for specific linkage between particular GHG emissions and particular localized climate impacts. However, TVA has also used the social cost of carbon (SCC) metric in the assessment of climate change impacts from direct coal mine methane emissions, and downstream GHG emissions resulting from transportation and combustion of coal. The sources of GHG social cost (SC-GHG) rates were: (1) the federal government's *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990* (IWG 2021) issued by the Biden Administration; and (2) USEPA and Bureau of Land Management social cost rates developed for regulatory impact analyses by the Trump Administration (GAO 2020). The costs associated with a 3 percent discount rate were used in this analysis.

Direct Emissions—Mining Operations

CMM emission values from the Sugar Camp Mine No. 1 were provided between 2010 and 2016 based on the tons per year of coal production (USEPA 2019b). These values were provided in units of cubic feet per ton of coal production and were averaged and converted to tons per year emissions based on the tons per year of coal production. This reference also provided CMM emission rates for the other mines within 20 miles for use in cumulative effects CMM emissions calculations.

The operation of coal mining equipment would also generate GHG emissions. The direct GHG emissions associated with operation of the mining equipment and coal processing plant are anticipated to be negligible compared to the CMM and coal combustion emissions and are not quantified. This is due to the use of electrically powered equipment and a significantly lower fuel combustion quantity during mining and coal processing activities compared to coal combustion.

Indirect Emissions—Coal Transportation and Combustion

Assuming that all of the coal extracted from the mine is eventually combusted, the associated GHG emissions were calculated using emission factors and GWP values for bituminous coal, as provided in the USEPA's GHG Emission Factors Hub online reference (USEPA 2023e). The GHG emissions associated with the rail transport were also estimated using this same reference with emission factors based on the ton-miles of coal transportation.

Total GHG Emissions and Social Costs of GHG

Table 3-16 summarizes the projected annual GHG emissions associated with Alternative A over the periods of 2025-2029 and 2030-2050. The annual GHG emissions change in year 2030 is because of the expectation of a proposed USEPA rule requiring 90 percent CO_2 emissions reductions from coal-fired power plants in 2030. The total estimated project life direct and indirect GHG emissions associated with the 253 million tons of processed coal is approximately 182 million $MTCO_2e$.

Table 3-16. Alternative A—Direct and indirect GHG emissions summary

GHG[1]	Emissions						
	(Short Tons/Yr., 2025-2029)	(Short Tons/Yr., 2030-2050)	(MT/Yr. for 2025-2029)	(MT/Yr. for 2030-2050)	($MTCO_2e$/Yr. for 2025-2029)	($MTCO_2e$/Yr. for 2030-2050)	(Project Life, 2025-2050, $MTCO_2e$)
Coal Mine Methane (Direct Emissions)							
CH_4	39,537	39,537	35,867	35,867	896,684	896,684	23,313,776
Coal Transportation (Indirect Emissions)							
CO_2	66,654	66,654	60,467	60,467	60,467	60,467	1,572,148
CH_4	43	43	39	39	977	977	25,407
N_2O	13	13	12	12	3,640	3,640	94,642
Coal Combustion (Both Well and Non-Well Controlled Plants, Indirect Emissions)							
CO_2	23,732,087	2,373,209	21,529,393	2,152,939	21,529,393	2,152,939	152,858,690
CH_4	2,799	2,799	2,539	2,539	63,471	63,471	1,650,248
N_2O	407	407	369	369	110,047	110,047	2,861,230
Totals							
CO_2	23,798,740	2,439,862	21,589,860	2,213,407	21,589,860	2,213,407	154,430,839
CH_4	42,379	42,379	38,445	38,445	961,132	961,132	24,989,432
N_2O	421	421	382	382	113,687	113,687	2,955,872
						Total	***182,376,143***

[1]CH_4 = methane; CO_2 = carbon dioxide; N_2O = nitrous oxide

The 2025-2029 projected direct and indirect annual CO_2e emissions associated with Alternative A represent approximately 0.8 percent of the 2.71 billion $MTCO_2e$ of U.S. GHG emissions reported through the GHGRP (USEPA 2023f) for 2021 and 0.4 percent of the estimated 6.34 billion $MTCO_2e$ of total U.S. GHG emissions (USEPA 2023i) for 2021. These same 2025-2029 annual emissions from Alternative A represent approximately 0.05 percent of the estimated 50.1 billion $MTCO_2e$ of total global GHG emissions for 2021 (Rivera et al. 2023).

The 2030-2050 projected direct and indirect annual CO_2e emissions associated with Alternative A represent approximately 0.1 percent of the 2.71 billion $MTCO_2e$ of U.S. GHG emissions reported through the GHGRP (USEPA 2023f) for 2021 and 0.1 percent of the estimated 6.34 billion $MTCO_2e$ of total U.S. GHG emissions (USEPA 2024e) for 2021. These same 2030-2050 annual emissions from Alternative A represent approximately 0.01 percent of the estimated 50.1 billion $MTCO_2e$ of total global GHG emissions for 2021 (Rivera et al. 2023).

Implementation of Alternative A would result in a small percentage increase in national and global GHG emissions. TVA has also estimated the social cost of GHG emissions from Alternative A as a way of showing the monetized climate impact from these emissions[2]. Table 3-17 summarizes the Alternative A total estimated project social cost of GHG (SC-GHG) for 2025-2050 in nominal dollars using the Biden Administration IWG February 2021 SC-GHG dollar per metric ton rates at a 3 percent discount rate (IWG 2021) and the Trump Administration SC-GHG rates (GAO 2020).

Table 3-17. Alternative A—Direct and indirect SC-GHG summary

Project Life, 2025-2050[1]	Biden Administration SC Rates, Nominal $	Trump Administration SC Rates, Nominal $
SC-CO_2	$12,425,236,373	$1,261,717,194
SC-CH_4	$3,489,112,059	$285,379,308
SC-N_2O	$384,155,827	$26,489,155
SC-GHG Summary	***$16,298,504,260***	***$1,573,585,667***

[1]SC = social cost; CO_2 = carbon dioxide; CH4 = methane; N_2O = nitrous oxide; GHG = greenhouse gas.

As a comparison between all Alternatives, the total estimated CO_2e emissions and SC-GHG for each alternative are presented in Table 3-18[3].

[2] There currently is no established criteria identifying the GHG social cost values considered significant for NEPA purposes.

[3] Although Alternatives B and C GHG emissions go beyond 2050 and through 2068, their SC-GHG have not been calculated beyond 2050 to allow a consistent SC-GHG comparison across all alternatives, i.e. 2025-2050, and because IWG SC rates are only provided until 2050.

Table 3-18. Total direct and indirect CO_2e emissions by alternative and associated SC-GHG

Alternative	CO_2e Emissions (Million MT)	Time Period	Biden Administration SC-GHG (Nominal Billion $)	Trump Administration SC-GHG (Nominal Billion $)	Time Period
No Action	120	2025-2050	$10.7	$1.0	2025-2050
A	182	2025-2050	$16.3	$1.6	2025-2050
B	440	2025-2068	$32.6	$3.1	2025-2050
C	440	2025-2068	$32.6	$3.1	2025-2050

Notes: MT = metric tons; SC-GHG = social cost of greenhouse gases.

Cumulative GHG Effects

Cumulatively, the reasonably foreseeable cumulative emissions of GHGs associated with the active mining operations under Alternative A and in the 20-mile radius of the SBR No. 8 Mine Area would total approximately 596 million metric tons of CO_2e for 2025-2050. The total cumulative SC-GHG associated with these emissions and time period using Biden Administration SC-GHG rates is estimated at $52.2 billion. The total cumulative SC-GHG associated with these emissions and time period using Trump Administration SC-GHG rates is estimated at $5.1 billion.

As a comparison between all Action Alternatives, the total estimated cumulative CO_2e emissions and SC-GHG for each Action Alternative using both Biden and Trump Administration SC-GHG rates are presented in Table 3-19.

Table 3-19. Total cumulative CO_2e emissions by alternative and associated SC-GHG

Alternative	CO_2e Emissions (Million MT)	Time Period	Biden Administration SC-GHG (Nominal Billion $)	Trump Administration SC-GHG (Nominal Billion $)	Time Period
A	596	2025-2050	$52.2	$5.1	2025-2050
B	886	2025-2068	$69.2	$6.7	2025-2050
C	886	2025-2068	$69.2	$6.7	2025-2050

Notes: MT = metric tons; SC-GHG = social cost of greenhouse gases.

Climate Change Effects (Projected and Due to Action Alternative)

Future projections for climate change in Illinois, the U.S., and beyond include increased temperatures and an overall increase in precipitation, as well as a change in the distribution and seasonality of precipitation with increases in both heavy rain and length of dry spells. These conditions increase the risk and severity of extreme heat days, flooding and droughts. These weather events increase the risk and frequency of allergies and respiratory issues (e.g., asthma attacks), and the potential for wildfires. With increased temperatures and extreme heat days in the summer, the risks of increased levels of ozone and particulate emissions go up and negatively affect air quality (Illinois State Climatologist 2022b). Continued long-term coal mining and subsequent combustion of the coal, including coal exported outside of the U.S., would further contribute to the risk of these negative climate

change impacts. These and additional climate related impacts are described in the latest Intergovernmental Panel on Climate Change Synthesis Report (IPCC 2023) and the U.S. Global Change Research Program, Fifth National Climate Assessment Report (USGCRP 2023).

Climate Change Effects on Action Alternative

The majority of mining activities under Alternative A occur underground over 500 feet below the land surface. As such, climate change effects are expected to have minimal impact on these underground activities. Surface activities include coal processing which is located adjacent to high-risk floodplain areas (FEMA 2021). Subsidence of land may increase the number of areas subject to flooding. Construction of berms and/or dredging in advance of planned subsidence would protect land, dwellings, and other structures within potentially flooded areas per IDNR-OMM permit requirements. Increases in flooding events may require more frequent and robust construction activities to protect land and structures from flooding.

3.4.2.2.3 Alternative B

Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. With approval of the mining plan, an estimated 283 million tons of TVA-owned coal would be mined over the period of 2025 through 2050 at an average annual production of approximately 9.73 million tons. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in Alternative A (Section 3.4.2.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the remaining unmined divested area with more than 427 million tons of recoverable coal would simultaneously be mined at the same annual rate over the period 2051 through 2068. Cumulatively, mining of privately owned and previously approved TVA-owned coal would occur simultaneously, along with other mining operations within a 20-mile radius of Sugar Camp Mine No. 1; together, these actions would result in a cumulative total of approximately 1,087 million tons of processed coal over the period 2025 through 2050, and an additional 175 million tons between 2051 to 2068. This would result in emissions of GHGs from the coal extraction, transportation of the coal to end users, and the eventual combustion of the extracted coal.

The same GHG emissions calculation methodology and analysis described for Alternative A applies to Alternative B.

Total GHG Emissions and Social Costs of GHG

Table 3-20 summarizes the projected annual GHG emissions associated with Alternative B over the periods of 2025-2029, 2030-2050, and 2051-2068. The annual GHG emissions change in year 2030 because of the expectation of a proposed USEPA rule requiring 90 percent CO_2 emissions reductions from coal-fired power plants in 2030. The total estimated direct and indirect GHG emissions associated with the 680 million tons of processed coal is approximately 440 million $MTCO_2e$ over the project life (2025-2068). Although Alternative B GHG emissions go beyond 2050 and through 2068, the SC-GHG have not been calculated beyond 2050 to allow a consistent SC-GHG comparison across all alternatives, i.e. 2025-2050, and because IWG SC rates are only provided until 2050.

Table 3-20. Alternative B—Direct and indirect GHG emissions summary

GHG[1]	Emissions (MT/Yr., 2024-2029)	(MT/Yr., 2030-2049)	(MT/Yr. for 2024-2029)	(MT/Yr. for 2030-2049)	($MTCO_2e$/Yr. for 2024-2029)	($MTCO_2e$/Yr. for 2030-2049)	(Project Life, 2024-2049, $MTCO_2e$)
Coal Mine Methane (Direct Emissions)							
CH_4	71,735	71,735	71,735	1,793,367	1,793,367	1,793,367	78,908,165
Coal Transportation (Indirect Emissions)							
CO_2	120,934	120,934	60,467	120,934	120,934	60,467	4,232,707
CH_4	78	78	39	1,954	1,954	977	68,404
N_2O	24	24	12	7,280	7,280	3,640	254,805
Coal Combustion (Both Well and Non-Well Controlled Plants, Indirect Emissions)							
CO_2	43,058,786	4,305,879	2,152,939	43,058,786	4,305,879	2,152,939	344,470,288
CH_4	5,078	5,078	2,539	126,942	126,942	63,471	4,442,976
N_2O	739	739	369	220,095	220,095	110,047	7,703,313
Totals							
CO_2	43,179,721	4,426,813	2,213,407	43,179,721	4,426,813	2,213,407	348,702,996
CH_4	76,891	76,891	74,313	1,922,264	1,922,264	1,857,816	83,419,545
N_2O	763	763	382	227,375	227,375	113,687	7,958,118
						Total	***440,080,659***

[1]CH4 = methane; CO_2 = carbon dioxide; N_2O = nitrous oxide

The 2025-2029 projected direct and indirect annual CO_2e emissions associated with Alternative B represent approximately 1.7 percent of the 2.71 billion $MTCO_2e$ of U.S. GHG emissions reported through the GHGRP (USEPA 2023f) for 2021 and 0.7 percent of the estimated 6.34 billion $MTCO_2e$ of total U.S. GHG emissions (USEPA 2023i) for 2021. These same 2025-2029 annual emissions from Alternative B represent approximately 0.1 percent of the estimated 50.1 billion $MTCO_2e$ of total global GHG emissions for 2021 (Rivera et al. 2023).

The 2030-2050 projected direct and indirect annual CO_2e emissions associated with Alternative B represent approximately 0.2 percent of the 2.71 billion $MTCO_2e$ of U.S. GHG emissions reported through the GHGRP (USEPA 2023f) for 2021 and 0.1 percent of the estimated 6.34 billion $MTCO_2e$ of total U.S. GHG emissions (USEPA 2023i) for 2021. These same 2030-2050 annual emissions from Alternative B represent approximately 0.01 percent of the estimated 50.1 billion $MTCO_2e$ of total global GHG emissions for 2021 (Rivera et al. 2023).

The 2051-2068 projected direct and indirect annual CO_2e emissions associated with Alternative B represent approximately 0.2 percent of the 2.71 billion $MTCO_2e$ of U.S. GHG emissions reported through the GHGRP (USEPA 2023f) for 2021 and 0.1 percent of the estimated 6.34 billion $MTCO_2e$ of total U.S. GHG emissions (USEPA 2023i) for 2021. These same 2051-2068 annual emissions from Alternative B represent approximately 0.01 percent of the estimated 50.1 billion $MTCO_2e$ of total global GHG emissions for 2021 (Rivera et al. 2023).

Implementation of the project under Alternative B would result in a small percentage increase in national and global GHG emissions. TVA has also estimated the social cost of GHG emissions from Alternative B as a way of showing the monetized climate impact from these emissions. Table 3-21 provides a summary of the Alternative B total estimated project SC-GHG for 2025-2050 in nominal dollars using the Biden Administration IWG February 2021 SC-GHG dollar per metric ton rates at a 3 percent discount rate (IWG 2021) and the Trump Administration SC-GHG rates (GAO 2020).

Table 3-21. Alternative B—Direct and indirect SC-GHG summary

Project Life, 2025-2050[1]	Biden Administration SC Rates, Nominal $	Trump Administration SC Rates, Nominal $
SC-CO_2	$24,850,472,746	$2,523,434,389
SC-CH_4	$6,978,224,119	$570,758,616
SC-N_2O	$767,138,878	$52,955,592
SC-GHG Summary	***$32,595,835,743***	***$3,147,148,597***

[1]SC = social cost; CO^2 = carbon dioxide; CH4 = methane; N_2O = nitrous oxide; GHG = greenhouse gas

As a comparison between all Alternatives, the total estimated CO_2e emissions and SC-GHG for each alternative are presented in Table 3-18.

Cumulative GHG Effects

Cumulatively, the reasonably foreseeable cumulative emissions of GHGs associated with the active mining operations under Alternative B and in the 20-mile radius of the TVA Mineral Rights Area would total approximately 886 million metric tons of CO_2e for 2025-2068. The total cumulative SC-GHG associated with these emissions for 2025-2050 using Biden Administration SC-GHG rates is estimated at $69.2 billion. The total cumulative SC-

GHG associated with these emissions for 2025-2050 using Trump Administration SC-GHG rates is estimated at $6.7 billion.

As a comparison between all Action Alternatives, the total estimated cumulative CO_2e emissions and SC-GHG for each Action Alternative using both Biden and Trump Administration SC-GHG rates are presented in Table 3-19.

Climate Change Effects
Refer to Section 3.4.2.2.2 as the climate change effects described under Alternative A also apply to Alternative B.

3.4.2.2.4 Alternative C
Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. Refer to Section 3.4.2.2.3 for GHG impacts from Alternative B as they are the same as for Alternative C, including cumulative GHG effects and climate change effects. However, if the purchasing entity did not mine any coal, the GHG impacts under Alternative C would be the same as those under the No Action Alternative.

3.5 Biological Resources

3.5.1 Vegetation
Vegetation provides habitat and food resources for birds, mammals, reptiles, amphibians, and insects. Vegetation also supports soil and nutrient cycles and provides ecosystem services, such as food, fresh water, fuel, fiber, and medicines to human populations (Michigan State University, n.d.). The federal Plant Protection Act of 2000 consolidated previous legislation and authorized the U.S. Department of Agriculture (USDA) to issue regulations to prevent the introduction and movement of identified plant pests and noxious weeds. EO 13112—Invasive Species directs federal agencies to prevent the introduction of invasive species (both plants and animals), control their populations, restore invaded ecosystems, and take other related actions. EO 13751—Safeguarding the Nation from the Effects of Invasive Species amends EO 13112 and directs actions to continue coordinated federal prevention and control efforts related to invasive species. Agencies are also directed to incorporate consideration of human and environmental health, climate change, technological innovation, and other emerging priorities into their efforts to address invasive species (USDA 2023a).

3.5.1.1 Affected Environment

3.5.1.1.1 TVA Mineral Rights Area
The TVA Mineral Rights Area is in the Southern Illinoian Till Plain, a subdivision of the Interior River Valleys and Hills ecoregion (CEC 1997, Woods et al. 2006). Southern Illinois was once covered by a mosaic of oak-hickory forests and bluestem prairies, but most of the area has been converted to agricultural lands. Soybeans, corn, and wheat are the primary crops, and forested areas are now largely confined to side slopes and river bottoms that are unsuitable for farming (Woods et al. 2006). Mesic tall-grass prairies are found in a mosaic pattern with the oak-hickory forest. Flatwood forests can be found on nearly level, clay-rich soils on poorly drained uplands.

Two globally rare flatwoods terrestrial plant communities are found in this region: the Pin Oak-Post Oak Lowland Flatwoods bottomland community and the Post Oak Flatwoods

community. The Pin Oak-Post Oak Lowland Flatwoods bottomland community occurs on terrace “flats” in the floodplains of major rivers, primarily the Ohio River and the Mississippi River and tributaries (NatureServe 2023). This bottomland community is thought to have less than 20 occurrences throughout its range within southwest Indiana, southern Illinois, and southeast Missouri. Due to damming, higher water levels in their preferred locations may have eliminated post oak from most occurrences of this community (Carey 1992, NatureServe 2023). These lowland flatwoods have been classified as having a vulnerable to imperiled global conservation status (NatureServe 2023). The Post Oak Flatwoods community also has a vulnerable to imperiled global conservation status with fewer than 50 occurrences throughout its range (NatureServe 2023). Some occurrences have been destroyed or degraded by clearing and selective logging, and some have been degraded by grazing. This community typically has average canopy cover of 80 percent or more. Trees may be stunted due to the unfavorable soil conditions.

3.5.1.1.2 SBR No. 8 Mine Area

Based on the 2021 National Land Cover Database (NLCD) (USGS 2023), approximately 4,454 acres of deciduous forests (19.9 percent) occur within the SBR No. 8 Mine Area. Most of the forested areas are heavily fragmented and concentrated around streams, with several bottomland forests present. Dominant species across the SBR No. 8 Mine Area include sugar maple, red maple, white oak, and American elm (USFS 2022). Species such as sycamore, red maple, sweet gum, and river birch are also common along stream corridors in this region. Based on the 2021 NLCD, the majority (59.7 percent; 13,375 acres) of the SBR No. 8 Mine Area is in cultivated crops. Pasture lands and fields in hay compose approximately 13.9 percent (3,124 acres) of the SBR No. 8 Mine Area. Remaining vegetative cover in the portions of the SBR No. 8 Mine Area consists of less than 1.0 percent of evergreen forest (91 acres), herbaceous plants (53 acres), woody wetland plants (33 acres), shrubs (12 acres), and herbaceous wetland plants (1 acre).

3.5.1.1.3 No. 4 Bleeder Shaft

Based on 2021 NLCD (USGS 2023), vegetation of the six bleeder shaft facilities consists of cultivated crops (33 acres, 83.8 percent), pasture/hay (5 acres, 12.3 percent), and deciduous forest (<1 acres, 2.2 percent).

Comprehensive environmental surveys were completed on the No. 4 Bleeder Shaft in fall 2023 (Appendix C). Vegetative communities on the No. 4 Bleeder Shaft consist of cropland, herbaceous plants, and deciduous forest. Table 3-22 summarizes the vegetation community types at the time of the survey. Not included in Table 3-22 are an approximately 0.33-acre area of open water and an approximately 3.16-acre of development (roadway and railroad).

Cropland, which consists of planted corn, comprises 71.9 percent of the No. 4 Bleeder Shaft. Other weedy species found in bare patches and along roadway and railroad edges included typical pioneering species such as butterweed, Indian goosegrass, and annual bluegrass.

Herbaceous plants comprise 13.3 percent of the No. 4 Bleeder Shaft and are located in disturbed areas along the roadways and railroad edges and in lawn areas of residential properties. Common herbaceous plants include Indian goosegrass, annual bluegrass, switchgrass, and bristlegrass.

Deciduous forests comprise 11.3 percent of the No. 4 Bleeder Shaft and are located in the easternmost portion. This forested area is part of a broader tract of woodlands that extends beyond the No. 4 Bleeder Shaft. Common overstory trees include pignut hickory, shagbark hickory, white oak, black willow, and black walnut. Diameter at breast height of overstory trees ranged from 3 inches to greater than 15 inches. The shrub layer is relatively open and contains green ash and raspberry species. The herbaceous layer in this forest type includes poison ivy, Virginia creeper, trumpet creeper, Asteraceae species, and grass species.

No notable plant communities were observed. No federal-noxious weeds, as defined by the USDA Natural Resource Conservation Service (NRCS) were observed, but other invasive plant species were observed throughout the Study Area. These species were most often phragmites, Indian goosegrass, Japanese honeysuckle, and bristlegrasses and are most often found in ruderal forested areas, along field edges, and in areas prone to disturbance.

Table 3-22. Summary of vegetation communities within the No. 4 Bleeder Shaft

Plant Community	Acreage	Percentage
Cropland	65.15	71.9%
Herbaceous Vegetation	12.09	13.3%
Deciduous Forest	10.23	11.3%
Total	***87.47***	***96.5%***

3.5.1.2 Environmental Consequences

3.5.1.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to vegetation. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated, per IDNR-OMM permit requirements. Short-term, temporary impacts to vegetation as a result of planned subsidence may occur, but these impacts would be remediated per IDNR-OMM permit requirements.

3.5.1.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. This would result in impacts to vegetation due to surface disturbances and planned subsidence.

Surface Disturbances

Existing plant communities at the six approximately 6.5-acre bleeder shaft facility locations would be eliminated for the construction and operations of these Project components. The footprint of the bleeder shaft facilities would have long term impacts to primarily cultivated crops and pastureland.

Once the bleeder shaft facilities are constructed, the portions of land that are not covered by hard surfaces (i.e., graveled areas, access roads, buildings) would be seeded with the approved temporary seed mixture to minimize the potential for erosion. With completion of the operational lives of these Project components, the bleeder shaft facility locations would be restored, based on the IDNR-OMM approved post-mining topographic conditions.

No uncommon terrestrial plant communities or otherwise unusual vegetation have been identified in the SBR No. 8 Mine Area, including where surface disturbances are proposed; thus, no impacts to these vegetative communities are anticipated in association with the Project.

Coal-Extraction Related Effects
Plant communities in the area of planned subsidence may be temporarily impacted by ponded water but would return to IDNR-OMM approved post-mining topographic conditions following reclamation. Ponding of more than a few days, particularly during the growing season, may have adverse impacts to vegetation not adapted to flooding. Small trees and shrubs and herbaceous vegetation may experience temporary impacts. However, though unlikely to occur, die-off of trees larger than sapling size would have a long-term effect.

Cumulative Effects
Alternative A along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds would not contribute to cumulative adverse impacts to vegetation. Permanent impacts to biological resources associated with these other actions have been or would be avoided or mitigated, per the IDNR-OMM permit requirements.

3.5.1.2.3 Alternative B
Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.5.1.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.5.1.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A.

Cumulative Effects
Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and TVA Mineral Rights watersheds would not contribute to cumulative adverse impacts to vegetation. Permanent impacts to biological resources associated with Alternative B and these other actions have been or would be avoided or mitigated, per the IDNR-OMM permit requirements.

3.5.1.2.4 Alternative C
Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.5.1.2.3).

Cumulative Effects
Alternative C along with the other actions as described in Section 3.1 for the TVA Mineral Rights watersheds would not contribute to cumulative adverse impacts to vegetation. Permanent impacts to vegetation associated with these other actions would be avoided or mitigated, per the IDNR-OMM permit requirements.

3.5.2 Wildlife

3.5.2.1 Affected Environment

3.5.2.1.1 TVA Mineral Rights Area and SBR No. 8 Mine Area

Both the TVA Mineral Rights Area and the SBR No. 8 Mine Area are located within the Southern Illinoian Till Plain ecoregion which may support a variety of common wildlife species and is composed mostly of agricultural fields. Forests are now largely confined to side slopes and river bottoms that are unsuitable for farming. According to Illinois Natural History Survey (INHS), the northern crayfish frog, eastern fence lizard, ground skink, and broadheaded skink are common in this ecoregion (INHS 2024). Relatively few bird species can use monocultural cropland habitat, which composes approximately 34 percent of the TVA Mineral Rights Area and approximately 60 percent of the SBR No. 8 Mine Area. Other species that cannot subsist in cropland areas are restricted to early successional habitats or forested habitats along the rivers and streams. Examples of amphibians, reptiles, and mammals found in bottomland forests include marbled salamander, gray tree frog, northern watersnake, eastern box turtle, American mink, river otter, beaver, swamp rabbit, and white-tailed deer (INHS 2024; IDNR 2020; NatureServe 2023).

The TVA Mineral Rights Area and SBR No. 8 Mine Area are within the boundaries of the Big Muddy River Watershed, which lies within a major avian flight corridor. The Big Muddy Watershed is part of the Mississippi River basin and contains Rend Lake and Crab Orchard Lake, two of the largest inland lakes in the state (Illinois State Water Survey 2011). For this reason, the Middle Fork Big Muddy River watershed is optimally situated for major influxes of migrating birds. These migratory birds include geese, ducks, and other water birds that are attracted to flooded fields and large lakes in the area. Migratory birds of conservation concern, as identified by USFWS (USFWS 2021a) and likely occurring in the TVA Mineral Rights Area and SBR No. 8 Mine Area, include the red-headed woodpecker and loggerhead shrike (present year-round), wood thrush (summer resident), and several spring and fall migrants including the solitary sandpiper, blue-winged warbler, cerulean warbler, and Kentucky warbler.

Developed and disturbed areas are home to several common species, including American robin, American crow, Carolina chickadee, European starling, house finch, house sparrow, mourning dove, Carolina wren, northern cardinal, northern mockingbird, black vulture, and turkey vulture (McKinney 2002). Mammals found in this community type include eastern gray squirrel, striped skunk, and raccoon (Whitaker 1996). Roadside ditches may provide habitat for amphibians including American toad, Fowler's toad, southern leopard frog, and upland chorus frog (IDNR 2020). Reptiles potentially present include red-bellied snake, gray rat snake, and smooth earth snake (Gibbons 2017).

Fish and game species are protected by hunting, fishing, and trapping regulations enforced by the USFWS and IDNR. In addition to these laws, the Migratory Bird Treaty Act (MBTA) of 1918, the Bald and Golden Eagle Protection Act (BGEPA) of 1940, and EO 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds also provide protection to birds. Aside from federal and state laws regulating the hunting, trapping or other capture, and possession of some species, most wildlife other than birds generally receives no legal protection. According to the Information for Planning and Consultation (IPaC), bald eagles may be present within the TVA Mineral Rights Area. Bald eagles are granted protections under the BGEPA and MBTA. Bald eagles are very large raptors that breed in areas close to water sources, including coastal areas, bays, rivers, lakes, and reservoirs (NatureServe 2023). Nest sites are often in tall trees of varying species or on rocky outcrops near water.

In winter, bald eagles are associated with open water and may congregate in areas with high waterfowl concentrations or with dead fish. Though no large water bodies are located within the TVA Mineral Rights Area or the SBR No. 8 Mine Area, the proximity to Rend Lake and high number of streams suggest bald eagles may forage within the Project vicinity.

Migratory Birds

Approximately 200 species of migratory birds have been identified in Franklin, Jefferson, and Hamilton counties (eBird 2023), and additional species likely occur regularly. The USFWS maintains a list of migratory birds of conservation concern (USFWS 2021a). These species are not listed under the ESA but are a high conservation priority for the USFWS. Additionally, without additional conservation action, these species are likely to become candidates for listing under the ESA. A total of 32 species of birds of conservation concern are listed for Bird Conservation Region 22, Eastern Tallgrass Prairie, and Region 24, Central Hardwoods, which encompass the project (USFWS 2021a). Species from this list with known occurrences in Illinois and species from the Migratory Birds list obtained from the USFWS IPaC for TVA Mineral Rights Area and SBR No. 8 Mine Area are listed in Table 3-23 and provided in Appendix C.

Table 3-23. Migratory bird species of conservation concern potentially occurring within the TVA Mineral Rights Area and SBR No. 8 Mine Area

Common Name	Scientific Name	Bird Conservation Region		General Habitat Description[1]	Potential Habitat	
		22	24		SBR No. 8 Mine Area	TVA Mineral Rights Area
Migrant Species (present as spring and fall migrant and/or during winter)						
American Golden-Plover	*Pluvialis dominica*	X		Wet fields, pastures, and grassy mudflats	Yes	Yes
Black-billed Cuckoo[2]	*Coccyzus erythropthalmus*	X	X	Bottomland forests, upland deciduous forests, southern IL lowlands, forest edges, and orchards	Yes	Yes
Bobolink	*Dolichonyx oryziorus*	X	X	Alfalfa fields, clover fields, hay fields and pastures as well as fence rows	Yes	Yes
Buff-breasted Sandpiper	*Calidris subruficoliis*	X		Short, grassy areas near mudflats; other short-grass areas, such as golf courses, airports and sod fields.	No	No
Dunlin (Hudson Bay)	*Calidris alpina hudsonia*	X		Mudflats, beaches, ponds, and marshes	No	No
Hudsonian Godwit	*Limosa haemastica*	X		Temporary water supplies; lakes, ponds, reservoirs	No	No
LeConte's Sparrow	*Ammodramus leconteii*		X	Marshes, prairies and grassy fields	Yes	Yes
Lesser Yellowlegs	*Tringa flavipes*	X	X	Temporary water supplies; rivers and streams; lakes, ponds and reservoirs	No	No
Pectoral Sandpiper	*Calidris melanotos*	X		Flooded fields, shorelines, mudflats and wet pastures	No	No
Ruddy Turnstone (Atlantic)	*Arenaria interpres morinella*	X		Mudflats, beaches, rocky shores and the Lake Michigan shoreline	No	No

Common Name	Scientific Name	Bird Conservation Region		General Habitat Description[1]	Potential Habitat	
		22	24		SBR No. 8 Mine Area	TVA Mineral Rights Area
Rusty Blackbird	*Euphagus carolinus*	X	X	Swamps, trees along rivers, woodland edges, grain fields and pond edges	Yes	Yes
Semipalmated Sandpiper (Eastern/Central)	*Calidris pusilla*	X	X	Shorelines of lakes and rivers, flooded fields and mudflats	Yes	Yes
Short-billed Dowitcher	*Limnodromus griseus*	X		Marshes; temporary water supplies; rivers and streams; wet prairies and fens; lakes, ponds and reservoirs	No	No
Short-eared Owl[3]	*Asio flammeus*	X	X	Prairies, marshes, grassy fields, and pines	Yes	Yes
Breeding Season Migrants (may occur during the breeding season and as spring and fall migrant)						
Cerulean Warbler[2]	*Dendroica cerulea*	X	X	Treetops in upland and bottomland forests	Yes	Yes
Chimney Swift	*Chaetura pelagica*	X	X	Nests in chimneys and less frequently large, open-topped hollow trees. Mostly forages over open terrain	Yes	Yes
Eastern Whip-poor-will	*Antrostomus vociferus*	X	X	Woodlands, woodland edges, and brushy prairie	Yes	Yes
Grasshopper Sparrow (Northern)	*Ammodramus savannarum*	X	X	Large tracts of open grasslands or prairies	Yes	Yes
Kentucky Warbler	*Oporornis formosus*	X	X	Upland or bottomland forests, especially in ravines	Yes	Yes
King Rail[3]	*Rallus elegans*	X	X	Cattail marshes or other areas with shallow water and many plants	No	No
Least Tern (Atlantic/Interior)[3]	*Sternula antillarum*		X	Rivers and lakes with sandbars or sand islands	No	No

Common Name	Scientific Name	Bird Conservation Region		General Habitat Description[1]	Potential Habitat	
		22	24		SBR No. 8 Mine Area	TVA Mineral Rights Area
Prothonotary Warbler	*Protonotaria citrea*	X	X	Swamps and bottomland forests	Yes	Yes
Upland Sandpiper[3]	*Bartramia longicauda*	X		Prairies, pastures, hay fields, red clover fields, fallow fields and grasslands adjacent to airfields	Yes	Yes
Wood Thrush	*Hylocichla mustelina*	X	X	Bottomland forests and wooded ravines on river bluffs	Yes	Yes
Resident Species (may occur year-round)						
Bewick's Wren (Eastern)[3]	*Thryonmanes bewickii altus*		X	Scrub, thickets, open woodlands near rivers and streams, and urban greenspaces	Yes	Yes
Field Sparrow	*Spizella pusilla*		X	Open areas with low perches	Yes	Yes
Henslow's Sparrow	*Ammodramus henslowii*	X	X	Tall grasslands and fallow fields with little to no trees or shrubs	Yes	Yes
Loggerhead Shrike (Eastern)[3]	*Lanius ludovicianus*	X		Open areas with perches	Yes	Yes
Red-headed Woodpecker	*Melanerpes erythrocephalus*	X	X	Deciduous woodlands and woodland edges	Yes	Yes

[1]Source: IDNR 2020
[2]State Threatened
[3]State Endangered

3.5.2.1.2 No. 4 Bleeder Shaft

Comprehensive environmental surveys were completed on the No. 4 Bleeder Shaft in fall 2023 (Appendix C). Ten bird species, four mammal species, one amphibian species, one reptile species, one group of insects, and one group of crustaceans were observed either directly or through evidence (e.g., tracks, scat) during the field survey. Table 3-24 summarizes the wildlife observed at the time of the survey.

Table 3-24. Summary of wildlife species observed in the footprint of the No. 4 Bleeder Shaft

Species observed (Common name)	Notes/Habitat Observed
Birds	
Downy woodpecker	Observed flying within forested area.
Northern cardinal	Observed flying within forested area.
Northern flicker	Heard calling in forested area.
Pileated woodpecker	Heard calling within forested area.
Red-tailed hawk	Heard calling.
Red-bellied woodpecker	Observed flying within forested area.
Wild turkey	Feather observed within forested area.
Turkey vulture	Observed flying above agricultural area.
Tufted titmouse	Observed flying within forested area.
White-throated sparrow	Heard in several locations across site.
Mammals	
Coyote	Observed scat in several locations across the site.
White-tailed deer	Observed tracks and scat in several locations across the site.
Gray squirrel	Observed within forested area.
Raccoon	Observed tracks in intermittent stream beds throughout site
Amphibians	
Frog spp.	Observed within forested area near a wetland, and in a freshwater pond.
Reptiles	
Garter snake	Observed within forested area near a wetland.
Insects	
Grasshopper spp.	Observed throughout site
Crustaceans	
Crayfish spp.	Burrows observed in several ephemeral streams and wetlands across site.

3.5.2.2 Environmental Consequences

3.5.2.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to wildlife. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be mitigated, per IDNR-OMM permit requirements. Any effects resulting from planned subsidence or mining would be subject to mitigation under Sugar Camp's integrated fish and wildlife habitat reclamation plan; the impacts to terrestrial wildlife and migratory birds would be insignificant after mitigation.

3.5.2.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Alternative A would result in temporary, localized impacts to wildlife due to surface disturbances and planned subsidence.

Effects to wildlife resulting from mining would be subject to mitigation under Sugar Camp's integrated fish and wildlife habitat reclamation plan; as such, the impacts to terrestrial wildlife would be insignificant after mitigation. Similarly, migratory bird flight patterns and stopovers would not be significantly impacted.

Surface Disturbances

Surface disturbances associated with Alternative A would affect motile and non-motile wildlife. Motile wildlife present at the time of construction of the associated bleeder shaft facilities could relocate to nearby areas of similar habitat for the duration of the Project. Wildlife that prefer forested areas would not be affected during construction of the No. 4 Bleeder Shaft. If tree clearing is necessary for construction of the remaining five bleeder shaft facilities, wildlife that prefer forested areas would have similar habitat adjacent and nearby. Non-motile wildlife would be impacted. Effects resulting from subsidence or mining would be subject to mitigation under Sugar Camp's integrated fish and wildlife habitat reclamation plan; the impacts to terrestrial wildlife and migratory birds would be insignificant after mitigation.

With reclamation, the disturbed areas would be seeded with the approved temporary seed mixture to minimize the potential for erosion. While the area would not immediately support species that prefer deciduous forested areas, wildlife that utilize open grassland and pasture lands would return to these areas following restoration. Wildlife that prefer forested areas would have sufficient adjacent and nearby lands of this type, and over time, these species could eventually return to areas disturbed by subsidence or construction of bleeder shaft facilities with potential field succession.

Coal Extraction-Related Effects

The temporary inundation of some subsided areas would affect wildlife by displacing some upland species such as the eastern meadowlark and providing additional habitat for wildlife using wetland habitats, including several species of amphibians, reptiles, herons, waterfowl, and shorebirds. There may also be a potential increase in habitat for cavity-dwellers due to tree mortality from inundation. These effects would occur short-term, prior to the restoration of the subsided areas to IDNR-OMM-approved post-mining land contours and hydrology.

Cumulative Effects
Cumulatively, Alternative A along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds would not have a significant impact to wildlife. As a result of surface disturbances for the construction of the bleeder shaft facilities, motile wildlife may relocate to the surrounding areas. This may result in those areas reaching or exceeding carrying capacity, i.e., the maximum number of organisms an ecosystem may sustainably support. Wildlife that would be temporarily disturbed by surface disturbances may return to the bleeder shaft facilities with completion of reclamation activities. Effects to wildlife resulting from mining operations are subject to mitigation under integrated fish and wildlife habitat reclamation plans. Permanent impacts to biological resources would be avoided or mitigated, per the IDNR-OMM permit requirements.

3.5.2.2.3 Alternative B
Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.5.2.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.5.2.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A.

Cumulative Effects
Cumulatively, Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights watersheds would not have a significant impact to wildlife. Surface and water resource disturbances associated with these other actions would be investigated for biological resources prior to construction, per state and federal regulations (i.e., Section 404). Permanent impacts to biological resources associated with the mining activities would be avoided or mitigated per IDNR-OMM permit requirements. Wildlife would be temporarily disturbed by surface disturbances, but displaced species would likely return with completion of reclamation activities.

3.5.2.2.4 Alternative C
Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.5.2.2.3).

Cumulative Effects
Cumulatively, Alternative C along with the other actions as described in Section 3.1 for the TVA Mineral Rights watersheds would not have a significant impact to wildlife. Surface and water resource disturbances associated with these other actions would be investigated for biological resources prior to construction, per state and federal regulations (i.e., Section 404). Permanent impacts to biological resources associated with the mining activities would be avoided or mitigated per IDNR-OMM permit requirements. Wildlife would be temporarily disturbed by surface disturbances, but displaced species would likely return with completion of reclamation activities.

3.5.3 Aquatic Life

Waterbodies in Illinois provide habitat for a wide range of aquatic life, including crayfish, mussels, insects, larvae, fish, frogs, turtles, bacteria and microorganisms, and aquatic vegetation (USGS 2018, IDNR 2023c). In Illinois, fish and aquatic life are protected under the Illinois Fish and Aquatic Life Code, which details rule and regulations surrounding the take, catch limits, and protection of aquatic life (525 ILCS 30/1).

3.5.3.1 Affected Environment

As described in Section 3.3.2.1, 11 named streams, multiple unnamed streams and open waters are present in the SBR No. 8 Mine Area and TVA Mineral Rights Area; an additional 12 named streams flow through the TVA Mineral Rights Area (Figure 3-4). Within the No. 4 Bleeder Shaft, two intermittent streams and one open water were identified (Figure 3-4). These waterbodies support aquatic life and directly or indirectly support the species that were documented during the field survey.

3.5.3.2 Environmental Consequences

3.5.3.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to aquatic life. Impacts to aquatic life from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated, per IDNR-OMM permit requirements. Impacts to streams or other waterbodies in planned subsidence areas would be subject to Sugar Camp's mitigation plan, and long-term impacts to aquatic life would be minimized.

3.5.3.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Any habitat disturbances resulting from the mining or planned subsidence would be subject to restoration under Sugar Camp's integrated fish and wildlife habitat reclamation plan, per IDNR permit requirements. This would result in minor temporary impacts to aquatic life due to surface disturbances and planned subsidence in the SBR No. 8 Mine Area.

Surface Disturbances

Aquatic resource surveys were completed on the No. 4 Bleeder Shaft in the fall of 2023 and surface waters were delineated (refer to Section 3.3.2.1.2). Construction and operations activities in the No. 4 Bleeder Shaft have the potential to affect surface water quality via stormwater runoff into small streams (i.e., unnamed tributary of Campbell Branch and subsequently Campbell Branch) (refer to Section 3.3.3.2.4) therefore temporary impacting aquatic life. However, with proper sediment and erosion controls, sediment loading and the introduction of pollutants to the receiving waters would be minimized. While it is not anticipated that the bleeder shaft facilities would permanently affect waterbodies due to avoidance and mitigation measures during siting, the construction and operation of these Project components would be reviewed by IDNR for potential effects on aquatic life.

Short-term temporary impacts to aquatic life may occur due to the formation of subsidence fractures in the approximately 16,129-acre subsidence area associated with the private/TVA-approved shadow area. Impacts to streams or other waterbodies in surface disturbance areas would be subject to Sugar Camp's mitigation plan and would be minimized.

Coal Extraction-Related Effects
Prior to reclamation, aquatic life could be affected by the alteration of habitat conditions within streams and changes to riparian conditions due to subsidence. These impacts could result in increased erosion and siltation, loss of in-stream habitat, and increased stream temperatures. Siltation has a detrimental effect on many aquatic animals adapted to riverine environments. Turbidity caused by suspended sediment can negatively impact spawning and feeding success of many fish species (Sutherland et al. 2002). Impacts on aquatic life are expected to be temporary, as hydrology and, thus, aquatic habitat would be restored in the subsided areas through reclamation, as discussed in Section 2.2.3.

Cumulative Effects
Alternative A along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds would not result in significant cumulative impacts to aquatic life. Permanent impacts to aquatic life associated with the Alternative A and these other actions have been or would be avoided or mitigated, per the IDNR-OMM permit requirements. Aquatic life has been or would be temporarily disturbed by surface disturbances and coal extraction-related effects, but displaced species would likely return with completion of reclamation activities. Effects to aquatic life resulting from mining operations are subject to mitigation under integrated fish and wildlife habitat reclamation plans.

3.5.3.2.3 Alternative B
Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.5.3.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.5.3.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A.

Cumulative Effects
Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds would not result in significant cumulative impacts to aquatic life due to avoidance, minimization, and mitigation, per IDNR-OMM permit requirements.

3.5.3.2.4 Alternative C
Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.3.5.2.3).

Cumulative Effects
Alternative C along with the other actions as described in Section 3.1 for the TVA Mineral Rights watersheds would not result in significant cumulative impacts to aquatic life due to avoidance, minimization, and mitigation, per IDNR-OMM permit requirements.

3.5.4 Threatened and Endangered Species

Some species of fish, wildlife, and plants are protected under the 1973 Endangered Species Act (ESA) and related state laws. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. Likewise, a threatened species is likely to become endangered within the foreseeable future throughout all or a significant part of its range. Under Section 7 of the ESA, federal agencies are required to consider the potential effects of their proposed actions on endangered and threatened species and critical habitats and consult with the USFWS if a proposed action has the potential to affect these resources.

The Illinois Endangered Species Protection Act of 1972 authorized the State of Illinois to list species as threatened and endangered through an Endangered Species Protection Board that produces and maintains the state list of protected species (520 ILCS 10).

Increased GHG emissions resulting from coal mining activities under the Action Alternatives have the potential to affect threatened and endangered species through climate change. Increases in the magnitude of weather extremes such as drought, heatwaves, and heavy precipitation, as well as long-term changes in temperature and precipitation, can drive local losses of species (IPCC 2023).

A desktop review of state and federal resources was performed, which included the USFWS IPaC tool and the IDNR Ecological Compliance Assessment Tool (EcoCAT) to identify species of conservation concern potentially present within each alternative project area. The TVA Mineral Rights Area was used for the USFWS IPaC and EcoCAT tools, as it also encompasses the SBR No. 8 Mine Area. Species contained on the USFWS IPaC, and EcoCAT protected species lists are discussed in the following sections and provided in **Appendix C**.

3.5.4.1 Affected Environment

3.5.4.1.1 Federally Listed Species

Federally listed threatened and endangered species determined during IPaC and EcoCAT database research as having the potential to utilize the TVA Mineral Rights Area and/or SBR No. 8 Mine Area are shown in Table 3-25. These species consist of three birds, three mammals, and one insect. Designated critical habitat for these species does not occur in the TVA Mineral Rights Area or the SBR No. 8 Mine Area. The little brown bat is currently under review for listing and may be formally listed as endangered or threatened in the future; therefore, it is included in this evaluation.

Table 3-25. Federally listed threatened and endangered species potentially occurring in the SBR No. 8 Mine Area and the TVA Mineral Rights Area

Common Name	Scientific Name	Status[1]	Preferred Habitat	Potential Habitat	
				SBR No. 8 Mine Area	TVA Mineral Rights Area
Birds					
Piping plover	*Charadrius melodus*	E	Piping plover populations use wide, flat, open sandy beaches. In IL, mudflats associated with lakes, ponds, or impoundments may be used for stopover habitat during migration.	No	No
Whooping crane	*Grus americana*	EXPN	Whooping cranes use coastal marshes and estuaries, inland marshes, lakes, open ponds, shallow bays, salt marsh and sand or tidal flats, upland swales, wet meadows and rivers, pastures, agricultural fields, and areas that are covered often intermittently with shallow water or have soil saturated with moisture.	Yes	Yes
Mammals					
Indiana bat	*Myotis sodalis*	E	Indiana bats spend winter hibernating in caves and mines. Summer habitat consists of the presence of suitable (i.e., open enough for bats to access) drinking and foraging areas with Potential Roost Trees (PRTs). A PRT is greater than 5-inch diameter at breast height (DBH) and has exfoliating bark, cracks, crevices or cavities.	Yes	Yes

Common Name	Scientific Name	Status[1]	Preferred Habitat	Potential Habitat	
				SBR No. 8 Mine Area	TVA Mineral Rights Area
Northern long-eared bat	*Myotis septentrionalis*	T	Northern long-eared bats spend winter hibernating in caves and mines. Summer bat habitat consists of the presence of suitable (i.e., open enough for bats to access) drinking and foraging areas with PRTs. A PRT is greater than 3-inch DBH and has exfoliating bark, cracks, crevices or cavities.	Yes	Yes
Tricolored bat	*Perimyotis subflavus*	PE	Tricolored bats spend winter hibernating in caves and mines. Summer bat habitat consists of live and dead leaf clusters of live or recently dead deciduous hardwood trees, pine needles, eastern red cedar, artificial roosts like barns, the underside of porch roofs, bridges, concrete bunkers, and rarely within caves.	Yes	Yes
			Insects		
Monarch butterfly	*Danaus plexippus*	C	Monarch butterflies use open areas with milkweed plants as breeding habitat. Adult monarchs feed on nectar from a variety of flower species.	Yes	Yes

[1]C = Candidate; E = Endangered; EXPN = Experimental population, Non-essential; PE = Proposed Endangered; T = Threatened

The piping plover is a small shorebird. Three geographically distinct summer breeding locations are recognized in the U.S. These consist of the Great Plains states, the shores of the Great Lakes, and the shores of the Atlantic Coast. Birds from all three populations winter on the southern Atlantic and Gulf coasts in the U.S. (USFWS 2020). Piping plovers use wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include small creeks or wetlands. In Illinois, mudflats associated with lakes, ponds, impoundments, rivers and larger streams, and wetlands may provide potentially suitable stopover habitat for this species during migration (IDNR 2002). A loss of habitat along beaches and other areas has led to the listing as endangered. While traditional coastal habitat associated with the piping plover is not present in the Project vicinity, the piping plover may stop in the region during migration and is therefore identified within this section. However, no stopover habitat is present in or adjacent to the Project Area.

The whooping crane is a long-lived large bird endemic to North America. Four geographically distinct populations exist in the wild. The Eastern Migratory Population, an experimental population that migrates between Wisconsin and Florida (USFWS 2012), may stop in the region during migration and is therefore identified within this section. During migration, it may forage in pasture and agricultural fields. Stopover habitat for the Eastern Migratory Population is present in or near the TVA Mineral Rights Area and SBR No. 8 Mine Area.

Indiana bats hibernate in caves and abandoned mines during winter. During summer, the Indiana bat roosts within a wide variety of forested habitats ranging from old-growth bottomland, floodplain, to upland forests comprised of hardwood trees with a diameter at breast height (DBH) of greater than or equal to five inches and loose or exfoliating bark. Large trees greater than 20 inches DBH are preferred. Preferred roost sites include forest openings, at the forest edge, or where the overstory canopy allows some sunlight exposure to the roost which is usually within 0.6 miles of water (USDA 2003). The USFWS defines suitable roosting habitat for the Indiana bat as any tree greater than or equal to five inches DBH with cracks, crevices, and/or exfoliating bark that is within 1,000 ft of forested/wooded habitat. This species uses both dead and live trees for roosting and rearing young and requires one or more primary trees plus multiple alternate trees to meet their roosting needs during an annual cycle. While live trees may be used, snags in stages of early- to mid-decay are preferred (USDA 2003).

Female Indiana bats roost together in maternal colonies during the summer to rear their young. These colonies are found in forested areas. Suitable summer habitat (such as upland and bottomland forests and woods near streams) for the Indiana bat occurs within the TVA Mineral Rights Area and SBR No. 8 Mine Area. Indiana bats have suffered population losses in recent years because of tree loss, pesticides, human disturbance, the collapse or flooding of cave hibernation sites, and a disease known as “white nose syndrome” that compromises bat immune systems (USFWS 2019b).

Northern long-eared bat (NLEB) winter roosting and maternity habitat typically consists of large caves and/or mines with large passages and entrances, constant temperatures, and high humidity with no air currents (USFWS 2015). Summer roosting and maternity habitat consists primarily of live or dead tree species and/or snags greater than or equal to three inches DBH that have exfoliating bark, cracks, crevices, and/or hollows; they also use bat-houses, buildings, and other anthropogenic structures (Amelon and Burhans 2006). Typically, these trees would be situated within 1,000 ft of forested or woodland areas that are adjacent to field edges, riparian forests, or other wooded corridors (USDA 2003). Forested and woodland areas are particularly important for this species, not only for roosting habitat, but also for foraging, as NLEB prefers to forage in upland forests rather than riparian areas (NatureServe 2023). These bats have also been observed utilizing forest edges and clearings for foraging habitat (NatureServe 2023).

In spring, summer, and fall, tricolored bats primarily roost in the leaves of live or dead trees within forested areas. Tricolored bats are also known to roost in human-made structures. Female tricolored bats form maternity roosting colonies in the summer and exhibit high site fidelity, returning to the same summer roost for multiple years (USFWS 2021b).

Similar to tricolored bats, little brown bats use a wide variety of habitats for summer roosting, including human-made structures, trees, rocks, and wood piles. Maternity colonies are most common in warm sites of human structures and infrequently in hollow trees. Little

brown bats are known to forage over bodies of water or in woodlands near water (USFWS n.d.).

Monarch butterflies are large, conspicuous insects that are strongly migratory. Habitat for the monarch butterfly includes patches of milkweed and nectar-producing flowering herbaceous plants, which may be used and consumed during all life stages (NatureServe 2023). In Illinois, monarch butterflies are found statewide and may use open weedy areas, roadsides, fields, pastures, and marshes that contain milkweed (IDNR 2020). Suitable habitat for the monarch butterfly may be present throughout TVA Mineral Rights Area and SBR No. 8 Mine Area.

3.5.4.1.1.1 No. 4 Bleeder Shaft

Prior to comprehensive environmental surveys on the No. 4 Bleeder Shaft area in fall 2023, IPaC was used to identify federal species of conservation concern potentially present. According to the IPaC, the range for the Indiana bat, northern long-eared bat, tricolored bat, whooping crane, monarch butterfly, and three Birds of Conservation Concern—chimney swift, field sparrow, and red-headed woodpecker—may occur within the No. 4 Bleeder Shaft area (Appendix C). The bald eagle was not identified as potentially occurring within the No. 4 Bleeder Shaft area.

During surveys, forested areas were found to contain suitable summer roosting habitat for the Indiana Bat, northern long-eared bat, tricolored bat, and little brown bat. Refer to Section 3.5.4.1.1 for habitat information on these species.

3.5.4.1.2 State-Listed Species

EcoCAT indicated that two state-listed species of conservation concern may occur in the area (Table 3-26).

Table 3-26. State-listed species of conservation concern potentially occurring within the SBR No. 8 Mine Area and TVA Mineral Rights Area

Common Name	Scientific Name	Status[1]	Preferred Habitat	Potential Habitat	
				SBR No. 8 Mine Area	TVA Mineral Rights Area
Turtles					
Ornate box turtle	*Terrapene ornata*	T	Prairies and open fields in former prairies.	Yes	Yes
Birds					
Little blue heron	*Egretta caerulea*	E	Freshwater swamps, lagoons, coastal thickets and islands.	No	No

[1]E = Endangered; T = Threatened

The ornate box turtle can be found from South Dakota to Arizona east to the Mississippi Valley. Habitat includes prairies and open fields in former prairies (IDNR 2020). Females may nest at woodland edges. The diet of ornate box turtles may consist of invertebrates, tadpoles, carrion, bird eggs, and plant materials. In Franklin County, the species was recorded at one site in the Wayne Fitzgerrell State Recreation Area, approximately five

miles northwest of the SBR No. 8 Mine Area and TVA Mineral Rights Area. One recorded observation in 2017 occurred in Jefferson County. The types of prairie and edge it inhabits may be found in abandoned hay fields or pasture within the SBR No. 8 Mine Area and TVA Mineral Rights Area.

The little blue heron is primarily found along the eastern coast of the U.S., though it sometimes uses major interior rivers. In Illinois, the little blue heron inhabits shallow wetlands along the Mississippi and Illinois rivers within the southern half of the state (IDNR 2020). In relationship to the SBR No. 8 Mine Area and TVA Mineral Rights Area, the closest known observation of a little blue heron was in 1998 at Rend Lake in Franklin County, approximately 3 miles west of the western portions of the SBR No. 8 Mine Area and TVA Mineral Rights Area. The types of wetlands this species inhabits are absent from the SBR No. 8 Mine Area and most of the TVA Mineral Rights Area.

3.5.4.1.2.1 No. 4 Bleeder Shaft

Prior to comprehensive environmental surveys on the No. 4 Bleeder Shaft site in fall 2023, EcoCAT was used to identify species of conservation concern potentially present within the footprint of the No. 4 Bleeder Shaft. According to the EcoCAT, no records of state-listed species were in the vicinity of the No. 4 Bleeder Shaft (Appendix C). No state-listed species were observed during field surveys.

3.5.4.2 Environmental Consequences

3.5.4.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to federally- or state-listed species. Habitat disturbances resulting from coal extraction or planned subsidence would be mitigated under Sugar Camp's integrated fish and wildlife habitat reclamation plan.

3.5.4.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area.

3.5.4.2.2.1 Federally Listed Species

As described below, overall, Alternative A is unlikely to affect federally listed species. Any habitat disturbances resulting from the mining or planned subsidence would be subject to restoration under Sugar Camp's integrated fish and wildlife habitat reclamation plan, per IDNR permit requirements.

Surface Disturbances

The footprint of the No. 4 Bleeder Shaft contains suitable summer roosting habitat for the Indiana bat, northern long-eared bat, tricolored bat, and little brown bat. However, the bleeder shaft would be sited to avoid tree clearing and therefore no impacts to protected bat species are expected to occur.

Prior to the construction of the remaining bleeder shaft facilities, TVA would conduct additional reviews to determine the effects of the construction and operation of these facilities on federally listed species. As a standard practice for surface disturbances, Sugar Camp would coordinate with USFWS to conduct additional presence/absence surveys to determine the potential effects of the construction and operations of the bleeder shaft facilities on federally listed bats or assume bat presence. If bat habitat is identified during

surveys or bat presence is assumed, Sugar Camp would limit tree clearing to between October 15 and March 31 to minimize impacts to federally listed bats.

Coal Extraction-Related Effects
Due to the minimal disturbance from subsidence, the temporary nature of subsidence effects, and the limited existing habitat, no significant impacts to federally listed species are expected. Any effects resulting from mining and associated subsidence would be temporary and mitigated under Sugar Camp's integrated fish and wildlife habitat reclamation plan, per IDNR-OMM permit requirements. Coordination by Sugar Camp with IDNR on the effects of planned subsidence and associated reclamation activities is not anticipated to occur within the next 12 months.

Cumulative Effects
Alternative A would not contribute to cumulative adverse impacts to federally listed species. Mine owners and operators associated with Alternative A and the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds have or would coordinate with IDNR and/or USFWS to determine the effects of proposed mine operations and components on federally listed species. Avoidance and minimization measures would be taken, accordingly and in compliance with the Endangered Species Act. Effects to wildlife, including federally listed wildlife species, resulting from mining operations are subject to mitigation under integrated fish and wildlife habitat reclamation plans.

Temporary impacts to federally listed threatened and endangered species may occur. Coordination with USFWS on the effects of considered mine operations and the proposed Illinois 14/I-57 interchange modification have occurred or would occur. Coordination with USFWS on the effects of considered mine operations and the I-57 widening project would have occurred or would occur. Effects to wildlife, including listed species, resulting from mining operations are subject to mitigation under integrated fish and wildlife habitat reclamation plans, per IDNR permit requirements. Effects to wildlife, including listed species, resulting from the proposed interchange modification and widening projects are subject to review and approval by applicable agencies. No significant cumulative effects to biological resources would occur as a result of the Proposed Action and other actions due to avoidance, minimization, and mitigation, per IDNR-OMM permit requirements, other agency requirements, and compliance with the Endangered Species Act, as applicable.

3.5.4.2.2.2 State-Listed Species
Under Alternative A, TVA would approve the proposed mining plan. Temporary impacts to state-listed species of conservation concern may occur due to surface disturbances. These impacts and any temporary impacts associated with subsidence would be mitigated under Sugar Camp's integrated fish and wildlife habitat reclamation plan, per IDNR permit requirements.

Surface Disturbances
According to the Illinois Natural Heritage Database, no state-listed threatened or endangered species are known to occur in the footprint of the No. 4 Bleeder Shaft, therefore no impacts to state-listed species are expected to occur. Prior to the construction of the remaining bleeder shaft facilities, TVA would conduct additional reviews to determine the effects of the construction and operation of these facilities on state listed species. Per IDNR-OMM permitting requirements, Sugar Camp would coordinate with IDNR to determine the potential effects of the construction and operations of the bleeder shaft facilities on state listed species.

Coal Extraction-Related Effects
Due to the minimal disturbance from subsidence, the temporary nature of subsidence effects, and the limited existing habitat, no significant impacts to state-listed species are expected. Any effects resulting from mining and associated subsidence would be temporary and mitigated under Sugar Camp's integrated fish and wildlife habitat reclamation plan, per IDNR-OMM permit requirements. Coordination by Sugar Camp with IDNR on the effects of planned subsidence and associated reclamation activities is not anticipated to occur within the next 12 months.

Cumulative Effects
Temporary impacts to state-listed species of conservation concern from Alternative A and the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds may have occurred or could occur. However, effects to wildlife, including listed species, resulting from mining operations are subject to mitigation under integrated fish and wildlife habitat reclamation plans, per IDNR permit requirements.

Temporary impacts to state-listed threatened and endangered species may occur. Coordination with IDNR on the effects of considered mine operations and the proposed Illinois 14/I-57 interchange modification and I-57 widening project would have occurred or would occur. Effects to wildlife, including listed species, resulting from mining operations are subject to mitigation under integrated fish and wildlife habitat reclamation plans, per IDNR permit requirements. Effects to wildlife, including listed species, resulting from the proposed interchange modification and widening projects are subject to review and approval by applicable agencies. No significant cumulative effects to state-listed species would occur as a result of the Proposed Action and other actions due to avoidance, minimization, and mitigation, per IDNR-OMM permit requirements, other agency requirements, and compliance with the Illinois Endangered Species Protection Act, as applicable.

3.5.4.2.3 Alternative B
Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.5.1.2.2 for impacts from approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.5.4.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A.

Cumulative Effects
Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and TVA Mineral Rights watersheds would not contribute to cumulative adverse impacts to threatened and endangered species due to avoidance, minimization, and mitigation, per IDNR-OMM permit requirements, other agency requirements, and compliance with the Endangered Species Act, as applicable.

3.5.4.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.5.4.2.3).

Cumulative Effects

Alternative C along with the other actions as described in Section 3.1 for the TVA Mineral Rights watersheds would not contribute to cumulative adverse impacts to threatened and endangered species due to avoidance, minimization, and mitigation, per IDNR-OMM permit requirements, other agency requirements, and compliance with the Endangered Species Act, as applicable.

3.6 Natural Areas, Parks, and Recreation

This section addresses natural areas that are within 10 miles of the SBR No. 8 Mine Area and TVA Mineral Rights Area. Under the Illinois Natural Areas Preservation Act, a natural area is defined as "an area of land in public or private ownership which, in the opinion of the [Illinois Nature Preserves] Commission, either retains or has recovered to a substantial degree its original natural or primeval character, though it need not be completely undisturbed, or has floral, faunal, ecological, geological, or archaeological features of scientific, educational, scenic or esthetic interest," (525 ILCS 30/1). Water resources and protected lands (including Illinois Nature Preserves, Illinois Natural Areas Inventory (INAI) sites, public and privately-owned natural lands, and municipal parks) were identified using data obtained from IDNR.

3.6.1 Affected Environment

One State Fish and Wildlife Area (SFWA), Ten Mile Creek, lies within the TVA Mineral Rights Area. No natural areas lie within the boundaries of the SBR No. 8 Mine Area. According to the EcoCAT, no records of INAI lands, dedicated Illinois Nature Preserves, or registered Land and Water Reserves are in the vicinity of the No. 4 Bleeder Shaft (Appendix C). Multiple natural areas are present within a 10-mile radius of both the SBR No. 8 Mine Area and the TVA Mineral Rights Area (Table 3-27; Figure 3-11).

Table 3-27. Natural Areas within 10 miles of the SBR No. 8 Mine Area and TVA Mineral Rights Area

Site Name	County	Acreage
Karcher's Post Oak Wood Nature Preserve	Hamilton	40
Benton Community Park	Franklin	134
Rend Lake	Franklin; Jefferson	18,900 (water); 20,000 (land)
Rend Lake State Fish & Wildlife Area	Jefferson	12,512
Wayne Fitzgerrell State Recreation Area	Franklin	3,380
Mt. Vernon Game Propagation Center	Jefferson	716
Ten Mile Creek State Fish & Wildlife Area	Hamilton; Jefferson	5,820

Karcher's Post Oak Wood Nature Preserve

This nature preserve is located approximately 5 miles northeast of the SBR No. 8 Mine Area and approximately 3.5 miles east of the TVA Mineral Rights Area, in Hamilton County. It is a 40-acre old-growth post oak forest (Illinois Audubon Society 2017). It is also

designated as an INAI site, which are areas that have been evaluated to have statewide conservation significance. The Karcher's Post Oak Wood INAI site was categorized as consisting of high-quality natural communities (IDNR 2023b).

Benton Community Park

The Benton Community Park is a 134-acre municipal park located approximately 4.6 miles southwest of the SBR No. 8 Mine Area and TVA Mineral Rights Area, in the City of Benton. The park provides recreational opportunities including walking paths, trails, tennis and basketball courts, ball fields, playgrounds, and picnic areas (City of Benton 2024).

Rend Lake

Rend Lake, constructed and operated by the U.S. Army Corps of Engineers, is a major tourist destination in southern Illinois, providing activities such as boating and water sports, camping, hiking, and horseback riding. The lake and associated lands encompass 18,900 acres of water and 20,000 acres of land (Recreation.gov 2024), and are located in Jefferson and Franklin Counties, approximately 1-mile due west of the SBR No. 8 Mine Area. The Rend Lake Conservancy District (organized under the Illinois River Conservancy Act) manages "utility and government functions around the lake, including: water conservation; water treatment and distribution; wastewater collection and treatment; recreation; land management; tourism; and economic development" (Rend Lake Conservancy District N.d.). The Conservancy District boundaries extend beyond the Lake and overlap the western portion of the SBR No. 8 Mine Area.

Rend Lake SFWA

The Rend Lake SFWA, managed by IDNR, consists of 12,512 acres of bottomland hardwoods, upland agricultural fields, and impounded water. The SFWA is located on the northern side of Rend Lake approximately 4.5 miles northwest of the SBR No. 8 Mine Area and 3.8 miles northwest of the TVA Mineral Rights Area. The SFWA provides habitat for multiple wildlife species and is managed for waterfowl year-round (IDNR 2023d).

Wayne Fitzgerrell State Recreation Area

The Wayne Fitzgerrell State Recreation Area is located on the eastern side of Rend Lake, approximately 1.5 miles west of the SBR No. 8 Mine Area and one mile west of the TVA Mineral Rights Area. This 3,300-acre area at Rend Lake is owned by USACE and managed by IDNR. The site is utilized for hunting, fishing, camping, picnicking, horseback riding, hiking, and water sports (IDNR 2023f).

Mt. Vernon Game Propagation Center

Located 7 miles north of the SBR No. 8 Mine Area and 5.6 miles east of the TVA Mineral Rights Area, the Mount Vernon Game Propagation Center consists of approximately 716 acres of forests, prairie, ponds, creeks, wetlands, and agricultural fields. According to *Hunt Illinois*, a website managed by IDNR, habitat at the Center is actively managed for hunting (*Hunt Illinois* N.d.).

Ten Mile Creek SFWA

This 5,820-acre area managed by IDNR is divided into four management units. Several of these units, which are utilized for hunting and wildlife management, are reclaimed mining sites. The SFWA provides recreational activities including hiking, fishing, target shooting, hunting, trapping, and wildlife viewing (IDNR 2023e). Portions of the SFWA are within one mile of the SBR No. 8 Mine Area. Other portions are within the boundaries of the TVA Mineral Rights Area.

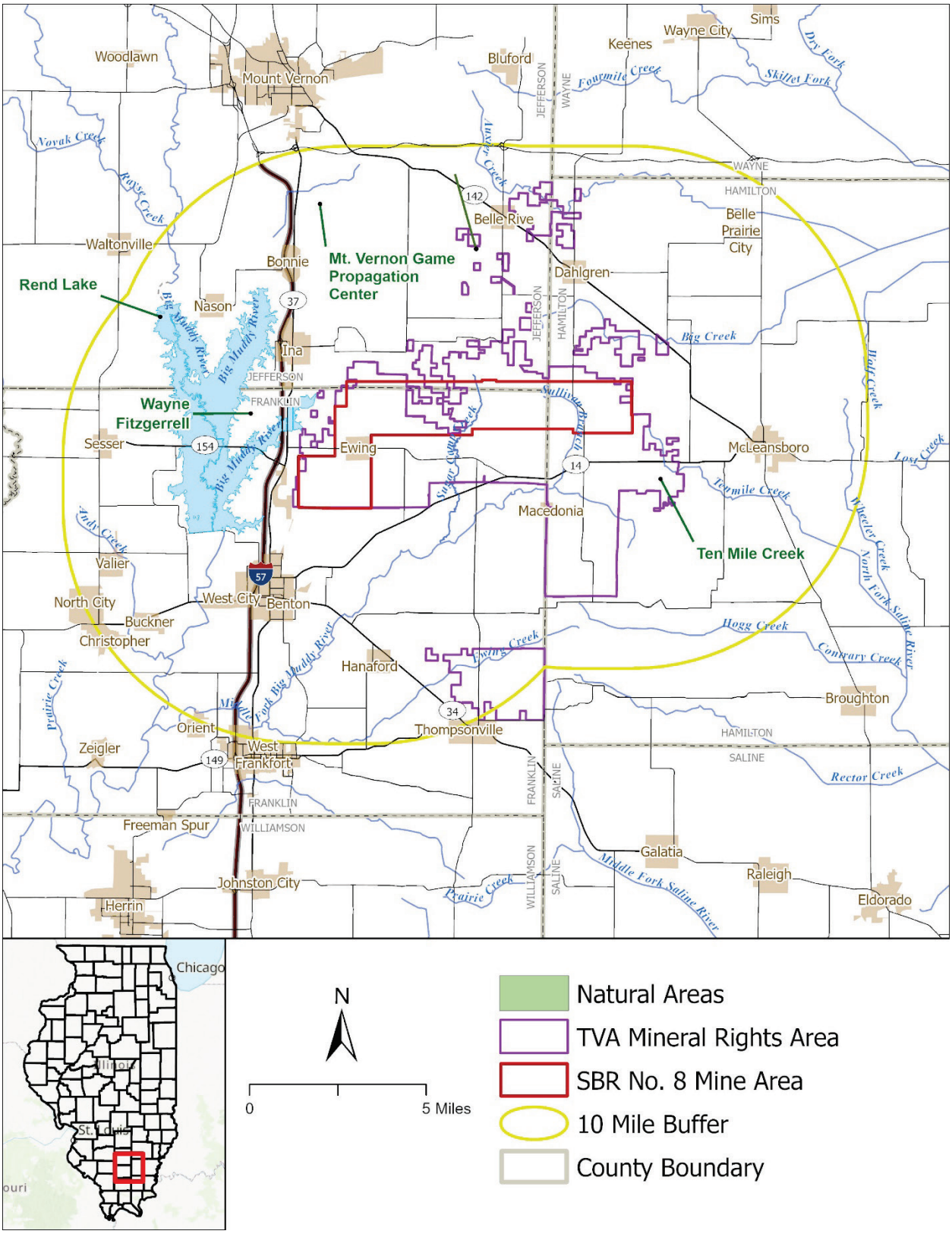


Figure 3-11. Natural areas within 10 Miles of the SBR No. 8 Mine Area and the TVA Mineral Rights Area

3.6.2 Environmental Consequences

3.6.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to natural areas.

Sugar Camp's actions related to ongoing mining of previously approved TVA-owned coal and privately owned coal would not result in direct adverse impacts to natural areas in the vicinity. Direct or indirect impacts to natural areas within the vicinity of the ongoing mining would continue to occur, but these impacts would continue to be minimized or mitigated, per IDNR-OMM permit requirements. Planned subsidence could cause indirect effects to natural areas in the vicinity of mining activities.

3.6.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area.

Surface Disturbances

No natural areas, parks, or recreation areas located within the bleeder shaft sites, therefore no impacts as a result of surface disturbance are expected to occur.

Coal Extraction Efforts

The natural areas in the vicinity of the SBR No. 8 Mine Area are either downstream from the SBR No. 8 Mine Area or within the same watersheds; therefore, temporary hydrologic impacts may occur due to planned subsidence. No direct impacts due to coal extraction are anticipated to occur.

Cumulative Effects

Alternative A along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds would not result in significant cumulative impacts to natural areas as no direct impacts associated with Sugar Camp's ongoing and proposed actions are anticipated. Minor, temporary indirect impacts may have occurred or could occur from subsidence associated with the Alternative A and these other actions and temporary effects to hydrologic patterns. These temporary impacts have been or would be subject to post-subsidence reclamation activities.

Moderate, temporary indirect impacts to natural areas in the vicinity could occur from planned subsidence associated with the overall coal extraction area and proposed actions associated with surface effects areas combined with the other mining operations. Temporary effects to hydrologic patterns have occurred and would occur; however, no long-term adverse impacts to natural areas are anticipated due to no direct impacts being anticipated and indirect impacts being subject to post-subsidence reclamation activities.

3.6.2.3 Alternative B

Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.6.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects

The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA

assumes that the impacts would be as described in the No Action Alternative (Section 3.6.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques would be the same as described for Alternative A. Portions of Ten Mile Creek SFWA are within the remaining TVA Mineral Rights Area. Hydrologic impacts due to future mining actions could result in direct or indirect adverse temporary impacts to natural areas in the vicinity of the remaining TVA Mineral Rights Area. These impacts would be minimized or mitigated, per IDNR-OMM permit requirements.

Cumulative Effects
Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and TVA Mineral Rights watersheds would not result in significant cumulative direct or indirect impacts to natural areas. No direct impacts associated with Sugar Camp's ongoing and proposed actions are anticipated. Future mining activities may result in direct impacts to Ten Mile Creek SFWA, depending on siting of the mining operations. All mining operations have been or would be subject to IDNR-OMM permit approval and regulations. Moderate, cumulative, temporary indirect impacts to natural areas in the vicinity could occur as a result of planned subsidence associated with the overall coal extraction area and proposed actions associated with surface effects areas combined with the other mining operations. Temporary effects to hydrologic patterns have occurred and would occur; however, no long-term adverse impacts to natural areas are anticipated due to no direct impacts being anticipated and indirect impacts being subject to post-subsidence reclamation activities.

3.6.2.4 Alternative C
Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.6.2.3).

Cumulative Effects
Alternative C along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and TVA Mineral Rights watersheds would not result in significant cumulative direct or indirect impacts to natural areas. Refer to Section 3.6.2.3 for cumulative impacts as a result of divestment of the TVA Mineral Rights Area.

3.7 Land Use

3.7.1 Affected Environment
The 2021 NLCD (USGS 2023) was used to identify existing land uses and ISGS's Illinois Oil and Gas Resources Map (ISGS 2024) was used to identify existing and historical oil and gas wells within the SBR No. 8 Mine Area and TVA Mineral Rights Area (Table 3-28; Figure 3-12). Both are dominated by agricultural land uses in hay/pasture and cultivated crops. The current land uses of the bleeder shaft facilities within the SBR No. 8 Mine Area consist of primarily cultivated crops and pasture/hay, and smaller areas of deciduous forest and development. Areas of deciduous forest are concentrated around streams, including Middle Fork Big Muddy River, Sugar Camp Creek and their tributaries. Additional land uses in the SBR No. 8 Mine Area and TVA Mineral Rights Area include small areas of developed land in residential and industrial/commercial land uses. There are 51 existing oil wells and 176 abandoned, plugged, and miscellaneous wells within the SBR No. 8 Mine Area and an additional 101 existing oil wells and 337 abandoned, plugged, and miscellaneous wells within the remaining TVA Mineral Rights Area (ISGS 2024).

The City of Benton and Rend Lake are located a few miles west of the SBR No. 8 Mine Area and TVA Mineral Rights Area. Both the SBR No. 8 Mine Area and TVA Mineral Rights Area are primarily within unincorporated portions of Franklin, Jefferson, and Hamilton counties that are not currently zoned. Approximately 646 acres of the SBR No. 8 Mine Area and of the TVA Mineral Rights Area are located within the Village of Ewing. Approximately 39 acres of the TVA Mineral Rights Area is located within the Village of Macedonia and 36 acres is located within the Village of Belle Rive.

Table 3-28. Land cover within the SBR No. 8 Mine Area and the TVA Mineral Rights Area

	SBR No. 8 Mine Area		TVA Mineral Rights Area	
	Acres	**%**	**Acres**	**%**
Open water	56	0.3	315	0.5
Developed, open space	728	3.3	2,055	3.0
Developed, low intensity	399	1.8	1,117	1.6
Developed, medium intensity	71	0.3	173	0.3
Developed, high intensity	14	0.1	29	<0.1
Barren land	3	<0.1	18	<0.1
Deciduous forest	4,454	19.9	15,810	23.2
Evergreen forest	91	0.4	12	<0.1
Mixed Forest	0	0	313	0.5
Shrub/scrub	12	<0.1	88	0.1
Herbaceous	53	0.2	266	0.4
Hay/pasture	3,124	13.9	11,218	16.5
Cultivated crops	13,375	59.7	36,401	53.4
Woody wetlands	33	0.2	319	0.5
Herbaceous wetlands	1	<0.1	16	<0.1

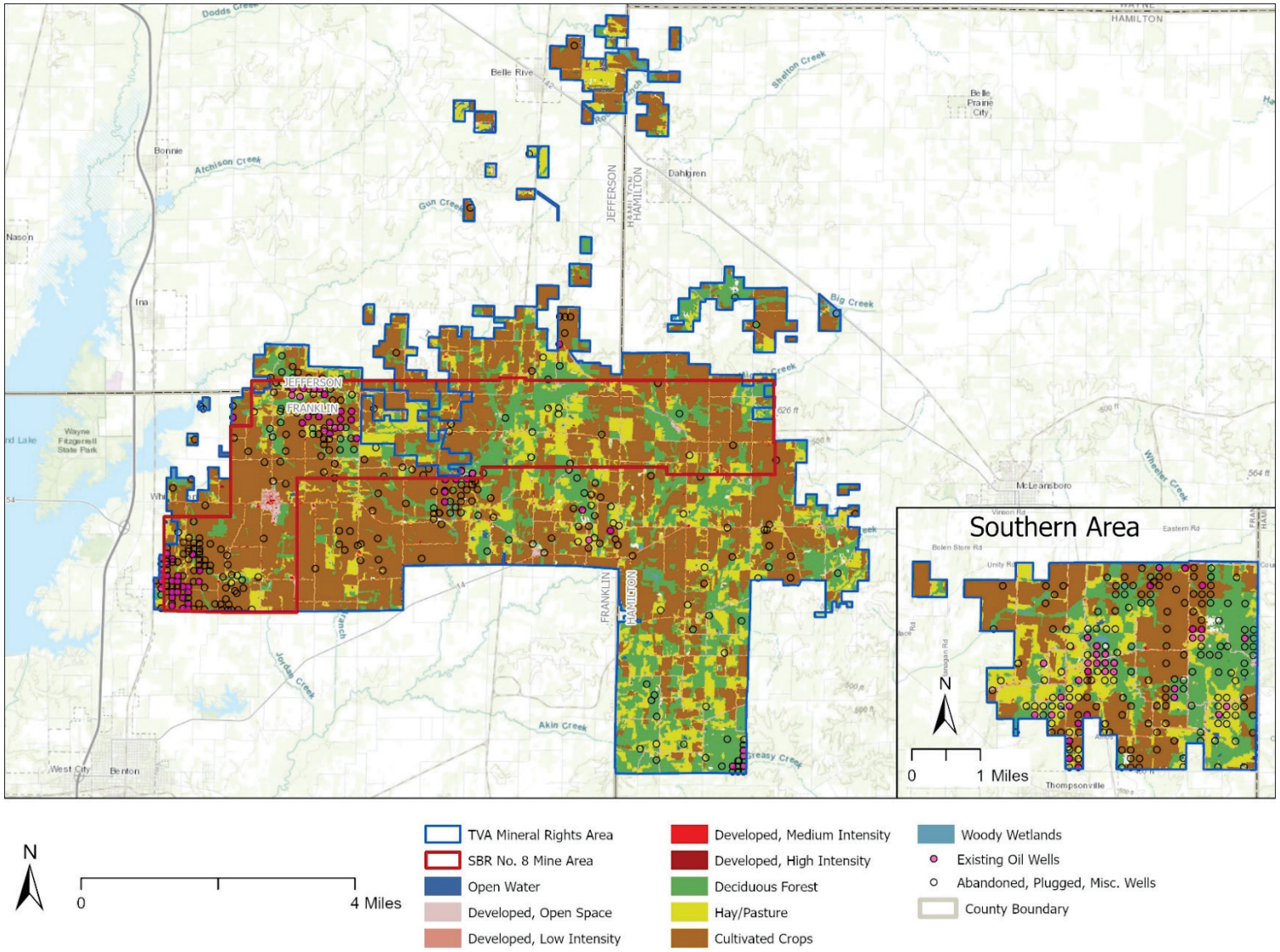


Figure 3-12. Land Use within the SBR No. 8 Mine Area and TVA Mineral Rights Area

3.7.2 Environmental Consequences

3.7.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to land use. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated, per IDNR-OMM permit requirements.

Temporary, minor impacts on land use could occur as a result of subsidence, but Sugar Camp is responsible for mitigation measures to restore the permit areas to IDNR-OMM-approved post-mining land uses.

3.7.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. This may result in minor temporary and permanent impacts to land use due to surface disturbances and planned subsidence in the SBR No. 8 Mine Area.

Surface Disturbances

Cultivated cropland and hay/pasture would be temporarily converted to heavy industrial uses by the construction and operation of the six bleeder shaft facilities.

As described in Section 2.2.3, upon conclusion of mining of each longwall panel, as the use-life of Project components come to an end, and/or at the completion of the active mining operations, reclamation operations would commence. Reclamation activities would be completed by Sugar Camp in accordance with the approved reclamation plan and the permit conditions developed in accordance with 62 IAC 1700-1850, Permanent Program Rules and Regulations. Sugar Camp estimates that the full reclamation of Sugar Camp Mine No. 1 would begin in 2040.

All rough grading would be completed within 180 days following the removal of facilities. Final grading and reclamation of topsoil and temporary cover crops completed within 12 months after closure of the active mining operation. The approved species of cover crops would be seeded to provide vegetative cover in accordance with IDNR-OMM-approved post-mining land use. Erosion and sediment control would be used to further stabilize the reclaimed SBR No. 8 Mine Area.

Overall, the Alternative A would have minor, temporary effects on land use as cultivated crops are prevalent in Franklin, Jefferson, and Hamilton counties and the state. No permanent impacts are anticipated as IDNR-OMM requires reclamation to pre-mining conditions.

Coal Extraction-Related Effects

Temporary, minor impacts to land use would occur as a result of subsidence. Examples of potential damage caused by subsidence include cracks in building foundations, road surfaces, or ponding of water from subsided streams, which would have localized, temporary, and minor impact impacts to land use within the SBR No. 8 Mine Area. Subsidence does not normally directly affect the inherent productivity of the surface for typical land uses such as agriculture or forestry. Longwall mining results in predictable and uniform subsidence patterns. IDNR-OMM requires coal companies to reestablish drainage

patterns and stream profiles affected by mining activities. Potential impacts to water quality at historic well sites would be monitored and mitigated, per IDNR-OMM permit requirements. Refer to Section 3.3.4 for details on water quality sampling and permitted activities. Sugar Camp is required to compensate landowners for any temporary crop loss from impaired drainage and any permanent crop loss due to the alteration or installation of waterways. Measures that Sugar Camp would implement to mitigate the effects of subsidence are further described in Section 2.2.2. These measures are designed to ensure the land is returned to a condition capable of maintaining the value and reasonably foreseeable uses that the land could support prior to subsidence. Consequently, no long-term impacts to land use are expected because of the underground extraction of coal.

Cumulative Effects
Alternative A along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds would result in permanent, cumulative changes to land use resulting from impacts to agricultural uses due to existing and proposed activities associated with the Action Alternative and these other actions. Alternative A and these other actions would have a minor effect, as cultivated crops are prevalent in Franklin, Jefferson, and Hamilton counties and throughout the state. Due to the rural nature of the area, mine operations would likely continue to convert agricultural and forested lands to reclaimed, IDNR-approved post-mining land uses. Reclamation activities associated with mining activities have occurred or would occur per approved reclamation plans and any mine permit conditions developed in accordance with Chapter I IAC 1817.62. Reclamation may involve reestablishment of drainage patterns or compensation to farmers.

Temporary, moderate impacts to land use would continue to occur as a result of subsidence within approximately 190,932 acres associated with the overall coal extraction areas of the other mining operations and proposed disturbances. IDNR-OMM requires coal companies to reestablish drainage patterns and stream profiles affected by mining activities. IDNR-OMM requires mitigation measures to ensure the land is returned to a condition capable of maintaining the value and reasonably foreseeable uses that the land was capable of supporting prior to subsidence.

3.7.2.3 Alternative B
Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.7.2.1 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.7.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A.

Cumulative Effects
Cumulatively, Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area and the TVA Mineral Rights watersheds would continue to result in permanent impacts to land use within the watershed area of analysis as a result of the other mining operations. Due to the rural nature of the area, mine operations would likely continue to convert agricultural and forested lands to reclaimed, IDNR-approved post-

mining land uses. Reclamation activities associated with mining activities have occurred or would occur per approved reclamation plans and any mine permit conditions developed in accordance with Chapter I IAC 1817.62.

3.7.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.7.2.3).

Cumulative Effects

Cumulatively, Alternative C along with the other actions as described in Section 3.1 for the TVA Mineral Rights watersheds would continue to result in permanent impacts to land use within the watershed area of analysis as a result of the other mining operations. Due to the rural nature of the area, mine operations would likely continue to convert agricultural and forested lands to reclaimed, IDNR-approved post-mining land uses. Reclamation activities associated with mining activities have occurred or would occur per approved reclamation plans and any mine permit conditions developed in accordance with Chapter I IAC 1817.62.

3.8 Transportation

3.8.1 Affected Environment

3.8.1.1 Roads and Railroads

There are approximately 50 miles of local roads and 5 miles of railroad in the SBR No. 8 Mine Area. An additional 99 miles of roads and 19 miles of railroad are in the remainder of the TVA Mineral Rights Area. Existing traffic volumes on some of the roads in the SBR No. 8 Mine Area were determined using Annual Average Daily Traffic (AADT) counts gathered between the years of 2014 and 2022 and measured at existing Illinois Department of Transportation (IDOT) stations (IDOT 2023c). Table 3-29 provides information on the most trafficked roads and railroads located in the SBR No. 8 Mine Area and TVA Mineral Rights Area. This table includes roads with AADT of 300 or higher to capture the most frequented roads in the area. Impacts to these frequented roads would have more noticeable repercussions to travelers in the SBR No. 8 Mine Area and TVA Mineral Rights Area.

The two rail lines that intersect the SBR No. 8 Mine Area and TVA Mineral Rights Area are operated by Canadian National Railway Company and Evansville Western Railway. 3.4 miles of Canadian National Railway intersects the SBR No. 8 Mine Area with an additional 7.3 miles intersecting the TVA Mineral Rights Area. 1.3 miles of Evansville Western Railway intersects the SBR No. 8 Mine Area with an additional 6.4 miles intersecting the TVA Mineral Rights Area.

The closest general aviation airport is the Benton Municipal Airport in Benton, located approximately 4.6 miles southwest of the SBR No. 8 Mine Area and 4.5 miles southwest of the TVA Mineral Rights Area. The closest major airport is the Lambert-St. Louis International Airport in St. Louis, Missouri located approximately 118 miles northwest of the SBR No. 8 Mine Area and 117 miles northwest of the TVA Mineral Rights Area (Homeland Infrastructure Foundation-Level Data 2023).

Table 3-29. Roads with 2014-2022 AADT counts of 300 or higher intersecting the SBR No. 8 Mine Area and TVA Mineral Rights Area

County	Road / Railroad Name	Miles		AADT
		SBR No. 8 Mine Area	TVA Mineral Rights Area	
Franklin	Ewing Road[1]	1.54	7.65	1080
Franklin	Log Cabin Road	2.01	0.58	450
Franklin	Main Street	0.5	--	325
Franklin	North Ewing Road	2.11	--	325
Franklin	North Thompsonville Road	--	3.99	1375
Franklin	State Highway 14	--	2.54	1955
Hamilton	Campbell's Corner Road	--	6.11	300
Hamilton	North Dahlgren Road	--	0.97	463
Hamilton	South Dahlgren Road	2.38	1.86	650
Hamilton	State Route 14	--	5.57	1800
Hamilton	State Route 142	--	0.69	2283
Jefferson	East IL Highway 142	--	0.30	2850
Jefferson	East Ina Road	--	0.39	300
Jefferson	North Log Cabin Lane	0.26	0.30	650

Source: IDOT 2021, IDOT 2023c
[1]Road that could be impacted by bleeder shaft facility construction.

Coal from Sugar Camp Mine No. 1 is loaded onto rail cars at the existing rail loadout at the coal processing plant and transported from the site by the Canadian National Railway.

3.8.2 Environmental Consequences

3.8.2.1 No Action Alternative

Under The No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to transportation. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated, per IDNR permit requirements. Subsidence has the potential to impact roads and bridges; damage to roads and bridges would be repaired as governed by the permit.

3.8.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. As required by the IDNR permitting process, measures to minimize inconvenience to the users of public roadways and necessary waivers from the authority governing the use of those roads would be obtained by Sugar Camp. Any temporary damage to roads would be repaired as required by the approved mine permit.

Surface Disturbances

Coal would be transported via the existing underground conveyor belt line from the mining areas to the existing support facilities. Thus, these activities would not result in impacts to roads in the SBR No. 8 Mine Area. The processed coal would, as at present, be loaded

onto rail cars at the existing rail loadout and transported from the site via the Canadian National Railway. The capacity of Canadian National Railway coal rail cars can range from 98 to 116 tons per coal rail car. Implementation of the Project would result in coal shipments via rail over a longer period of time.

The construction of the six bleeder shaft facilities, likely to be sequential over a period of years, would add a minimal amount of traffic to the roads in the SBR No. 8 Mine Area for the approximate nine-month construction period per bleeder shaft. This traffic would consist of individual employee vehicles for approximately 35 people and trucks transporting rocks and other supplies to construct these facilities. Construction of the six bleeder shaft facilities could result in temporary or permanent closure of a portion of Cyril James Road, Ewing Road, Rescue Church Road, Williams Chapel Road, County Road 350 East, Evansville Western Railway, and County Road 1500 North. Cyril James Road, Rescue Church Road, Williams Chapel Road, County Road 350 East, and County Road 1500 North are minor rural roads primarily serving landowners in the vicinity. Prior to closure, coordination with the public authority governing the roadway would occur. Ewing Road has the highest AADT of the roads that may be impacted by the construction of the bleeder shaft facilities, likely due to its proximity to the township of Ewing which contains residential buildings, a post office, a school, and the local fire department (IDOT 2023c). The one railway that could be impacted by the construction of the bleeder shaft facilities, Evansville Western Railway, should be avoided (IDOT 2021).

Coal Extraction-Related Effects

No increase in traffic would occur during the operation of the Project-related mining activities due to capacity limitations such that there would not be an increase in employee traffic. Temporary impacts to roads would occur due to planned subsidence in the SBR No. 8 Mine Area. Approximately 38 miles of roads within the SBR No. 8 Mine Area could be affected by subsidence, with 27 miles of these roads within Franklin County, 9 miles within Hamilton County, and 2 miles within Jefferson County. As required by IDNR, measures to minimize inconvenience to users of public roadways would be taken such as routing around the planned subsidence areas. No permanent road closures are expected to occur due to subsidence.

Prior to mining under roads subject to subsidence, Sugar Camp would obtain the necessary waivers from the public authority governing those roads. Sugar Camp would monitor each roadway section as the longwall panel mining passes underneath it and implement temporary corrective measures, such as rerouting, minor re-grading, repairing pavement, to maintain safe roadways. Once the entire subsidence event passes, Sugar Camp would restore any damage to roads caused by subsidence, per IDNR-OMM requirements. Depending on the particular road segment, this could include repaving, reconstruction of culverts and drainage ditches, installation of new guard rail, and other measures.

Any bridges along roads within the coal extraction areas are considered structures and would be evaluated by a structure survey before the underlying area is mined. Coordination with the appropriate public road authority would be necessary to repair or remove and replace an affected bridge, or if it is along a state route, the state (IDOT) would replace an affected bridge. The need to replace bridges could result in temporary road closures with appropriate detours until the repair or replacement occurs.

USACE's Hydrologic Engineering Center River Analysis System, a software program that models flow, sediment transport, and water quality in given areas (USACE 2020), would be

used in advance of critical areas located in or near the existing 100-year floodplain in relation to the mining sequence to direct pre-mitigation work to prevent or minimize the effects of planned subsidence. Two hundred and twenty-three (223) areas requiring drainage correction are expected adjacent to roadways and two areas requiring drainage correction are expected adjacent to railways.

Planned subsidence may affect Evansville Western Railway, which passes through the southeastern portion of the SBR No. 8 Mine Area. Sugar Camp, in close coordination with the Evansville Western Railway, would monitor the railway section as the longwall panel and bleeder shaft pass underneath it and implement temporary corrective measures to maintain safe railways. Once the entire subsidence event passes, Sugar Camp, in close coordination with the Evansville Western Railway, would restore any damage to the railways caused by subsidence, per IDNR-OMM requirements.

Overall, direct impacts to transportation resources associated with implementation of Alternative A would be anticipated to be minor to moderate and minimized or mitigated. Alternative A would result in an increase in the annual quantity of coal produced and transported from the site by train.

Cumulative Effects

If mine components associated with Alternative A and nearby mines are constructed at the same time or if subsidence of different portions of the associated subsidence areas occur simultaneously, moderate, temporary cumulative effects could occur to existing roadways. Some local road closures have occurred or could occur due to area mining activities, resulting in moderate, temporary or permanent cumulative effects when considered with Alternative A. As required by the IDNR-OMM permitting process, Sugar Camp and other mine operators have taken or would take measures to minimize inconvenience to the users of public roadways and have obtained or would obtain the necessary waivers from the authorities governing the use of those roads. Beneficial effects to transportation from the proposed IDOT projects (Section 2.2, such as additional lanes and eased traffic flow, would offset some of the adverse cumulative effects from mining activities (IDOT 2023a, IDOT 2023b).

Moderate, temporary cumulative impacts on transportation would continue to occur as a result of the past, present, and RFFAs within the watersheds that encompass the SBR No. 8 Mine Area. Rail lines constructed to transport coal from the various mine operations may result in the construction of additional grade crossings. Some local roadways may be temporarily or permanently closed as a result of the construction and operation of proposed mine components or due to construction of the proposed IDOT projects. Any temporary damage to roads or bridges as a result of planned subsidence would be repaired as required by IDNR-OMM.

Cumulatively, if mine components are constructed within the watersheds that encompass the SBR No. 8 Mine Area at the same time as those constructed for the Proposed Action or if subsidence of different portions of the overall 122,377-acre subsidence area occur simultaneously, moderate, temporary cumulative effects could occur to existing roadways. Some local road closures could also occur due to mining activities within the watersheds that encompass the SBR No. 8 Mine Area, resulting in moderate, temporary or permanent cumulative effects to about 1,100 miles of additional local roads and railways (IDOT 2023c). As required by the IDNR-OMM permitting process, Sugar Camp and other mine operators would take measures to minimize inconvenience to the users of public roadways and obtain

the necessary waivers from the authorities governing the use of those roads. Beneficial effects to transportation from the proposed IDOT projects would offset some of the adverse cumulative effects from mining activities.

3.8.2.3 Alternative B

Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.8.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects

The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.8.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A. IDNR-OMM permit requirements should be followed by all new owners and operators including communication with and waivers from the public authority governing affected roads, coordination with Canadian National Railway and Evansville Western Railway, and reclamation plans.

Cumulative Effects

Cumulatively, Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds would result in moderate, temporary cumulative impacts to transportation. Rail lines constructed to transport coal from the various mine operations would reduce coal-hauling truck traffic on existing roads in the vicinity but may result in the construction of additional grade crossings. Some local roadways may be temporarily or permanently closed as a result of the construction and operation of proposed mine components or due to construction of the proposed IDOT projects. Any temporary damage to roads or bridges as a result of the subsidence of up to approximately 659,740 acres associated with the other mining operations would be repaired as required by IDNR-OMM.

Cumulatively, if mine components are constructed within the watersheds that encompass the SBR No. 8 Mine Area and the remaining TVA Mineral Rights Area at the same time as those constructed for the mine activity or if subsidence of different portions of the overall 676,551-acre subsidence area occur simultaneously, moderate, temporary cumulative effects could occur to existing roadways. Some local road closures could also occur due to mining activities in the geographic area of analysis, resulting in moderate, temporary or permanent cumulative effects to approximately 881.3 miles of additional local roads and railways (IDOT 2023c). As required by the IDNR-OMM permitting process, Sugar Camp and other mine operators would take measures to minimize inconvenience to the users of public roadways and obtain the necessary waivers from the authorities governing the use of those roads. Beneficial effects to transportation from the proposed IDOT projects (Section 2.3), such as additional lanes and eased traffic flow, would offset some of the adverse cumulative effects from mining activities.

3.8.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.8.2.3).

Cumulative Effects
Cumulatively, Alternative C along with other mining operations within the watersheds that encompass the SBR No. 8 Mine Area and TVA Mineral Rights Area are anticipated to affect existing roadways moderately and temporarily. Refer to Section 3.8.2.3 for cumulative effects as a result of divestment of the TVA Mineral Rights Area.

3.9 Utilities

3.9.1 Affected Environment

There are natural gas, electric, water, and communications utilities within the SBR No. 8 Mine Area and TVA Mineral Rights Area (Table 3-30). Within the SBR No. 8 Mine Area there are approximately 48 segments of communications lines, 33 segments of public water lines, and a portion of an electrical transmission line are present. There are no known natural gas transmission pipelines that intersect the SBR No. 8 Mine Area. An additional approximately 25 segments of communications lines, 45 segments of public water lines, two segments of natural gas transmission pipelines, and one portion of a high voltage electrical transmission line are within the remaining TVA Mineral Rights Area (Figure 3-13). Many electrical distribution lines are also present in the areas.

Table 3-30. Utility providers within the SBR No. 8 Mine Area and the TVA Mineral Rights Area

Utility Provider	Utility
Akin Water District	Water/Sewer
Alpha Gas and Electric	Gas/Electric
Ambit Energy	Electric
Ameren Illinois	Gas/Electric
AT&T	Communications
City of Mt. Vernon	Water/Sewer
Clear Wave Fiber LLC	Communications
Ewing-Ina Water Commission	Water/Sewer
Hamilton County Communications, Inc.	Communications
Hamilton County Water District	Water/Sewer
Just Energy	Gas
Nicor Gas	Gas
SouthEastern Illinois Electric Cooperative, Inc.	Electric
Spectrum	Communications
T-Mobile	Communications
Tri-County Electric Cooperative	Electric
US Mobile	Communications
Veolia North America	Water/Sewer
Verizon	Communications
West Frankfort Water Department	Water/Sewer

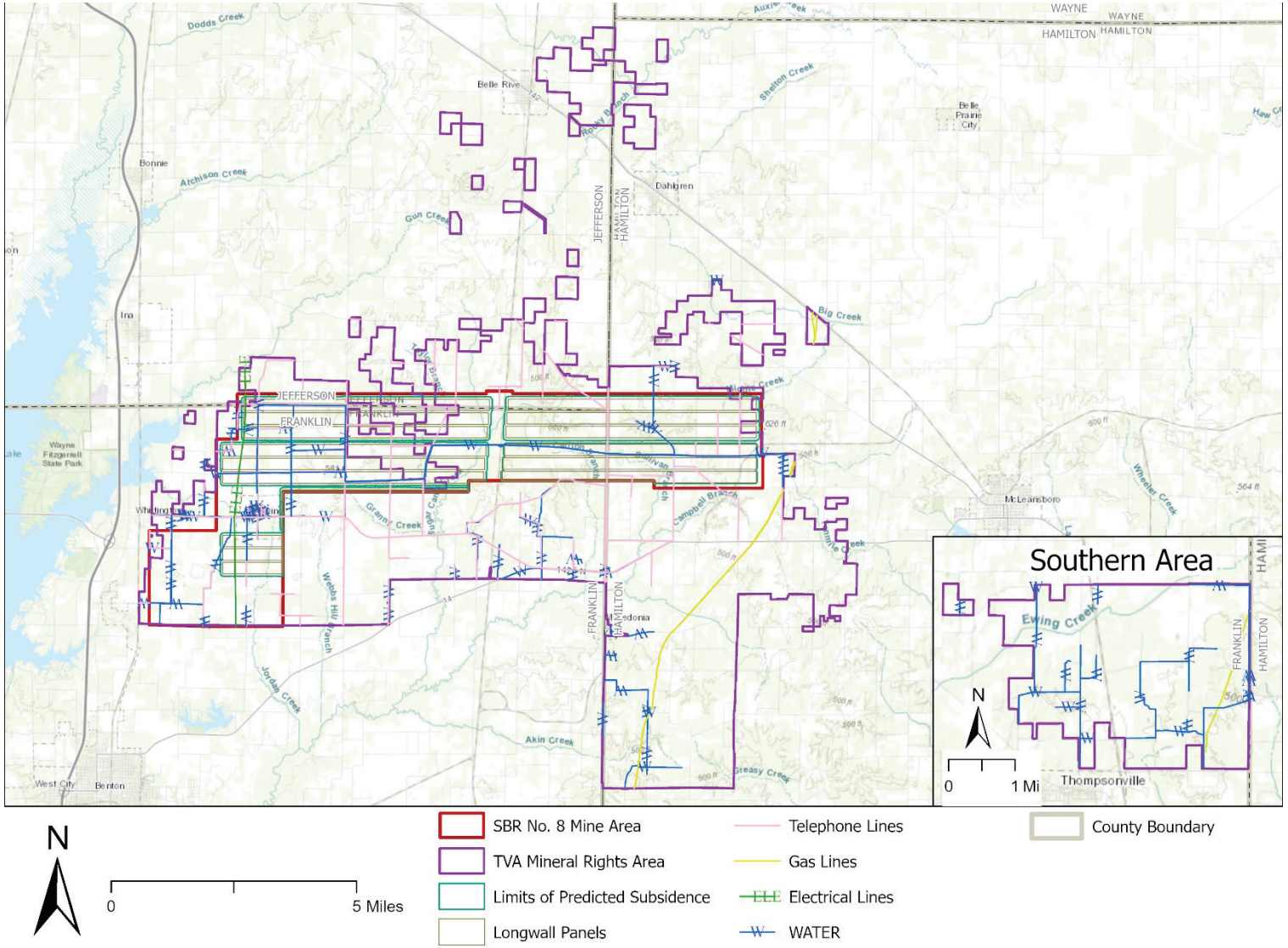


Figure 3-13. Utility Infrastructure within the SBR No. 8 Mine Area and the TVA Mineral Rights Area

3.9.2 Environmental Consequences

3.9.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to utilities. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized mitigated, per IDNR-OMM permit requirements.

Minor impacts to utilities would occur from subsidence. Sugar Camp would use existing agreements or pursue new agreements with governmental bodies and utility companies responsible for all utility services expected to be affected by subsidence. Sugar Camp would also be required to compensate utilities for repair of any damage caused by its mining activities.

3.9.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Four of the proposed bleeder shaft facilities are near segments of communications lines, segments of public water lines, and the electrical transmission line. These segments of utilities lines should be avoided during construction. Utilities in the SBR No. 8 Mine Area could be temporarily affected due to the resulting subsidence.

Surface Disturbances

Two public water line segments are present in the footprint of two of the proposed bleeder shaft facilities. These water lines would likely need to be relocated in order to maintain access to the line for routine maintenance and inspection. Relocation of the water line would be done in close coordination with the associated utility company to mitigate effects.

Coal Extraction-Related Effects

Planned subsidence would result in temporary impacts to utilities in the SBR No. 8 Mine Area. Utility components may become damaged, broken, or out of alignment as a result of subsidence. Subsidence could temporarily affect communications, water, natural gas, and electric utility lines that follow public roadways.

Sugar Camp has existing agreements or would pursue agreements with governmental bodies and utility companies responsible for all utility lines expected to be affected by subsidence. Such agreements, to be negotiated in advance of subsidence, would allow the implementation of measures designed to prevent or minimize subsidence damage and/or outline a timely procedure for the repair or replacement of damaged utility infrastructure following subsidence. These agreements would vary in scope and content and would be site specific for each such facility. As an example, if a water line is broken or leaking, action would be taken immediately to repair it.

In accordance with 62 ILL. Adm. Code 1784.20 b) 8), the convenience and safety of the public would be a high priority in the development and implementation of such cooperative agreements. Sugar Camp would be required by IDNR-OMM to inform utility companies well in advance of subsidence to adequately prepare for subsidence effects. Sugar Camp would also be required to compensate utilities for repair of any damage caused by its mining activities. The effects of subsidence on utilities would therefore be minimal and short-term after preventive planning with utility companies and subsequent repair.

Cumulative Effects
Cumulatively, Alternative A along with other mining operations within the watersheds that encompass the SBR No. 8 Mine Area would be minor and short-term due to preventive planning with governmental bodies and utility companies and subsequent repair.

Permanent impacts to utilities associated with the mining activities in the watersheds that encompass the SBR No. 8 Mine Area would continue to be avoided or mitigated, per IDNR-OMM permit requirements. Sugar Camp and other mine operators would use existing agreements or would pursue agreements with governmental bodies and utility companies responsible for all utility services expected to be affected within the 649,489-acre subsidence area. Mine operators would continue to compensate utilities for repair of any damage caused by mining operations.

Cumulatively, effects on utilities and utility services due to the planned subsidence of approximately 649,489 acres associated with the overall coal extraction area and proposed actions on the approximately 902,068 acres would be minor and short-term due to preventive planning with governmental bodies and utility companies and subsequent repair.

3.9.2.3 Alternative B
Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.9.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.9.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A. IDNR-OMM permit requirements should be followed by all new owners and operators including communication with the public authority governing affected utilities, coordination with private utilities companies, and reclamation plans.

Cumulative Effects
Cumulatively, actions resulting from Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds would avoid permanent impacts to utilities through continued mitigation, per IDNR-OMM permit requirements. Sugar Camp and other mine operators would use existing agreements or would pursue agreements with governmental bodies and utility companies responsible for all utility services expected to be affected within the approximate 649,489-acre subsidence area. Mine operators would continue to compensate utilities for repair of any damage caused by mining operations. Impacts to utilities would be minor and short-term due to preventive planning with governmental bodies and utility companies and subsequent repair.

3.9.2.4 Alternative C
Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.9.2.3).

Cumulative Effects
Cumulatively, Alternative C along with other mining operations within the watersheds that encompass the SBR No. 8 Mine Area and TVA Mineral Rights Area are anticipated to affect utilities temporarily during subsidence. Refer to Section 3.9.2.3 for cumulative effects a result of divestment of the TVA Mineral Rights Area.

3.10 Cultural Resources

Cultural resources are properties and places that illustrate aspects of prehistory or history or have long-standing cultural associations with established communities and/or social groups. Cultural resources may include archaeological sites, unmodified landscapes and discrete natural features, modified landscapes, human-made objects, structures such as bridges or buildings, and groups of any of these resources, sometimes referred to as districts. Information sources utilized for this section include the National Register of Historic Places (NRHP) webmap maintained by the National Park Service, the IHPA Historic Architectural Resources GIS System (HARGIS) which contains the Illinois Historic Sites Survey (IHSS) Inventory, the Illinois Inventory of Archaeological Sites (IIAS), and the IDOT Historic Bridges of Illinois database.

A cultural resources survey of the No. 4 Bleeder Shaft was completed in fall 2023.

3.10.1 Affected Environment

Once identified, cultural resources are evaluated for inclusion in the NRHP maintained by the National Park Service. Tangible cultural resources may qualify for inclusion in the NRHP if they are 50 years of age or older (unless in exceptional cases), retain integrity of location, design, setting, materials, workmanship, feeling, and association; and are found to embody one or more of four different types of values, or criteria, in accordance with 36 CFR § 60.4:

- *Criterion A:* association with events that have made a significant contribution to the broad patterns of our history.
- *Criterion B:* association with the lives of persons significant in our past.
- *Criterion C*: embodiment of the distinctive characteristics of a type, period, or method of construction; representative of the work of a master; possessing high artistic values; or representative of a significant and distinguishable entity whose components may lack individual distinction.
- *Criterion D*: cultural resources that have yielded, or may be likely to yield, information important in prehistory or history.

TVA determined the area of potential effects (APE) to cultural resources as the SBR No. 8 Mine Area as well as the six bleeder shaft facilities, including the installation of associated utilities needed to operate the bleeder shaft facilities (“footprint”), where physical effects could occur. In addition, the areas within a 0.5-mile radius of the bleeder shaft within which the Project would be visible and where visual effects on aboveground resources could occur (“viewshed”) are also part of the APE.

3.10.1.1 Cultural Context

Native Americans occupied what is now southern Illinois beginning at least 12,000 years ago (Evans et. al, 1997, Moffat et al. 1998). Fertile river floodplains and rich hunting grounds supported lifestyles that gradually transitioned from nomadic hunting and gathering

to settled agricultural practices. French explorers first encountered the Native American peoples of Illinois in the late 1600s, which led to alliances and conflicts. In the 1830s, most Native American groups were forced to move west of the Mississippi River. By the mid- to late 1800s, Euro-American settlement was occurring across the state. These immigrants built many of the farmsteads once scattered around the SBR No. 8 Mine Area and vicinity. Subsequent modern development has caused the alteration or removal of many of these farmstead structures; however, some do remain (Schroder 2004). The remnants of many of these human occupations of southern Illinois could potentially be found in the SBR No. 8 Mine Area.

3.10.1.2 SBR No. 8 Mine Area and TVA Mineral Rights Area

According to the IIAS, the SBR No. 8 Mine Area exhibits moderate to low probability for archaeological sites, with some pockets of high probability due to being in a watershed area. Forty-three archaeological sites have been recorded within the TVA Mineral Rights Area and 26 of these sites are within the SBR No. 8 Mine Area (Table 3-31). Nineteen of the sites within the SBR No. 8 Mine Area were recorded in 2007 during the survey of the Illinois Fuel Corporation Project Area. Seven sites were identified during the Logan Mine No. 1 Project in 2014. Nine of these sites were investigated during surveys conducted by Sugar Camp in relation to their mining operations.

Table 3-31. Archaeological sites recorded within the SBR No. 8 Mine Area and the TVA Mineral Rights Area

Site	Period	Type	SBR No. 8 Mine Area	TVA Mineral Rights Area	NRHP Status
11FK26	Precontact, Unknown	Habitation		X	Recommended for Phase II[1]
11FK127	Precontact, Unknown	Unknown		X	Recommended for Phase II[1]
11FK184	Historic	Habitation		X	Unknown
11FK218	Precontact	Habitation		X	Not reviewed
11FK230	Historic	Farmstead	X	X	Not eligible
11FK231	Historic	Habitation	X	X	Not eligible
11FK232	Historic	Habitation	X	X	Not eligible
11FK233	Historic	Habitation	X	X	Not eligible
11FK234	Historic	Habitation	X	X	Not eligible
11FK235	Historic	Habitation	X	X	Not eligible
11FK236	Historic	Habitation	X	X	Not eligible
11FK237	Historic	Habitation	X	X	Not eligible
11FK238	Historic	Habitation	X	X	Not eligible
11FK239	Historic	Habitation	X	X	Not eligible
11FK240	Historic	Habitation	X	X	Not eligible
11FK241	Historic	Habitation	X	X	Not eligible
11FK242	Historic	Habitation	X	X	Not eligible
11FK243	Historic	Habitation	X	X	Not eligible

Site	Period	Type	SBR No. 8 Mine Area	TVA Mineral Rights Area	NRHP Status
11FK244	Historic	Habitation	X	X	Not eligible
11FK245	Historic	Habitation	X	X	Not eligible
11FK246	Historic	Habitation	X	X	Not eligible
11FK247	Historic	Habitation	X	X	Not eligible
11FK248	Historic	Habitation	X	X	Not eligible
11FK284	Historic	Habitation	X	X	Not eligible
11FK285	Historic	Habitation	X	X	Not eligible
11FK286	Historic	Habitation	X	X	Not eligible
11FK287	Precontact, Unknown	Camp Site	X	X	Not eligible
11FK288	Precontact, Unknown	Camp Site	X	X	Not eligible
11FK289	Precontact	Isolated Find	X	X	Not eligible
11FK305	Historic	Habitation		X	Not eligible
11FK308	Historic	Farmstead		X	Not eligible
11FK332	Historic	Habitation		X	Unknown
11H79	Woodland, Mississippian	Unknown		X	Unknown
11H84	Archaic, Woodland, Historic	Unknown		X	Unknown
11H85	Archaic	Unknown		X	Unknown
11H123	Historic	Habitation		X	Not eligible
11H141	Historic			X	Not eligible
11H143	Historic			X	Not eligible
11H144	Historic			X	Not eligible
11H175	Historic	Habitation		X	Recommended for Phase II[1]
11JN1	Precontact	Habitation	X	X	Unknown
11JN379	Precontact			X	Not eligible

[1]Indicates potential for listing on the NRHP but require additional investigations to confirm.

A total of 53 investigations have occurred within the TVA Mineral Rights Area, which overlaps the SBR No. 8 Mine Area and No. 4 Bleeder Shaft (Table 3-32).

Table 3-32. Previous investigations conducted within the TVA Mineral Rights Area

Survey ID	Year	Title	Institute[1]
123	1981	An Archaeological Survey of the Rend Lake Conservancy District's Wastewater Treatment Facility near Ewing, IL	CAI
16976	2008	Phase I Cultural Resources Survey of the Illinois Fuel Corporation, LLC, Project Area, Franklin County, IL	ARG
19575	2012	Phase I Cultural Resources Survey and Assessment of the Rend Lake Bypass Project RLCD 11-15 Water Main Construction Corridor, Franklin and Jefferson Counties, IL	ARG
19633	2012	Phase I cultural resources survey and assessment of a 1-mile-long segment of the Rend Lake Conservancy District's Proposed Water Main Bypass Corridor located near Rend Lake, Franklin County, IL	ARG
20701	2014	Phase I Cultural Resource Survey of 2,331-acre Logan Mine No. 1 near McLeansboro, IL	PRA
22659	2018	Phase I Cultural Resources Survey and Assessment of a 1.6-acre IBR (North Main XC20) for Sugar Camp Energy, LLC, Franklin County, IL	ARG
22684	2018	Phase I Cultural Resources Survey and Assessment of the 1.2-Acre TG2 XC 70 IBR for Sugar Camp Energy, LLC, Franklin County, IL	ARG
22991	2018	Phase I Cultural Resources Survey and Assessment of the 11.7-Acre TG2 and HG6 XC37 IBR for Sugar Camp Energy, LLC, Franklin County, IL	ARG
23039	2018	Phase I Cultural Resources Survey and Assessment of the 9.7-Acre HG6 XC71 IBR for Sugar Camp Energy, LLC, Franklin County, IL	ARG
23876	2020	Phase I Cultural Resources Survey and Assessment of the HG7 Degas IBR for Sugar Camp Energy, Franklin County, IL	ARG
24026	2021	Phase I Cultural Resources Survey and Assessment of the HG7 XC38 IBR, Franklin County, IL	ARG
24275	2020	Phase I Cultural Resources Survey and Assessment of the HG7 XC101 IBR for Sugar Camp Energy, Franklin County, IL	ARG
24424	2022	Phase I Cultural Resources Survey and Assessment of Viking Mining’s Panel 8 Route 14 Subsidence Repairs, Franklin County, IL	ARG
3335	1990	Dike on Sugar Camp Creek Tributary	CAP
7947	1996	TR 364, Unknown Bridge	ITA
7948	1996	TR 71A, Borrow 2 of 2	ITA
7949	1996	TR 71A, Borrow	ITA
90332	2023	PH I Viking Mining's Three North Mains Sites	ARG

Survey ID	Year	Title	Institute[1]
12228	2001	Phase I Archaeological Survey for Proposed Wetlands in Ten Mile Creek Conservation Area, Belle Rive, Dahlgren, and Goshen Units, Hamilton and Jefferson Counties	ISM
18503	2010	A Cultural Resource History for the Sugar Camp Energy IBR, Hamilton County, IL	CRA
19634	2008	A cultural resource survey for the proposed Savatran Railroad Spur, west of McLeansboro in Franklin and Hamilton Counties, IL	CRA
19635	2008	A cultural resource survey for the proposed Savatran Railroad Spur and a wetlands mitigation area west of McLeansboro in Franklin and Hamilton Counties, IL	CRA
19697	2012	Phase I Cultural Resources Survey and Assessment of the Sugar Camp Energy Mine Permit Area and Associated Access Road, Hamilton County, IL	ARG
20482	2014	Phase I Cultural Resources Survey and Assessment of Sugar Camp Energy s Viking Mine LLC, 5.1-Acre Turbine Borehole IBR Project, Franklin and Hamilton Counties, IL	ARG
20483	2014	Phase I Cultural Resources Survey and Assessment of Sugar Camp Energy s Viking Mine LLC, Turbine Borehole IBR Project Waterline Reroute, Franklin and Hamilton Counties, IL	ARG
20701	2014	Phase I Cultural Resource Survey of 2,331-acre Logan Mine No. 1 near McLeansboro, IL	PRA
21764	2016	Phase I Cultural Resources Survey and Assessment of the Proposed IBR North HG#3 XC117 Turbine Site for Sugar Camp Energy’s IDNR Permit 382, Hamilton County, IL (ARG CRM 1959).	ARG
22192	2017	Phase I Cultural Resources Survey and Assessment of a Proposed Viking HG4 Bleeder Borehole Project for Sugar Camp Energy's IDNR Permit 382, Hamilton County, IL	ARG
22618	2018	Phase I Cultural Resources Survey and Assessment of a 1-Acre IBR for Sugar Camp Energy, LLC, Hamilton County, IL	ARG
22619	2018	Phase I Cultural Resources Survey and Assessment of a TG2 Bleeder Shaft and Power Borehole for Sugar Camp Energy, LLC, Hamilton County, IL	ARG
22869	2018	Phase I Cultural Resources Survey and Assessment of the TG2 Bleeder Shaft Waterline, for Sugar Camp Energy, LLC, Hamilton County, IL	ARG
22936	2018	Phase I Cultural Resources Survey and Assessment of a TG2 Bleeder Shaft and Power Borehole for Sugar Camp Energy, LLC, Hamilton County, IL	ARG

Survey ID	Year	Title	Institute[1]
23052	2018	Phase I Cultural Resources Survey and Assessment of the 10-Acre Route 14 Rebuild for Sugar Camp Energy, LLC, Hamilton County, IL	ARG
23205	2019	Phase I Cultural Resources Survey and Assessment of the 3-Acre TG2 XC102 IBR for Sugar Camp Energy, LLC, Hamilton County, IL	ARG
23466	2019	Phase I Cultural Resources Survey and Assessment of a 19.83-Acre Waterline IBR for Sugar Camp Energy, LLC, Franklin and Hamilton Counties, IL	ARG
2385	1988	Phase I Archaeological and Historical Survey and Assessment	ARG
23875	2020	Phase I Cultural Resources Survey and Assessment of the Viking HG7 XC105 IBR for Sugar Camp Energy, Hamilton County, IL	ARG
24180	2021	Phase I Cultural Resources Survey and Assessment of Proposed Dredging Areas along the Middle Fork Big Muddy River, for Sugar Camp Energy, Franklin and Hamilton Counties, IL	ARG
24261	2021	Phase I Cultural Resources Survey and Assessment of the HG6 XC134 IBR for Sugar Camp Energy, Hamilton County, IL	ARG
24422	2022	Phase I Cultural Resources Survey and Assessment of a Proposed IBR for Viking Mining's District 3 Bleeder Shaft, Hamilton County, IL	ARG
3854	1991	Phase I Archaeological Survey for the Hamilton County Water District, Expansion 5	ARG
7765	1996	Phase I Survey for Two Wetlands in Ten Mile Creek Conservation Area, Hamilton County	ISM
8153	1992	Hamilton County Water District Expansion #8	ARG
90186	2023	Sugar Camp Mine Project, Viking District 4	HDR
166	1985	An Archaeological Assessment of the Frailey Tract	Kuttruff, L.C.
17162	2008	Phase I Survey of (Disturbed) Turkey Production Facility Project Area	CAI
6839	1995	Phase I Archaeological Survey of 16 Miles of Waterline Expansion for the Village of Belle Rive	ARG
8618	1997	Phase I Archaeological Survey for a Subimpoundment Construction Project at the Ten Mile Creek Fish and Wildlife Area, Jefferson and Hamilton Counties	ISM
9337	1999	Phase I Archaeological Survey for the Phase II Waterline Expansion in Belle Rive, IL	ARG

[1]ARG = American Resources Group Ltd.; CAI = Center for Archaeological Investigations, Southern IL University; CRA = Cultural Resource Analysts Inc.; CAP = Contract Archaeology Program, Southern IL University; ITA = IL Transportation Archaeological Research Program; ISM = IL State Museum; PRA = Prairie Archaeology and Research

Database research indicated that there are ten historic architectural resources within the TVA Mineral Rights Area, with four of the sites located within the SBR No. 8 Mine Area (Table 3-33). Five churches and three cemeteries of unknown age were also identified during the structure survey for SBR No. 6; these are present within the SBR No. 8 Mine Area. If any of these are determined to be of potential historic age, they would be evaluated for NRHP eligibility. There are no known historic bridges in the SBR No. 8 Mine Area.

Table 3-33. Historic-age architectural resources within the SBR No. 8 Mine Area and the TVA Mineral Rights Area

HARGIS Reference	Significant Name	County	Year Built	SBR No. 8 Mine Area	TVA Mineral Rights Area	National Register Evaluation
201197	Judd, C. H., House	Jefferson	1881		X	Eligible
300664	Webb Store	Franklin	1850-1900	X	X	Undetermined
300687	School Building	Franklin	1850-1900		X	Undetermined
300700	Cross, John, House	Hamilton	1850-1900		X	Undetermined
300701	Judd, Chester, Home	Hamilton	ca. 1860	X	X	Undetermined
300702	Riddle Inn	Hamilton	ca. 1840	X	X	Undetermined
300703	Burns Inn	Hamilton	ca. 1840	X	X	Undetermined
300705	Duplex Farmhouse	Hamilton	1850-1900		X	Undetermined
300707	Country Home	Hamilton	1850-1900		X	Undetermined
301077	Judd Mansion	Jefferson	1878		X	Undetermined

3.10.1.3 No. 4 Bleeder Shaft

Prior to the 2023 field survey of the No. 4 Bleeder Shaft, background research was conducted to identify all previously identified archaeological sites and surveys located within a 1-mile radius (IIAS 2023). The records search revealed four previously recorded archaeological sites (11H58, 11H64, 11H65, and 11H141) within the search radius. Of the four previously recorded sites, one (11H141) is located on the No. 4 Bleeder Shaft. Site 11H141 is a historic artifact scatter with a date range from 1871 to 1945. This site was determined to be not eligible for listing in the NRHP (CRA 2008).

The 2023 survey included 91 acres of the No. 4 Bleeder Shaft surveyed for archaeological and architectural resources and an additional 0.5-mile surrounding viewshed buffer area surveyed for architectural resources.

As a result of the survey, one archaeological site, 11H186, was newly recorded. The site is categorized as a low-density artifact scatter likely dating from the early- to late-twentieth century. Due to a lack of integrity and limited data potential, the site is unlikely to provide new knowledge about the prehistory or history of Hamilton County. Therefore, Site 11H186 was recommended as not eligible for the NRHP under Criteria D because of lack of

significance, and no further work is recommended at this site. No remnants of Site 11H141, previously determined to not be eligible for the NRHP, were identified during the survey and its destruction was confirmed.

During the architectural resources survey, six historic-age architectural resources were recorded (Table 3-34). None of these architectural resources are recommended eligible for listing in the NRHP because of a lack of significance under Criteria A through D.

Table 3-34. Historic-age architectural resources documented during the No. 4 Bleeder Shaft investigation

Field ID Number	Year Built	Function/Use	NRHP Recommendation
FID-1	1930	Agricultural/outbuilding (barn)	Not eligible
FID-2a	1920	Domestic/single dwelling	Not eligible
FID-2b	ca. 1920	Domestic/secondary dwelling	Not eligible
FID-3a	1920	Domestic/single dwelling	Not eligible
FID-3b	ca. 1920	Agricultural/outbuilding (barn)	Not eligible
FID-3c	ca. 1920	Agricultural/outbuilding (barn)	Not eligible

Notes: ca. = circa; ID = Identifier

Federal agencies are required to consult with Native American tribes that may have significant religious or cultural resources in a Project region. The tribes that may have interests in this are listed in Section 1.5.4.3. TVA initiated consultation with these tribes on January 9, 2024. TVA also initiated consultation with IHPA on January 9, 2024.

3.10.2 Environmental Consequences

IHPA and IDNR entered into a programmatic agreement (PA) concerning procedures for protecting historic properties and complying with the Illinois State Agency Historic Resources Preservation Act related to activities conducted through the Surface Coal Mining Land Conservation and Reclamation Act (225 ILCS 720) and the Abandoned Mined Lands and Waters Reclamation Act (20 ILCS 1920) (IDNR 2003). This PA identifies classes of exempted projects and activities that are considered to have no effects on historic properties.

3.10.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the mining of additional TVA-owned coal would occur to cultural resources. Impacts to historic properties from subsidence associated with the No Action Alternative would be minor and temporary.

3.10.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. This could result in impacts to cultural resources due to construction of surface facilities. Per the agreement between IHPA and IDNR, shadow areas are considered exempt activities that have no effect on historic properties (IDNR 2003). TVA would continue to consult with IHPA and interested tribes regarding Project effects to cultural resources from non-exempt actions. INDR will review proposed projects and activities to determine if they fit within the classes of exempt projects or activities (IDNR 2003).

Surface Disturbances
Prior to construction of the remaining five bleeder shaft facilities, TVA would conduct a Phase I cultural resources survey of the APEs defined for these areas and provide results and findings to IHPA and federally recognized Indian tribes in consultation. However, it is expected that the construction and operation of the bleeder shaft facilities would cause minor visual changes to the overall landscape viewshed. The bleeder shaft facilities would be dismantled and their sites restored at the end of their useful lives, as described in Section 2.2.1.

The construction and operation of the No. 4 Bleeder Shaft would not affect historic properties. No archaeological sites or historic-age architectural resources listed on the NRHP or recommended eligible for listing on the NRHP were present. TVA initiated consultation with Illinois SHPO and federally recognized Indian tribes concerning these recommendations on January 9, 2024 (Appendix D). The Illinois SHPO concurred by letter dated February 16, 2024. None of the consulted tribes responded.

Coal Extraction-Related Effects
Per the *Programmatic Agreement between the Illinois Historic Preservation Agency and the Illinois Department of Natural Resources*, "shadow areas in which there would be no surface disturbance" and no flooding are a class of exempt activities that are "considered to have no effect on historic properties" (IDNR 2003). The PA indicates that mining activities/subsidence would not result in adverse effects unless flooding occurs. INDR does require mines/permit holders to repair or compensate owners for structural damage caused by subsidence, although the PA indicates that there is no effect on historic properties. Per the 2003 PA, no historic resources would be affected by subsidence where no surface disturbance is proposed. INDR is responsible for reviewing future projects and activities to determine if they fit within the exemptions or would require additional cultural resource investigations.

Cumulative Effects
Surface disturbances associated with the mining under Alternative A, other area mining operations, and IDOT actions considered in the watershed geographic area of analysis have been or would be investigated for cultural resources impacts prior to construction. Phase I cultural resources assessments are routinely conducted, as needed, and the results of these assessments are provided to IHPA for consultation. Mine operators are required to repair or compensate owners for structural damage caused by planned subsidence, including damage to historic properties.

Cumulative effects to cultural resources, such as impacts to the viewsheds of aboveground resources or effects to NRHP-eligible archaeological sites, would be avoided, minimized, or mitigated, per IDNR-OMM requirements, and in consultation with IHPA and interested tribes.

3.10.2.3 Alternative B
Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. The effects of TVA's approval of the proposed mining plan are described in Section 3.10.2.2.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA

assumes that the impacts would be as described in the No Action Alternative (Section 3.10.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A. IDNR-OMM permit requirements should be followed by all new owners and operators.

Cumulative Effects
Surface disturbances associated with the mining and IDOT actions considered in Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds have been or would be investigated for cultural resources impacts prior to construction. Phase I cultural resources assessments are routinely conducted, as needed, and the results of these assessments are provided to IHPA for consultation.

Cumulative effects to cultural resources, such as impacts to the viewsheds of aboveground resources or effects to NRHP-eligible archaeological sites, would be avoided, minimized, or mitigated, per IDNR-OMM requirements, and in consultation with IHPA and interested tribes.

3.10.2.4 Alternative C
Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.10.2.3).

3.11 Waste Management
Solid waste consists of a broad range of materials that include refuse, sanitary wastes, contaminated environmental media, scrap metals, nonhazardous wastewater treatment plant sludge, nonhazardous air pollution control wastes, various nonhazardous industrial waste, and other materials (solid, liquid, or contained gaseous substances).

Hazardous materials are defined as substances or materials that have been determined to be capable of posing an unreasonable risk to health, safety, and property. Hazardous material includes hazardous substances and hazardous wastes. Under RCRA, a waste is determined to be a hazardous waste if it is specifically listed on one of four lists (the F, K, P and U lists) found in title 40 of CFR in sections 261.31-261.33. A waste can also be determined to be hazardous if it exhibits one or more of the following hazardous waste characteristics, as defined in 40 CFR 261.21 through 261.24: ignitability, corrosivity, reactivity, or toxicity.

Hazardous materials and management of these materials are regulated under a variety of federal laws including the Occupational Safety and Health Administration (OSHA) standards, Emergency Planning and Community Right to Know Act and RCRA subtitle C.

3.11.1 Affected Environment
The IDNR-OMM Permit No. 382 describes several methods for hazardous waste disposal throughout the Sugar Camp site, as well as the disposal of refuse from the coal preparation process.

Coal refuse is the reject material that is produced in the processing of coal. Coal naturally occurs interbedded within sedimentary deposits, and the reject material consists of varying

amounts of slate, shale, sandstone, siltstone, and clay minerals, which occur within or adjacent to the coal seam, as well as some coal that is not separated during processing. Coal refuse is permanently disposed of or stored long-term in RDAs. Two RDAs are currently used for or proposed for use of storage of coal preparation plant refuse and have remaining capacity. Coarse coal refuse from the SBR No. 8 Mine Area is projected for disposal at the 389-acre East RDA (pending MSHA and IDNR review for approval). Fine coal refuse would be disposed at the North RDA which has more than 10 years of capacity remaining. The North RDA under Permit No. 382 is used almost exclusively for disposal of both coarse and fine coal refuse produced during the coal preparation process. Course refuse generally consists of inert non-coal (rock material) fragments separated from the unprocessed coal upon extraction via a series of shakers. Fine refuse typically exits the separation process as a slurry and generally shares many properties with the associated coal seam, including silicon, aluminum, and sulfur compounds.

In 2014, an RO treatment plant was installed to process water with high chloride concentrations that was infiltrating the mine workings. The source of the high chloride water is presumably located directly above the No. 6 coal seam; as the longwall operation progresses and the rock roof fractures, this water drains into the mine workings. This high chloride water is pumped from the underground workings to two surface clarifying/settling ponds before being pumped to the RO treatment plant. The RO plant, located near the preparation plant, treats the high chloride water into two waste streams. About 75 percent of the treated water (approximately two million gallons per day) is pumped directly to Pond 001 and then utilized by the preparation plant. The second waste stream is a liquid concentrate, consisting of approximately 675,000 gallons per day. About half of this second waste stream is disposed of in the two on-site deep injection wells, while the remaining half is sent to the existing RDA for permanent or long-term storage. The RO treatment plant, combined with the deep injection wells, was the best available treatment option and has been approved by both the IEPA and IDNR-OMM. Wastewater generated during future mining activities will be directed to the RO treatment plant. Concentrated saline reject water from the RO treatment plant is either pumped to underground injection wells or discharged to the RDA; however, the treatment of wastewater is limited by the capacity of the RO treatment plant and the RDA at the time of pumping.

As described above in Section 3.3.4.1, PFAS was recently found in surface water discharges from the mine and Sugar Camp has installed new treatment systems to remove PFAS from the mine's wastewater. USEPA has designated PFAS compounds as a hazardous substance under CERCLA of 1980 (Superfund). Therefore, under RCRA, PFAS waste, which includes the PFAS-containing firefighting foam used to suppress the underground fire as well as any PFAS removed from the wastewater, is regulated as Subtitle C hazardous waste. Under all alternatives, discharge of PFAS to the environment is to be discontinued.

3.11.2 Environmental Consequences

3.11.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Sugar Camp would be limited in expanding its underground mining operations to the previously approved mining of approximately 25,847-acres. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated, per IDNR permit requirements.

The existing North RDA and the proposed East RDA would store refuse from processing of previously approved TVA-owned coal and privately owned coal. The existing coal preparation plant would continue to be managed under a Spill Prevention, Control, and Countermeasure (SPCC) Plan for onsite bulk oil in containment, in accordance with applicable regulations. Subsidence does not generate additional solid or hazardous waste.

3.11.2.2 Alternative A

Under Alternative A, TVA would implement the terms of the existing coal lease agreement and approve the proposed mining plan as submitted by Sugar Camp in SBR No. 8. According to the submitted plan, TVA would approve Sugar Camp to mine TVA-owned coal reserves within the SBR No. 8 Mine Area, representing approximately 166 million tons of unprocessed coal over a 26-year period. This would be in addition to the mining of the privately owned and previously approved TVA coal included in the No Action Alternative. Preparation of the unprocessed coal would produce about 83 million tons of coal refuse for disposal in the existing RDAs and the planned East RDA.

Sugar Camp does not consider any of the refuse onsite as waste, except for bulk oil stored in underground containment for use in mining equipment. Sugar Camp maintains a SPCC Plan for onsite bulk oil in containment and reports usage to USEPA, in accordance with applicable regulations. Following TVA approval of the mining plan, quantities of bulk oil stored and used onsite are expected to remain consistent compared to current bulk oil storage and use.

Surface Disturbances

The mining plan includes the construction of six bleeder shaft facilities associated with the mining of TVA-owned coal. These planned activities would disturb approximately 39 acres of surface lands within the SBR No. 8 Mine Area at six different locations. Topsoil material would be removed and placed in a stockpile for future reclamation. Excavated consolidated material would be utilized for road and parking area base construction or placed in a stockpile for future reclamation. Therefore, construction of the six planned bleeder shaft facilities would not result in generation of solid or hazardous waste requiring management other than what is described herein.

The extracted coal, both TVA-owned and privately owned, would be processed at the existing coal preparation plant. The plant is located on privately owned lands occupying approximately 2,420-acres, outside of the SBR No. 8 Mine Area. The plant is currently operating and was approved by IDNR in 2008. Water used at the plant is treated on-site. Sugar Camp holds an NPDES permit to discharge water from 13 locations outside of the SBR No. 8 Mine Area (Appendix B). Use of the existing coal preparation plant for Alternative A would not result in new surface facilities, and the overall processing capacity would not change. Under Alternative A, the coal preparation plant would operate for a longer period of time. The coal preparation plant has an approved capacity that would not increase with the addition of the approximately 83 million tons of coal refuse that would not have otherwise been generated if TVA does not approve the Proposed Action.

Refuse material would be managed at the proposed East RDA for long term storage from the coal preparation plant. The East RDA would be used to store refuse from the processing of privately owned and TVA-owned coal.

Coal Extraction-Related Effects
Planned subsidence within the SBR No. 8 Mine Area would not generate additional solid or hazardous waste, and thus, no impacts would occur in relation to waste.

Cumulative Effects
Cumulative effects associated with Alternative A along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds can be avoided or minimized by maintaining SPCC plans, for onsite bulk oil storage within containment, at all ongoing and proposed coal facilities, including bleeder shaft facilities and existing and proposed RDAs. No cumulative impacts would occur due to planned subsidence associated with the Action Alternative, with consideration to other mining actions within 20 miles, including the activities associated with the No Action Alternative, as subsidence does not generate additional solid or hazardous waste.

The proposed Illinois 14/I-57 interchange modification and other mining activities in the 20-mile radius are subject to USEPA's oil spill prevention program which includes the SPCC and the Facility Response Plan (FRP) rules. The FRP rule requires certain facilities to submit a response plan and prepare to respond to a worst-case oil discharge or threat of a discharge. Mine operators are required to comply with USEPAs SPCC and FRP rules. Existing and proposed RDAs would be capped and maintained in accordance with applicable regulations and approved by IDNR-OMM.

3.11.2.3 Alternative B
Under Alternative B, TVA would approve the proposed mining plan and would divest the TVA Mineral Rights Area. Refer to Section 3.11.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects
The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.11.2.1). If the coal in the remaining TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A.

Cumulative Effects
Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds are subject to USEPA's oil spill prevention program which includes the SPCC and the FRP rules. Cumulative effects associated with these actions can be avoided or minimized by maintaining SPCC plans at all ongoing and proposed coal facilities, including bleeder shaft facilities and existing and proposed RDAs. The FRP rule requires certain facilities to submit a response plan and prepare to respond to a worst-case oil discharge or threat of a discharge. Mine operators are required to comply with USEPA's SPCC and FRP rules. Existing and proposed RDAs would be capped and maintained in accordance with applicable regulations and approved by IDNR-OMM. No cumulative impacts would occur due to planned subsidence as subsidence does not generate additional solid or hazardous waste.

3.11.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.11.2.3).

3.12 Public and Occupational Health and Safety

In this section, safety is discussed in the context of relevant regulatory requirements under OSHA, MSHA, and other types of hazard assessment and prevention. Scoping comments recommended that the EIS address occupational health and safety measures, including safety related to humans and infrastructure during subsidence. Subsidence and pollutant emissions are safety issues that could potentially occur. In the context of evaluating the project impacts, “safety” is interpreted as engineering design, operation, and handling of project infrastructure, equipment, and materials in a manner that seeks to reduce hazards and prevent the occurrence of incidents and accidents (International Finance Corporation 2007).

3.12.1 Affected Environment

Mine safety is regulated by several agencies, including IDNR Mine Safety and Training Division, OSHA, and MSHA. Safety requirements are a condition of obtaining regulatory permits and approvals to construct, operate, and close mines. Safety issues are typically addressed under state and federal regulatory programs designed to ensure physical safety pertaining to engineering design and structural integrity of the project components and infrastructure, and safe storage, use, transportation, and disposal of materials, product, and waste streams. It also includes operational safety for workers, and the safety of visitors to the facility and the general public in the vicinity.

MSHA works to prevent death, illness and injury from mining and promote safe and healthful workplaces for U.S. miners. MSHA carries out the provisions of the Federal Mine Safety and Health Act of 1977 as amended by the Mine Improvement and New Emergency Response Act of 2006. The agency develops and enforces safety and health rules for all U.S. mines regardless of size, number of employees, commodity mined, or method of extraction. MSHA also provides technical, educational and other types of assistance to mine operators. MSHA regulates the health and safety of miners predominantly using 30 CFR part 75 for underground and 30 CFR part 77 on the surface.

The Illinois Emergency Management Agency has the responsibility and authority to coordinate with state and local agencies in the event of a release of hazardous materials.

The TVA Mineral Rights Area and SBR No. 8 Mine Area consist of privately-owned land and existing land use is predominantly agricultural. Public emergency services in the area include urgent care clinics, hospitals, law enforcement services, and fire protection services.

The Logan Primary Care clinic, located on State Highway 37 in West Frankfort, Franklin County between 10 and 15 miles (approximately 22-minute drive) southwest of the TVA Mineral Rights Area, is the closest urgent care clinic to the TVA Mineral Rights Area and SBR No. 8 Mine Area. The Franklin Hospital is the closest hospital, located on Bailey Lane in Benton, Franklin County, between six and nine miles (approximately 13-minute drive) southwest of the TVA Mineral Rights Area and SBR No. 8 Mine Area.

Law enforcement services in Franklin County are provided by the Benton Police Department and Franklin County Sheriff's Offices, which share a building approximately 10 miles (15-minute drive) southwest of the TVA Mineral Rights Area. Fire protection services are provided by the Ewing-Northern Fire Department, approximately four miles (five-minute drive) north of the TVA Mineral Rights Area and SBR No. 8 Mine Area.

Law enforcement services in Jefferson County are provided by the Mount Vernon Police Department and Jefferson County Sheriff's Offices. Both the Mount Vernon Police Department and Jefferson County Sheriff's Office are located in Mount Vernon approximately 13 miles (19-mile drive) northwest of the TVA Mineral Rights Area. The closest fire protection services are provided by the Jefferson Fire Protection District II Fire Department in Ina, approximately three miles (six-minute drive) west of the TVA Mineral Rights Area.

Law enforcement services in Hamilton County are provided by the McLeansboro Police Department and Hamilton County Sheriff's Offices, located near each other approximately four miles (nine-minute drive) east of the TVA Mineral Rights Area. Fire protection services are provided by the McLeansboro Fire Department, approximately four miles (nine-minute drive) east of the TVA Mineral Rights Area.

3.12.2 Environmental Consequences

3.12.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the proposed mining of TVA-owned coal would occur to health and human safety. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated, per MSHA and OSHA regulations and IDNR Mine Safety and Training Division.

Sugar Camp would avoid subsidence-related damages to private property or to reimburse affected parties for those damages by coordinating pre- and post-subsidence surveys with property owners.

3.12.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. This may result in safety impacts because of surface disturbances or subsidence, but any impacts would be minimized or mitigated through compliance with MSHA, OSHA, IDNR Mine Safety and Training Division, and other relevant regulatory programs. These regulations require site-specific plans that would be submitted to and approved by MSHA before implementation.

Surface Disturbances

Sugar Camp complies with MSHA and OSHA regulations through the implementation of numerous site-specific plans for each mining operation. Sugar Camp would follow CFR Part 70 for all underground components of the mine and CFR 30 Part 77 for mandatory safety standards for all surface components of the mine. Sugar Camp houses copies of their Ventilation Plan, Roof Control Plan, and Emergency Response Plan at each mining site. Plans for RDAs, shaft facilities, and seal installations are technically evaluated, reviewed, and approved by MSHA prior to construction. Sugar Camp also maintains a SPCC Plan and Emergency Management and Fire Fighting plans at the mining site.

As shown on Figure 2-1, fans would be installed at the top of the bleeder ventilation shafts associated with the bleeder shaft facilities to increase the rate of circulation and reduce the risk of explosions and fires. Methane in concentrations between five and 15 percent can be explosive (Kissell 2006). Safety regulations usually require that methane levels be kept lower than one percent for health and safety of mine workers.

Sugar Camp would backfill and seal mine openings, such as bleeder shaft and boreholes, in accordance with pertinent state and federal regulations. The boreholes would be permanently sealed within 60 days of inactivity. The bleeder shaft and any boreholes would be plugged from top to bottom according to all MSHA and IDNR regulatory standards after they are no longer needed.

Coal Extraction-Related Effects

The operation of underground mining equipment could contribute to pollutant emissions that could pose a safety threat to workers in the underground longwall mining areas. To maintain safe levels of pollutants within the mine, safety regulations require the use of filters on diesel- powered mining equipment to minimize diesel exhaust emissions on most underground diesel machinery. Other equipment is electrically powered and does not contribute directly to emission levels.

In its application for UCM Permit No. 382, Sugar Camp was required to describe how mine stability is maximized to prevent unplanned subsidence. Sugar Camp used the Analysis of Retreat Mining Pillar Stability (ARMPS) program to calculate the stability factor by using the loads applied to and the load bearing capacities of coal pillars. The ARMPS program uses an empirical method with an extensive amount of case histories incorporated for calibration. It is the industry standard for pillar design. Site-specific strength values for coal pillars and floor are developed to ensure an adequate factor of safety for roof stability and to prevent unplanned subsidence. Plate testing would be conducted in conventional room-and-pillar sections within the first 1,000 feet of entering a mine area. Should any changes in mine stability or conditions be encountered, a more detailed study of the floor, roof and pillars would be performed at that time. As stated in the UCM Application, “the subsidence control plan…will serve to avoid damage to any surface features to assure compliance with 62 Ill. Adm. Code 1817.121(d).”

Sugar Camp is required to avoid subsidence-related damages to private property or to reimburse affected parties for those damages. Planned subsidence is predictable, uniform, and minimizes damage to surface structures as mining proceeds. Sugar Camp would coordinate with property owners and the public authority governing roads in the potential impact area prior to and after subsidence as part of a pre- and post-subsidence survey of structures, such as buildings and bridges, as described in Section 2.2.2. Sugar Camp would also implement mitigation measures outlined in Section 2.7 to minimize potential safety impacts caused by subsidence. These mitigation measures include the repair of any damage to buildings or other structures, roads, utilities, or drainage caused by subsidence.

Cumulative Effects

Cumulatively, Alternative A along with other mining operations within the watersheds that encompass the SBR No. 8 Mine Area would not contribute to cumulative adverse impacts to human health and safety due to compliance with regulatory safety programs.

Previous portions of Sugar Camp Mine No. 1 and future actions related to the mine have been or would be designed and operated to comply with IDNR Mine Safety and Training

Division requirements and MSHA and OSHA regulations. Thus, Sugar Camp's ongoing and proposed actions associated with the SBR No. 8 mine expansion and the existing 2,420-acre surface effects area would not contribute to cumulative adverse impacts to human health and safety.

3.12.2.3 Alternative B

Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.12.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects

The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.12.2.1). If the coal reserves in the remaining TVA Mineral Rights Area are mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A. IDNR-OMM and USACE permit requirements should be followed by all new owners and operators.

Cumulative Effects

Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds would be designed and operated to comply with IDNR Mine Safety and Training Division requirements and MSHA and OSHA regulations. Thus, future mining activities associated with TVA Mineral Rights Area would not contribute to cumulative adverse impacts to human health and safety.

3.12.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.12.2.3).

3.13 Socioeconomics

3.13.1 Affected Environment

The SBR No. 8 Mine Area and TVA Mineral Rights Area are in unincorporated, primarily rural portions of eastern Franklin County, western Hamilton County, and southeastern Jefferson County, a few miles east of the City of Benton and Rend Lake. The SBR No. 8 Mine Area and TVA Mineral Rights Area were examined to identify U.S. Census Bureau (USCB) 2020 Census Tract (CT) Block Groups (BGs); this is defined as the study area for socioeconomics. The SBR No. 8 Mine Area and TVA Mineral Rights Area overlap USCB 2020 CT 412 BGs 2 and 3 in Franklin County, CT 9732 BG 3 and CT 9733 BG 1 in Hamilton County, and CT 504 BG 1 in Jefferson County. Generally, CT 412 encompasses the TVA Mineral Rights Area and the majority of the SBR No. 8 Mine Area. Additionally, the TVA Mineral Rights Area overlaps with CT 412 BGs 2 and 3 in Franklin County, CT 9732 BG 3 and CT 1933 BG 2 in Hamilton County, and CT 504 BG 1 in Jefferson County. CT 9733 encompasses the eastern portion of the SBR No. 8 Mine Area and TVA Mineral Rights Area with minor overlap in CTs 405 and 504. One additional CT, CT 9732, overlaps the southeastern portion of the TVA Mineral Rights Area (Figure 3-14).

3.13.1.1 Population and Demographics

The population of Illinois, Franklin County, Hamilton County, and Jefferson County have all decreased by 0.1 percent, 4.4 percent, 5.5 percent, and 4.4 percent, respectively, since 2010 (USCB 2023a; Table 3-35). Only two of the BGs, CT 412 BG 2 and CT 9732 BG 3, have increased in population from 2010 to 2020.

Table 3-35. Population trends in the socioeconomic study area

Geography	2010 Census	2020 Census	Percent Change 2010-2020
Illinois	12,830,632	12,812,508	-0.1
Franklin County	39,561	37,804	-4.4
CT 405 BG 2	1,134	1,109	-2.2
CT 412 BG 1	1,158	1,157	-0.1
CT 412 BG 2*	733	758	3.4
CT 412 BG 3*	1,859	1,729	-7.0
Hamilton County	8,457	7,993	-5.5
CT 9732 BG 3*	767	805	5.0
CT 9733 BG 1	1,055	1,010	-4.3
CT 9733 BG 2*	878	778	-11.4
Jefferson County	38,827	37,113	-4.4
CT 504 BG 1*	1,370	1,357	-0.9
CT 504 BG 2	866	851	-1.7
CT 504 BG 3	2,673	1,971	-26.3

Sources: USCB 2023a
*Only intersects with the TVA Mineral Rights Area

Other demographic characteristics of the 10 affected BGs, as compared with the state and counties, are summarized in Table 3-36, based on the ACS (2022). The populations of affected BGs were generally more aged than the state population with the only exceptions being in CT 9733 BG 1 and CT 504 BG 1. CT 405 BG 2 and CT 504 BG 2 were the only BGs with higher percentages of people who were high school graduates or higher than the state.

Table 3-36. Demographic Characteristics for the Socioeconomic study area

Geography	% of Population 65 Years and Over^	Median Age>	% High School or Higher[1, **]	% of Occupied Housing Units, Renter Occupied[++]	Median Year Housing Units Built[##]
Illinois	16.2	38.7	90.1	33.3	1970
Franklin County	20.5	43.2	89.9	24.9	1965
CT 405 BG 2	19.6	40.8	91.1	26.8	1992
CT 412 BG 1	14.5	40	86.2	16.2	1979
CT 412 BG 2*	25.6	41	90.1	16.3	1991
CT 412 BG 3*	21.7	43.7	84.3	19.2	1983
Hamilton County	22.1	43	86.3	22.9	1971
CT 9732 BG 3*	29.1	44.3	78.2	14.8	1978
CT 9733 BG 1	13.0	31.4	87.7	18.9	1973
CT 9733 BG 2*	20.7	42.8	74.3	1.5	1983
Jefferson County	19.6	41.2	90.6	28.0	1977
CT 504 BG 1*	12.9	35.1	88.1	10.8	1991
CT 504 BG 2	22.4	43.8	90.6	15.7	1972
CT 504 BG 3	14.3	42.3	69.7	26.9	1975

Source: ACS 2022 - ^ Table ID: B01001, > Table ID: B01002, ** Table ID: B15003, ++ Table ID: B25003, ## Table ID: B25035.
*Only intersects with the TVA Mineral Rights Area
[1]Of Population over 25 Years and includes High School Equivalency

According to the ACS, all affected BGs had lower percentages of renter-occupied housing units than the state (ACS 2022). In all the affected BGs, housing units were generally constructed more recently than across the state.

3.13.1.2 Employment and Income

The coal mining industry has historically been significant to the economy of southern Illinois, including the SBR No. 8 Mine Area and TVA Mineral Rights Area counties, because of the rich mineral resources within the Illinois Coal Basin. Coal mining remains one of Franklin County's larger industries with two active underground mines and one active coal recovery mine (USEIA 2023, IDNR 2023a). The budgeted employment level of Sugar Camp Mine No 1 is 228 employees. A comparison of industries within Franklin, Hamilton, and Jefferson counties and the State of Illinois is shown in Table 3-37.

Table 3-37. 2022 Employment data counties within the SBR No. 8 Mine Area and the TVA Mineral Rights Area

Geography	Total Employment	Farming	Private, Non-farming industries[1]	Government	Mining Related Industries[2]
Illinois	8,094,358	73,287	7,179,946	841,125	17,205
Franklin County	13,933	612	11,089	2,232	680
Hamilton County	3,710	602	2,535	573	557
Jefferson County	25,239	940	21,920	2,379	430

Source**:** U.S. Bureau of Economic Analysis (BEA) 2022
[1]Private, non-farming industries include mining, retail, manufacturing, and professional services.
[2]These numbers are estimated based on available data and included in the Private, Non-farming industries total.

Table 3-38 summarizes ACS data on employment and income for the affected BGs (ACS 2022). Except for four BGs, all other BGs had lower percentages of people in the labor force than the state. Seven of the 10 BGs had unemployment rates above that of the state. Based on the ACS, per capita income in all the affected BGs was lower than that of the state (ACS 2022).

Table 3-38. Employment and Income Characteristics for the socioeconomic study area

Geography	% of 16+ Civilian Population in Labor Force^^	Unemployment Rate^^	% Employed in Education Services, Healthcare, and Social Services*	% Employed in Manufacturing *	Per Capita Income>>
Illinois	65.2	5.9	23.3	11.6	$43,198
Franklin County	55.9	6.7	26.4	12.4	$28,310
CT 405 BG 2	59.3	6.1	35.3	10.0	$32,501
CT 412 BG 1	66.4	2.3	18.2	18.5	$35,005
CT 412 BG 2*	60.6	7.9	20.4	10.8	$27,543
CT 412 BG 3*	60.5	7.4	17.9	14.2	$28,862
Hamilton County	55.1	4.4	24.9	12.4	$29,785
CT 9732 BG 3*	44.0	9.8	9.5	24.9	$30,244
CT 9733 BG 1	69.7	7.1	24.8	14.2	$28,228
CT 9733 BG 2*	59.5	0.5	17.2	20.6	$28,447
Jefferson County	58.7	6.4	24.6	16.0	$30,167
CT 504 BG 1*	66.2	3.4	17.8	21.3	$32,654
CT 504 BG 2	66.5	8.5	17.0	20.1	$31,925
CT 504 BG 3	20.3	7.5	24.0	12.3	$10,825

Source: ACS 2022 - ^^ Table ID: B23025, * Table ID: C24030, >> Table ID: B19301.
*Only intersects with the TVA Mineral Rights Area

Pertinent civilian employment characteristics for the affected BGs are also shown in Table 3-38. Manufacturing, education services, and healthcare generally lead the industries for employment. Though not shown in Table 3-38, agriculture, forestry, mining, and retail trade also employ larger percentages of people in the socioeconomic study area, accounting for generally 10 to 20 percent of employment.

3.13.2 Environmental Consequences

3.13.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no impacts associated with the proposed mining of TVA-owned coal would occur to socioeconomics. Positive socioeconomic impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur.

Planned construction of the East RDA would provide employment for about 20 people over an approximate two-year period. These employment needs would likely create some new local job opportunities during construction of the East RDA, while ongoing mining operations would continue to have positive effects on the local economy through continued employment. However, short- or long-term loss of mine-related employment, associated expenditures, and tax revenues, may occur under the No Action Alternative depending on the future of the TVA Mineral Rights Area leased to Sugar Camp.

3.13.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Positive socioeconomic impacts from the mining of additional TVA-owned coal would occur.

Surface Disturbance

Over an approximate nine-month period, about 15 workers would be employed to construct the first Bleeder Shaft Facility in the SBR No. 8 Mine Area. A similar number of employees would likely be required for the later construction of the other five bleeder shafts in the SBR No. 8 Mine Area. The mining and processing of the TVA-owned coal would be carried out by current Sugar Camp employees, with no additional non-construction hiring attributable to the Project. The mining of the TVA-owned coal under Alternative A would, however, provide employment for a longer period of time than would otherwise occur. These employment needs would likely create some new local job opportunities during construction of the Project, while mining operations would continue to have positive effects on the local economy through continued employment.

Coal Extraction-Related Effects

Overall, long-term beneficial economic impacts would result from implementation of Alternative A, including the purchase of materials, equipment, and services. These benefits would be local or regional, depending on where the goods and services are obtained. Indirect economic effects would also occur. These would generally derive from the expenditure of wages earned by the workforce involved in construction activities and mining operations. Under Alternative A, long-term mining operation employment and income levels would be similar to current levels.

Cumulative Effects

Overall, moderate, short- to long-term, cumulative beneficial economic impacts would result from implementation of Alternative A in combination with other actions within the

watersheds that encompass the SBR No. 8 Mine Area, including the activities associated with the No Action Alternative. Indirect, cumulative economic effects would also occur from the expenditure of wages earned by the workforce involved in construction activities and mining operations.

Economic benefits of mining activities and the proposed IDOT construction projects in the 20-mile radius include the purchase of materials, equipment, and services, and moderate short- to long-term increases in employment and income. These increases would be local or regional, depending on where the goods, services, and workers have been or are obtained. In addition, the short- and long-term economic benefits of road construction and mining-related operations may have a particular benefit to low-income populations in the watersheds that encompass the SBR No. 8 Mine Area.

3.13.2.3 Alternative B

Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.13.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects

TVA Mineral Rights would be divested in accordance with authorized or legal means. The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.13.2.1). If the coal reserves in the remaining TVA Mineral Rights Area are mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A.

Cumulative Effects

Overall, moderate, short- to long-term, cumulative beneficial economic impacts would result from implementation of Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds. Indirect, cumulative economic effects would also occur from the expenditure of wages earned by the workforce involved in construction activities and mining operations.

Economic benefits of mining activities and the proposed IDOT construction projects in the watersheds that encompass the remaining TVA Mineral Rights Area include the purchase of materials, equipment, and services, and moderate short- to long-term increases in employment and income. These increases would be local or regional, depending on where the goods, services, and workers have been or are obtained. In addition, the short- and long-term economic benefits of road construction and mining-related operations may have a particular benefit to low-income populations in the watersheds that encompass the remaining TVA Mineral Rights Area.

3.13.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.13.2.3).

3.14 Environmental Justice

3.14.1 Affected Environment

Environmental justice (EJ) is defined in EO 14096 as “just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision-making and other Federal activities that affect human health and the environment.” EJ-related impacts are analyzed to identify and address, as appropriate, disproportionate and adverse human health or environmental effects of federal programs, policies, and activities on minority and low-income populations, as guided by EO 12898 and EO 14096.

- Minority populations exceeding 50 percent, where minority populations are defined as people who identify themselves as Asian or Pacific Islander, American Indian or Alaskan Native, Black (not of Hispanic origin), Hispanic, some other race, or those indicating two or more races (i.e., all USCB race and ethnic categories apart from One Race White);
- Low-income populations, where per capita income is at or below $15,225 or the poverty rate for all people exceeds the official 2022 poverty rate for the U.S., 11.5 percent (USCB 2023b, USCB 2023c); and
- Groups demonstrating differential patterns of consumption of natural resources among minority and low-income populations, defined herein as tribal populations.

The SBR No. 8 Mine Area and TVA Mineral Rights Area were examined to identify USCB 2020 CT BGs; this is defined as the study area for EJ. Within the study area and in addition to the above thresholds, minority EJ populations were defined as the BGs with minority percentages that were 10 percent or more above the state percentage or both the county and state percentages. Low-income EJ populations were also defined as the BGs with poverty rates that were five percent or more above the state percentage or both the county and state percentages or per capita income rates that were five percent or more below the state rate or both the county and state rates. BGs meeting these thresholds are identified as the areas where the chance for amplified environmental and human health effects to minority and low-income populations may be greatest (i.e., the qualifying EJ populations).

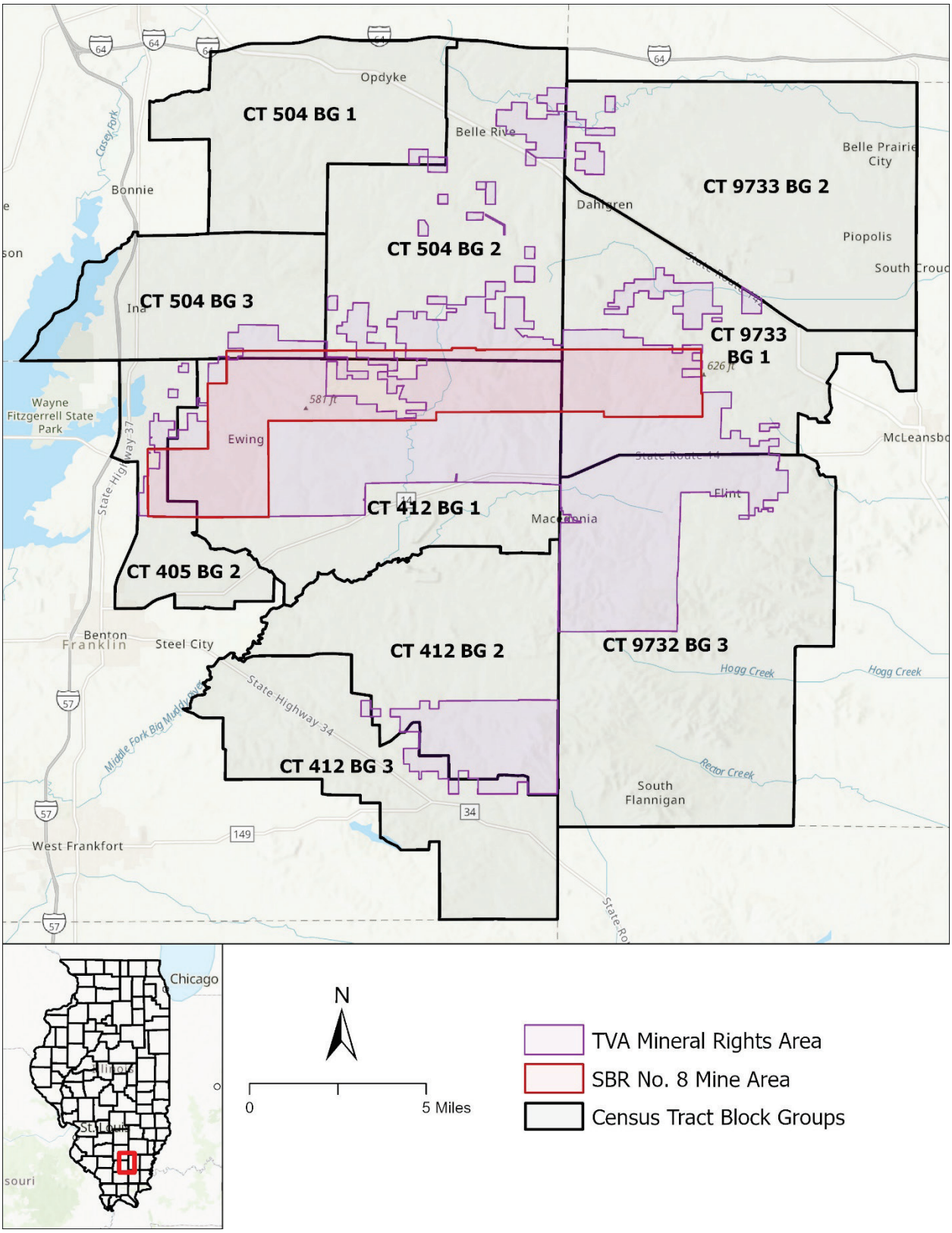


Figure 3-14. U.S. Census Bureau 2020 CT BGs in the SBR No. 8 Mine Area and the TVA Mineral Rights Area

3.14.1.1 Minority Populations

According to the 2022 ACS, minority populations in all BGs are lower than the state (Table 3-39; USCB 2023a). Overall minority percentages in all BGs do not exceed the 50-percent threshold noted in CEQ Guidance. CT 504 BG 3 exceeds the Black or African American percentages in Illinois and Jefferson County, indicating that this CT has a higher percentage of Black or African communities than is typical of the state and county. CT 412 BG 1 and CT 504 BG 2 exceed the American Indian or Alaskan Native and Asian percentages in Illinois and Hamilton and Jefferson counties, indicating that these CTs have a higher percentage of American Indian or Alaskan Native and Asian communities than is typical of the state and county.

None of the BGs qualify as minority EJ populations as they do not meet or exceed the total minority percentage thresholds for the state or the county and the state.

No tribal areas are known to exist near the SBR No. 8 Mine Area or TVA Mineral Rights Area (USBIA 2018). However, ACS 2022 data indicates that American Indian or Alaskan Natives in CT 412 BG 1 and CT 504 BG 2 exceed the percentages in Illinois and Hamilton and Jefferson counties. The SBR No. 8 Mine Area and TVA Mineral Rights Area are approximately 30 and 18 miles respectively north of the Shawnee National Forest, which occupies land ceded by the Kaskakia, Cahokia, Michigamea, Peoria, and Tamaroa in 1803 and 1818. The Shawnee National Forest also contains a segment of the Trail of Tears which is of demonstrated interest to the Tribal Historic Preservation Office of the Cherokee Nation and United Keetoowah Band of Indians in Oklahoma (USDA and U.S. Forest Service [USFS] N.d., USDA and USFS 2022).

Table 3-39. Minority percentages and ethnicities in the EJ study area

Geography	% Minority	% White[1]	% Black / African Am.	% Am. Indian / Alaska Native	% Asian	% Native Hawaiian / Pacific Islander	% Some Other Race	% Two or More Races	% Hispanic / Latino[2]
Minority EJ Thresholds to Meet or Exceed									
Illinois	44.7		17.1	1.3	7.5	0.1	12.8	8.3	19.7
Franklin County	5.8		1.4	1.3	0.8	0.0	1.9	3.9	2.1
Hamilton County	5.4		0.1	2.1	0.5	0.3	1.2	2.0	2.2
Jefferson County	17.4		8.7	2.3	1.8	0.1	3.1	6.9	3.2
Illinois	40.4	72.7	15.5	1.2	6.8	0.1	11.6	7.5	17.8
Franklin County	5.2	99.0	1.3	1.2	0.7	0.0	1.7	3.5	1.9
CT 405 BG 2	1.5	99.4	0.9	0.6	0.0	0.0	0.0	0.9	0.0
CT 412 BG 1	2.3	99.5	0.0	1.7	0.0	0.0	0.5	1.7	0.1
CT 412 BG 2*	7.6	95.2	0.8	1.1	0.0	0.0	3.5	0.6	5.8
CT 412 BG 3*	1.8	99.8	0.0	1.2	0.0	0.0	0.0	1.0	0.6
Hamilton County	4.9	97.9	0.1	1.9	0.4	0.3	1.1	1.8	2.0
CT 9732 BG 3*	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CT 9733 BG 1	6.9	98.9	0.0	0.0	0.0	0.0	1.1	0.0	6.9
CT 9733 BG 2*	1.0	99.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Jefferson County	15.7	91.7	7.9	2.1	1.6	0.1	2.8	6.2	2.9
CT 504 BG 1*	3.6	98.0	0.1	0.9	2.8	0.0	0.3	1.9	0.0
CT 504 BG 2	10.3	98.9	0.0	4.2	1.6	0.0	3.9	8.6	4.5
CT 504 BG 3	33.3	78.3	20.2	1.0	0.0	0.0	8.1	7.7	6.7

Source: USCB 2023a, ACS 2022

[1] Race percentages are provided for those reporting a particular race alone or in combination.

[2] This group is calculated separately from the other ethnicities and may include overlap from the other categories, as the USCB does not consider Hispanic or Latino a "race."

*Only intersects with the TVA Mineral Rights Area

3.14.1.2 Low-Income and Poverty Populations

According to the 2022 ACS, the poverty rates of all BGs except four are higher than the U.S. 2022 official poverty rate of 11.5 percent (USCB 2023, Table 3-40). Only one BG, CT 504 BG 3, had a per capita income below the U.S. 2022 per capita income poverty threshold of $15,230. The remaining BGs have per capita incomes below that of Illinois, with one below both Illinois and Hamilton County. All BGs qualify as low-income EJ populations due to meeting or exceeding the U.S. 2022 official poverty rate of 11.5 percent, or the thresholds for the state or the county and the state.

Table 3-40. Per capita household income and poverty status in the EJ study area

Geography	Per Capita Income	Percent of Persons Below Poverty Level
Low-Income EJ Thresholds to Meet or Exceed		
Illinois	$40,983	12.2
Franklin County	$26,858	18.7
Hamilton County	$28,258	13.2
Jefferson County	$28,620	14.7
Illinois	$43,198	11.6
Franklin County	$28,310	17.8
CT 405 BG 2	**$32,501**	*19.8*
CT 412 BG 1	**$35,005**	9.2
CT 412 BG 2*	**$27,543**	*20.8*
CT 412 BG 3*	**$28,862**	**14.0**
Hamilton County	$29,785	12.6
CT 9732 BG 3*	**$30,244**	*21.7*
CT 9733 BG 1	*$28,228*	8.1
CT 9733 BG 2*	**$28,447**	10.7
Jefferson County	$30,167	14.0
CT 504 BG 1*	**$32,654**	5.7
CT 504 BG 2	**$31,925**	6.2
CT 504 BG 3	*$10,825*	*21.6*

Source: USCB 2023a, ACS 2022
*Only intersects with the TVA Mineral Rights Area
Emboldened cells indicate BGs with low-income rates that are at least five percent different than the state.
Italicized cells indicate BGs with low-income rates that are at least five percent different than both the county and state.

3.14.1.3 Environmental Justice Indices

The USEPA EJScreen tool was used to consider 13 different environmental indicators (i.e., EJ indices) in the SBR No. 8 Mine Area in comparison to the state (USEPA 2023d). These indicators were examined to determine the risk of negative health impacts for residents living within the EJ study area. The 13 indicators that were examined included particulate matter 2.5 ($PM_{2.5}$), ozone, diesel particulate matter, air toxics cancer risk, air toxics respiratory hazard index (HI), toxic releases to air, traffic proximity and volume, lead paint, Superfund proximity, risk management plan (RMP) facility proximity, hazardous waste

proximity, underground storage tanks (USTs) and leaking UST, and wastewater discharge. Indicator levels of 50 or greater were considered to have above average pollution levels (above the 50th percentile as compared to the state).

The results of this examination indicated that only three BGs in the EJ study area generally contained above average levels of pollution. Therefore, these groups may be at risk for disproportionate and cumulative negative health impacts. Three of the BGs scored above average pollution in one environmental indicator (Table 3-41). The highest percentile (79th) in the BGs occurred in CT 504 BG 2 for RMP) facility proximity.

Google Streetview was used to assess the SBR No. 8 Mine Area and surrounding TVA Mineral Rights Area for minority or low-income indicators such as ethnic grocery stores or churches and signs of economic distress like dilapidated houses. In general, the area surrounding the SBR No. 8 Mine Area and TVA Mineral Rights Area does not appear dilapidated. Several Mennonite churches, including Middle Creek Mennonite Church and Ewing Mennonite Church, were identified within the SBR No. 8 Mine Area and TVA Mineral Rights Area (Google 2023).

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Table 3-41. Block Group Environmental Indicator Percentile Comparisons to the State for the EJ study area

Geography	Particulate Matter 2.5	Ozone	Diesel Particulate Matter	Air Toxics Cancer Risk	Air Toxics Respiratory HI	Toxic Releases to Air	Traffic Proximity and Volume	Lead Paint	Superfund Proximity	RMP Facility Proximity	Hazardous Waste Proximity	USTs and Leaking USTs	Wastewater Discharge
Franklin County													
CT 405 BG 2	8	20	16	0	36	2	15	18	15	2	8	19	**57**
CT 412 BG 1	6	24	3	0	0	1	5	39	11	39	5	0	43
CT 412 BG 2*	6	24	3	0	0	4	1	23	16	9	7	0	43
CT 412 BG 3*	6	24	3	0	0	4	2	37	25	1	10	10	29
Hamilton County													
CT 9732 BG 3*	5	22	0	0	0	2	0	26	11	10	3	0	38
CT 9733 BG 1	6	20	0	0	0	0	3	39	6	**55**	4	12	37
CT 9733 BG 2*	6	20	0	0	0	0	5	40	6	49	4	12	28
Jefferson County													
CT 504 BG 1*	6	17	6	0	0	2	10	32	11	17	15	13	11
CT 504 BG 2	6	17	6	0	0	1	4	46	8	**79**	8	0	29
CT 504 BG 3	6	17	6	0	0	1	38	41	9	1	8	16	9

Source: USEPA 2023d
*Only intersects with the TVA Mineral Rights Area
Emboldened cells indicate environmental indicator levels of 50 or greater, considered to have above average pollution levels (above the 50th percentile as compared to the state).

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3.14.2 Environmental Consequences

3.14.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no disproportionate impacts to EJ populations would result from the mining of additional TVA-owned coal. Impacts from the ongoing mining of previously approved TVA-owned coal and privately owned coal would continue to occur, but these impacts would continue to be minimized or mitigated.

While low-income populations are present in the vicinity of Sugar Camp Mine No. 1, the No Action Alternative would not disproportionately adversely affect them. In addition, the economic benefits may have a particular benefit to low-income populations in the mine vicinity.

3.14.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area.

While low-income populations EJ populations are present in the SBR No. 8 Mine Area, the Project would not disproportionately affect EJ populations as compared to impacts borne by all populations in and around the SBR No. 8 Mine Area. The overall impacts of Alternative A, as described in other sections in this chapter, would be minor, and reasonably foreseeable off-site impacts would be negligible. As such, no disproportionate or adverse direct or indirect impacts on minority or low-income populations due to human health or environmental effects are expected to result from Alternative A. In addition, the minor beneficial impacts to employment and income levels in the local region could provide additional opportunities to nearby environmental justice populations.

The No. 4 Bleeder Shaft is in CT 9733 BG 1. Per capita income in CT 9733 BG 1 is below that of Illinois and Hamilton County. An estimated 8.1 percent of people in CT 9733 BG 1 lived below the poverty level in 2022, which is lower than county, state, or national poverty levels (Table 3-40). Regarding minority populations, CT 9733 BG 1 has an estimated 6.9 percent minority population. Minority populations in CT 9733 BG 1 are higher than in Hamilton County, but much smaller than state or national levels (Table 3-39). Though CT 9733 BG 1 is considered a low-income EJ population, proposed No. 4 Bleeder Shaft impacts are unlikely to disproportionately affect the EJ population. Consideration of the effects of siting the bleeder shaft facilities on potentially vulnerable populations would occur during the IDNR-OMM permitting process and associated environmental reviews by TVA. Per IDNR Rules, these facilities may not be sited within 300 feet of any public building, school, church, community or institutional building, public park, or occupied dwelling, and landowners near the proposed facility location may state concerns about the proximity of these facilities to their properties. Such concerns would be considered by Sugar Camp, and siting adjustments would be made, as deemed appropriate.

Cumulative Effects

Based on the analysis conducted, it was determined that impacts resulting from Alternative A would not result in disproportionate and adverse impacts to any EJ populations in the EJ study area. It is acknowledged that low-income populations are present within the EJ study area; however, there is not a disproportionate and adverse effect to EJ populations when compared to the impacts borne by all populations in and around the EJ study area.

EJScreen data showed that three of the BGs contain pollutants at levels that are significantly higher than state averages. Therefore, Alternative A could result in amplified cumulative impacts to EJ populations as a result of pre-existing environmental contaminants. Two of the BGs, CT 9733 BG 1 and CT 504 BG 2, in the EJ study area are impacted by RMP facility proximity above the 50th percentile as compared to the state. An RMP facility is a facility that has developed a chemical accident management plan as guided by the EPA (USEPA 2023d). One of the BGs, CT 405 BG 2, is impacted by wastewater discharge above the 50th percentile as compared to the state. Sugar Camp holds a NPDES permit for industrial wastewater discharge(s) by ensuring any proposed process water discharge meets applicable effluent limits and water quality standards, as identified in the NPDES permit, and therefore should not result in adverse wastewater impacts to EJ populations.

Through appropriate mitigation measures, no cumulative adverse impacts would occur to EJ populations present in the vicinity of Sugar Camp Mine No. 1 resulting from implementation of Alternative A in combination with other actions within the watersheds that encompass the SBR No. 8 Mine Area, including the activities associated with the No Action Alternative; however, cumulative beneficial impacts to these populations may be realized.

EJ impacts would continue to be avoided by IDOT and by the mine operators due to compliance with IDNR permit requirements to avoid, minimize, or mitigate adverse effects from mining operations.

3.14.2.3 Alternative B

Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.14.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects

The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal reserves in the remaining TVA Mineral Rights Area are not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.14.2.1). If the coal reserves in the remaining TVA Mineral Rights Area are mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A.

Cumulative Effects

No cumulative adverse impacts would occur to EJ populations present in the vicinity of Sugar Camp Mine No. 1 resulting from implementation of Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds; however, moderate cumulative beneficial impacts may be realized. EJ impacts would continue to be avoided by IDOT and by the mine operators due to compliance with IDNR-OMM permit requirements to avoid, minimize, or mitigate adverse effects from mining operations.

3.14.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.14.2.3).

3.15 Noise and Visual Resources

3.15.1 Affected Environment

3.15.1.1 Noise

Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). The human ear does not perceive all sound frequencies equally well. Therefore, measured sound levels are adjusted or weighted to correspond more closely to noise perceived by human hearing. The adjusted noise metric that most closely duplicates human perception of noise is known as the A-weighted decibel (dBA). The threshold of human hearing is zero decibels (dB), and the threshold of discomfort or pain is around 120 dB.

A day-night average sound level (L_{dn}) is a 24-hour noise descriptor used to assess noise impacts for land uses where people sleep and there is a heightened sensitivity to nighttime noise. The L_{dn} noise metric is recommended by the USEPA and has been adopted by most federal agencies (USEPA 1974). An L_{dn} of 65 dBA is the threshold level most commonly used for noise planning purposes, representing compromise between community impact and the need for activities such as construction. The dBA is the adjusted noise metric that most closely duplicates the human perception of noise. Areas exposed to an L_{dn} above 65 dBA are generally not considered suitable for residential use. An L_{dn} of 55 dBA was identified by USEPA as a level below which there is no adverse impact (USEPA 1974). Noise levels (measured in dBA) of common activities/situations are provided in Table 3-42.

Table 3-42. Noise levels of common activities/situations

Activity/Event	A-weighted decibel (dBA)
Lowest audible sound to person with average hearing	0
Quiet rural, nighttime	25
Quiet urban, nighttime	45
Large business office	60
Normal speech at three feet	70
Noisy urban area, daytime	75
Food blender at three feet	90
Gas lawn mower at three feet	100
Jet flyover at 1,000 feet	110

Source: California Department of Transportation 2013

Noises occurring at night generally produce a greater annoyance than do noises of the same levels occurring during the day. People generally perceive intrusive noise at night as being 10 dBA louder than the same level of noise during the day. This perception is largely because background environmental sound levels at night in most areas are about 10 dBA lower than those during the day (USEPA 1974).

Ambient noise in the SBR No. 8 Mine Area (including the No. 4 Bleeder Shaft) and the TVA Mineral Rights Area consists mainly of agricultural, road and rail transportation, rural, and natural sounds such as wind and wildlife. Generally, noise levels of these types range from

45 to 55 dBA (USDOT 2006). Portions of Evansville Western Railway and Canada National Railway and several roads bisect the SBR No. 8 Mine Area and the TVA Mineral Rights Area including highways and less-traveled state and county roads. Noise from freight trains traveling at 50 miles per hour measures around 80 dBA at a distance of 100 feet (California High-Speed Rail Authority 2018). Trains using horns must not exceed 110 dB to be in accordance with Federal Railroad Administration requirements (Federal Railroad Administration 2020).

In addition to residences, sensitive noise receivers can include schools, churches, cemeteries, public parks, and historic buildings or sites. USGS National Structure Dataset (NSD) identified 676 buildings in the SBR No. 8 Mine Area with an additional 1,295 buildings located in the TVA Mineral Rights Area. Desktop analysis also identified one school within the SBR No. 8 Mine Area and TVA Mineral Rights Area; one additional school is in the TVA Mineral Rights Area (Illinois State Board of Education 2022). Seven cemeteries were identified in the SBR No. 8 Mine Area with eight additional cemeteries in the TVA Mineral Rights Area. Two churches were identified in the SBR No. 8 mine Area, and three additional churches are in the TVA Mineral Rights Area (USGS 2024, Google Earth 2024). Portions of one public park intersect the TVA Mineral Rights Area (IDNR 2023e). 30 historic buildings or sites are located within the SBR No. 8 Mine Area, with an additional 23 historic buildings or sites located within the TVA Mineral Rights Area (Table 3-43).

The No. 4 Bleeder Shaft and a surrounding 0.5-mile buffer were examined to identify potential sensitive noise receivers and viewpoints. Based on aerial imagery and USGS NSD, 29 sensitive noise receivers are near the No. 4 Bleeder Shaft. 24 of these receivers overlap with the SBR No. 8 Mine Area and TVA Mineral Rights Area. These primarily consist of residential farm complexes, associated outbuildings, and isolated residential buildings, with each building generally counted as one receptor. Five of the receivers, two of which are in the SBR No. 8 Mine Area, were identified as historic-age architectural resources, however none of these were recommended eligible for listing in the NRHP. Three of the receivers, one of which is in the SBR No. 8 Mine Area, were identified as archaeological sites, however none of these were recommended eligible for listing in the NRHP (Section 3.10.1.2). These receivers are located approximately 417 feet to 2,577 feet from the No. 4 Bleeder Shaft. No schools, cemeteries, churches, or public parks were identified near the No. 4 Bleeder Shaft. Five historic buildings and three archaeological sites were identified near the No. 4 Bleeder Shaft. Table 3-43 provides a further breakdown of sensitive noise receivers.

Table 3-43. Sensitive noise receivers present in the SBR No. 8 Mine Area, TVA Mineral Rights Area, and half-mile buffer of the No. 4 Bleeder Shaft

Sensitive Noise Receiver Type[1]	Frequency		
	SBR No. 8 Mine Area	TVA Mineral Rights Area	½-mile buffer of the No. 4 Bleeder Shaft
Schools	1	1	0
Churches	2	3	0
Cemeteries	7	8	0
Public Parks	0	1	0
Historic Buildings or Sites	30	23	2
Unidentified Buildings[1]	676	1,295	3
Total Number of Noise Receivers by Area	**716**	**1,331**	**5**

Sources: Google Earth 2023, USGS 2024, NPS 2024, and IDNR 2023e
[1]Includes residential, commercial, agricultural, and other types of buildings.

3.15.1.2 Visual Resources

Visual resources are composed of the visual character of a place and include both natural and human-made attributes. Visual resources influence how an observer experiences a particular location and distinguishes it from other locations. For example, an agricultural setting would elicit very different feelings in an observer than would a manufacturing plant or an industrial area. Such resources are important to people living in or traveling through an area and can be an essential component of historically and culturally significant settings. For this analysis, the scenery management system and associated analytical assessment procedures developed by the USFS are adapted for use within a natural and human-built environment and integrated with planning methods used by TVA (after TVA 2016; USDA 1995). The general area viewshed is evaluated based on its scenic attractiveness and scenic integrity. Scenic attractiveness is a measure of the scenic beauty of a landscape based on perceptions of the visual appeal of landforms, waterways, vegetation, and the human-built environment. Scenic attractiveness is assessed as either distinctive, typical/common, or indistinctive. As adapted for this analysis, scenic integrity measures the degree of visual unity of the natural and cultural character of the landscape. Scenic integrity is evaluated as either low, moderate, or high. This analysis also considers the existing character of the area as an important factor in understanding the affected environment.

The SBR No. 8 Mine Area and TVA Mineral Rights Area are northeast of the City of Benton. The regional character is mostly rural, with agricultural and pasture fields, flat terrain with rolling hills, forested areas, and generally small towns and communities. Existing components associated with the coal preparation plant include reclaim tunnels, parking lots, access roads, drainage control structures, office buildings, changing rooms, assembly rooms, warehousing facilities, storage facilities, elevator facilities, ventilation facilities, RDAs, overland conveyors, screens, a crusher, power distribution facilities, power lines, water lines, a rail loadout, stockpile areas, and other associated facilities. The visual characteristics of the SBR No. 8 Mine Area, TVA Mineral Rights Area, and No. 4 Bleeder Shaft are similar to the regional character described above. Scenic attractiveness of these areas is rated as typical or common of a rural agricultural and rural residential area. Scenic

integrity is assessed as moderate to high due to the relative unity and consistency of the surrounding natural and cultural character.

Prominent visual receptors (viewpoints) near the No. 4 Bleeder Shaft, where more concentrated visual effects from the construction of bleeder shaft facilities could occur, include six residential farm complexes and three isolated residential buildings (Table 3-44, Figure 3-15). Of the six residential farm complexes, four are located along County Road 1400, running west-east near the southern boundary of the No. 4 Bleeder Shaft, and two are located along County Road 300 East, running north-south along the western boundary of the No. 4 Bleeder Shaft. Two isolated residential buildings are located on County Road 1400 and one isolated residential building is located on County Road 300 East.

Two of the residential farm complexes adjacent to County Road 1400 have sparse tree cover and unobstructed views of the No. 4 Bleeder Shaft to the north and east. Views of the No. 4 Bleeder Shaft from the remaining two residential farm complexes located along County Road 1400 are obstructed by forest. One of the isolated residential buildings on County Road 1400 has a partially obstructed view of the No. 4 Bleeder Shaft to the northwest by a forested area. The remaining isolated residential building on County Road 1400 has a forested area on the west side of the property that obstructs the view of the No. 4 Bleeder Shaft.

One of the residential farm complexes adjacent to County Road 300 East has a completely obstructed view of the No. 4 Bleeder Shaft due to surrounding forested areas. The second residential farm complex adjacent to County Road 300 East has a partially obstructed view of the No. 4 Bleeder Shaft. Most of the No. 4 Bleeder Shaft is obstructed by a forest stand to the southeast of the complex. The isolated residential building adjacent to County Road 300 East is surrounded by trees that would obstruct the view of the No. 4 Bleeder Shaft.

The long-range views from portions of County Road 1400, County Road 300 East, and Evansville Western Railway as they pass near the No. 4 Bleeder Shaft are partially obscured by mature trees. The long-range views from other portions of these roads are unobstructed because of intervening cropland. County Road 350 has unobstructed views of the No. 4 Bleeder Shaft.

Table 3-44. Viewpoints in the vicinity of the No. 4 Bleeder Shaft

Receptor Location	Description	Receptor Type	Views to No. 4 Bleeder Shaft
County Road 1400	Two-lane gravel public road that extends west-east along the southern boundary of the No. 4 Bleeder Shaft.	Residential farm complex Road travelers	Partially obscured by mixed deciduous trees
County Road 300 East	Two-lane gravel public road that extends north-south, intersecting with County Road 1400.	Residential farm complex Isolated single-family home Road travelers	Partially obscured by mixed deciduous trees
County Road 350	Gravel road that traverses north-south along the eastern boundary of the No. 4 Bleeder Shaft and intersects with County Road 1400. Provides access to the No. 4 Bleeder Shaft through its connection with County Road 1400.	Road travelers	Unobstructed
Evansville Western Railway	Railway that extends northeast-southwest near the southeastern boundary of the No. 4 Bleeder Shaft and intersects County Road 350 and County Road 1400.	Rail travelers	Partially obscured by mixed deciduous trees

Figure 3-15. Visual resources in the vicinity of the No. 4 Bleeder Shaft

3.15.2 Environmental Consequences

3.15.2.1 No Action Alternative

Under the No Action Alternative, TVA would not approve the proposed mining plan and would not divest the TVA Mineral Rights Area. Thus, no noise or visual impacts associated with the mining of additional TVA-owned coal would occur. Noise and visual impacts from the ongoing mining and processing of previously approved TVA-owned coal and privately owned coal would continue to occur.

Noise and visual impacts would continue to occur in the vicinity of the existing coal preparation plant during the life of the mining operations and in sporadic locations during the operational life of the bleeder shaft facilities associated with private/TVA-approved coal mining. The bleeder shaft facilities are located in rural, agricultural areas and would cause minor noise and visual impacts to surrounding residences and businesses. During construction and blasting, noise impacts would be avoided or mitigated, in compliance with IDNR permit requirements. While the planned East RDA would have a similar operational life as the bleeder shaft facilities, this facility would have a long-term visual effect, lessening over time as this soil-capped impoundment revegetates.

3.15.2.2 Alternative A

Under Alternative A, TVA would approve the proposed mining plan and would not divest the TVA Mineral Rights Area. This would result in minimal and temporary noise and visual impacts due to the construction of six new bleeder shaft facilities, including the #4 shaft in the No. 4 Bleeder Shaft.

Surface Disturbances

Under Alternative A, noise would be generated by heavy equipment used to construct the bleeder shaft facilities as detailed in Section 2.2.1.1. The exact location of one of the bleeder shaft facilities is known; thus, only the current number of homes or businesses within a half-mile buffer of the No. 4 Bleeder Shaft were quantified. However, because land use within the SBR No. 8 Mine Area is primarily agricultural with sparse residences and businesses, the five additional bleeder shaft facilities are not likely to have adverse noise or visual effects.

Construction noise would cause temporary and moderate adverse impacts to the ambient sound environment in the No. 4 Bleeder Shaft. Several residences and residential agricultural complexes would experience heightened noise during construction. However, when freight trains travel through the area on nearby railways, ambient sounds in the No. 4 Bleeder Shaft are often higher than the typical 45 to 55 dB, and these existing noises would help offset effects from construction during this time. Additionally, construction would primarily occur during daylight hours, between sunrise and sunset; therefore, construction would not affect ambient noise levels at night during most of the construction period. Most of the proposed equipment would not be operating on-site for the entire construction period but would be phased in and out according to the progress of construction.

The No. 4 Bleeder Shaft would initially be developed with small dozers and a loader removing and stockpiling topsoil on the perimeters of the site for later reclamation of the site. A Frontier-Kemper 350MT Blind Drilling System would be used to complete the bleeder shaft. The 26 buildings near the No. 4 Bleeder Shaft, consisting of residential farm complexes and isolated residential buildings, would hear an increase in noise as a result of construction activities. Construction-related noise levels would range from 80 to 93 dB at 50

feet, which is greater than 45 to 55 dB associated with rural areas (California Department of Transportation 2013). However, noise decreases by six dB with every doubling of distance from a noise-generating source, and the No. 4 Bleeder Shaft is approximately 417 feet from the closest building. The nearest building would experience noise levels ranging from 62 to 75 dB during construction periods, similar to a busy office or noisy urban area. These noise levels are above both the U.S. Department of Housing and Urban Development and USEPA guidelines of 65 and 55 dBA, respectively. The remaining five bleeder shaft facilities are likely to be placed in agricultural areas away from residences and businesses.

During normal operation, properties directly adjacent of the No. 4 Bleeder Shaft and additional five bleeder shaft facilities could potentially hear noise consisting of trucks or machinery. Noise would also be generated by fans installed within the bleeder ventilation shaft; some of this noise would be shielded by the vent housing, as well as by surrounding topography and vegetation. Operational noise generated by the bleeder shaft fan would be constant. However, due to the attenuation caused by the IDNR-required 300-foot setback from occupied dwellings, noise levels at the nearest residences would be comparable to normal ambient noise. The operational life of each bleeder shaft facility is expected to be approximately five years. After that time, the equipment would be removed, and no additional operational noise would be generated. Operational noise impacts of the bleeder shaft facilities are expected to be minor.

Visual impacts would occur during construction and operation of the bleeder shaft facilities; the extent of visual impacts would depend on the siting of the bleeder shaft facilities. Visually speaking, the bleeder shaft facilities would not be dramatically different from the current scenery in the SBR No. 8 Mine Area. While the viewshed in the immediate vicinity would change from a mostly rural setting to an industrial one with the addition of these components, the broader viewsheds in the SBR No. 8 Mine Area constitute a predominantly agricultural setting with localized existing coal infrastructure.

The construction of the No. 4 Bleeder Shaft and five additional bleeder shaft facilities would change the visible environment of the SBR No. 8 Mine Area. During construction, heavy machinery would be present, though this would not be out of place in comparison to the equipment used at the nearby coal preparation plant and cultivation of the agricultural fields. Additionally, existing plant communities at the No. 4 Bleeder Shaft including deciduous forested areas, would be removed, and part of the site would be graded, changing the contouring, coloring and texture of the scenery attributes. During construction, the SBR No. 8 Mine Area would appear as a mixture of browns and grays due to earthmoving, road construction, and other construction activities.

The properties with views most affected by the No. 4 Bleeder Shaft include two of the residential farm complexes adjacent to County Road 1400, one of the isolated residential buildings on County Road 1400, and one residential farm complex adjacent to County Road 300 East. The No. 4 Bleeder Shaft would change the unobstructed of the residential farm complexes and isolated residential buildings from an agricultural field to a bleeder shaft cover and fan as well as drill sites that would be covered with eight inches of crusher-run gravel. Road travelers would see the No. 4 Bleeder Shaft while on the adjacent public roads. These visual impacts would be most noticed from County Road 1400, County Road 300 East, County Road 350, and the Evansville Western Railway. The topography of the area is generally flat with some rolling hills, but the relatively stable elevations and tree-lined drainages and site boundaries block views of the site from most other vantage points.

The No. 4 Bleeder Shaft and the five additional bleeder shaft facilities would be reclaimed or capped with soil at the end of their operational life; overall the adverse visual impacts are expected to occur in various portions of the SBR No. 8 Mine Area over approximately 25 years. Reclamation of the bleeder shaft facilities would revert the industrial coal production views to a grassed area with comparable visual characteristics as the affected environment.

Due to the changing visual character of the SBR No. 8 Mine Area and surrounding area, and the proposed reclamation plan, the change in viewshed from agricultural land and forested areas to industrial coal facilities is not expected to result in permanent adverse impacts.

Coal Extraction-Related Effects

Underground mining operations would generally not be heard above ground within the SBR No. 8 Mine Area. Planned subsidence is not expected to result in noise impacts. Most of the subsidence would not be noticeable visually due to the general relief of the terrain in the SBR No. 8 Mine Area. This terrain is hilly with forested areas and agricultural fields. Negligible visual impacts may occur as land subsides in a controlled manner but is not expected to be noticeable or change the visual character of the SBR No. 8 Mine Area vicinity.

Overall, direct impacts to noise and visual resources associated with implementation of Alternative A would be anticipated to be moderate and temporary during the construction of bleeder shaft facilities and minor during regular mine operation.

Cumulative Effects

Overall, cumulative impacts of Alternative A along with other mining operations within the watersheds that encompass the SBR No. 8 Mine Area, including the activities associated with the No Action Alternative, have and would alter the soundscape and scenery in the vicinity of Sugar Camp Mine No. 1 and other area mines, but due to implementation of the IDNR-OMM-required reclamation plan, the localized noise and visual impacts are not expected to result in permanent cumulative adverse impacts. Noise impacts would continue to be avoided or mitigated, per permit requirements. Changes to the visual character of the vicinity of existing surface effects areas are temporary due to implementation of the reclamation plan.

Noise and visual impacts have occurred within the watersheds that encompass the SBR No. 8 Mine Area as a result of past mining actions and would continue with ongoing mining operations. Due to the rural nature of the watersheds that encompass the SBR No. 8 Mine Area, mine operators would likely continue to locate the bleeder shaft facilities in rural, agricultural areas, and these facilities would cause noise and visual impacts to nearby residences and businesses. During construction, noise impacts associated with construction of bleeder shaft facilities would continue to be avoided or mitigated, per IDNR-OMM permit requirements. Noise and visual impacts would not occur in relation to planned subsidence of the estimated 105,567 acres.

Overall, cumulative impacts have altered the soundscape and scenery in the vicinity of area mines, but due to implementation of the IDNR-OMM-required reclamation plan, the localized noise and visual impacts in relation to the mine plan and other actions considered in this analysis are not expected to result in significant permanent cumulative adverse impacts.

3.15.2.3 Alternative B

Under Alternative B, TVA would approve the proposed mining plan and would divest the remaining TVA Mineral Rights Area. Refer to Section 3.15.2.2 for impacts as a result of approval of the mine plan.

Divestment of TVA Mineral Rights Area Effects

The purchasing entity may or may not mine the coal in the remaining TVA Mineral Rights Area in the future. If the coal in the remaining TVA Mineral Rights Area is not mined, TVA assumes that the impacts would be as described in the No Action Alternative (Section 3.15.2.1). If the coal in the TVA Mineral Rights Area is mined, TVA assumes that the mining techniques, and therefore the impacts, would be the same as described for Alternative A. IDNR-OMM permit requirements should be followed by all new owners and operators thus limiting adverse impacts to noise and visual resources.

Cumulative Effects

Cumulatively, Alternative B along with the other actions as described in Section 3.1 for the SBR No. 8 Mine Area watersheds and the TVA Mineral Rights Area watersheds would result in continued noise and visual impacts with ongoing mining operations. Due to the rural nature of these areas, mine operators would likely continue to locate bleeder shaft facilities in rural, agricultural areas, and these facilities would cause noise and visual impacts to nearby residences and businesses. During construction, noise impacts associated with construction of bleeder shaft facilities would continue to be avoided or mitigated, per IDNR-OMM permit requirements. Noise and visual impacts would not occur in relation to planned subsidence of the estimated 676,740 acres.

Overall, cumulative impacts have altered the soundscape and scenery in the vicinity of area mines, but due to implementation of the IDNR-OMM-required reclamation plan, the localized noise and visual impacts in relation to the mine plan and other actions considered in this analysis are not expected to result in significant permanent cumulative adverse impacts.

3.15.2.4 Alternative C

Under Alternative C, TVA would not approve the proposed mining plan and would divest the TVA Mineral Rights Area. The purchasing entity may or may not mine the coal in the TVA Mineral Rights Area in the future. TVA assumes the impacts to be similar to those of Alternative B (Section 3.15.2.3).

Cumulative Effects

Cumulatively, Alternative C along with other mining operations within the watersheds that encompass the SBR No. 8 Mine Area and TVA Mineral Rights Area would lead to continued minimal and mitigated impacts to noise and visual resources. Refer to Section 3.15.2.3 for cumulative effects as a result of divestment of the TVA Mineral Rights Area.

3.16 Unavoidable Adverse Environmental Impacts

The Proposed Action could cause some unavoidable adverse environmental effects (Table 2-3). Depending upon the exact nature of the Project effects, these resources could include cultural resources, groundwater, surface water quality, wetlands, terrestrial plants and wildlife, transportation, federally and state-listed species, and prime farmland. These effects could result from land use changes, including vegetation clearing. Some of these adverse effects could be reduced through implementing mitigation measures as described in Section 2.7.

Use of land for construction of the bleeder shaft facilities could result in unavoidable impacts to prime farmland and farmland of statewide importance during operation of the mine. These temporary impacts would affect no more than 39 acres of land. The extent of the impact would depend on the acres of prime farmland in the footprint of the bleeder shaft facilities and the timing of subsidence and drainage restoration activities.

As explained in Section 3.4.2, extraction of underground coal results in the unavoidable release of methane. The transportation of the coal to the end users and the combustion of the coal by the end users would also result in the emission of substantial quantities of CO_2. The emissions of methane and CO_2, both of which are GHGs that contribute to long-term global climate changes, also constitute an unavoidable adverse effect.

Planned subsidence has the potential to cause unavoidable impacts to various resources due to changes in topography and hydrology or from direct damage to structures. Subsidence could cause changes in drainage patterns, thereby affecting wetland functions. Groundwater quantity and quality could also be impacted. However, the IDNR permit would require repair of such damages or compensation to surface landowners for these damages; therefore, these impacts would be temporary.

3.17 Relationship of Short-Term Uses and Long-Term Productivity

Short-term uses are those that generally occur on a year-to-year basis. Examples are wildlife use of forage, timber management, recreation, and human use of water resources. Long-term productivity is the capability of the land to provide both market and nonmarket resources for future generations. In this context, long-term impacts to SBR No. 8 Mine Area productivity would be those that last beyond the life of the Project.

The Proposed Action would affect short-term uses of the 16,129-acre portion of the SBR No. 8 Mine Area where planned subsidence would occur as well as the locations of the bleeder shaft facilities. Subsidence could result in short-term losses of agricultural production in limited areas due to temporary changes in soils, topography, and drainage patterns. Following the IDNR-OMM-required reclamation and restoration activities, the productivity of the SBR No. 8 Mine Area, for both humans and wildlife, would be restored with no expected long-term losses. Overall, any long-term loss of productivity would be negligible.

3.18 Irreversible and Irretrievable Commitments of Federal Resources

An irreversible or irretrievable commitment of Federal resources would occur when such resources would be consumed, committed, or lost because of the Project. The 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. The proposed extraction of TVA-owned coal associated with the Project, as well as some construction and operation activities, would result in an irretrievable and irreversible commitment of natural and physical resources, most notably the TVA-owned coal, a Federal resource. The implementation of the Proposed Action would involve irreversible commitment of fuel, electric energy, and resource labor required to operate mining equipment and the coal preparation plant and bleeder shaft facilities represent other irreversible commitments of resources. Because of IDNR-OMM-required reclamation and restoration activities, the SBR No. 8 Mine Area would not be irreversibly altered, overall, as the SBR No. 8 Mine Area would be returned to IDNR-OMM-approved post-mining conditions and, thus, used for pre-mining activities such as agriculture or other productive purposes upon cessation of the Proposed Action.

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Appendix A – Notice of Intent

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been decided in favor of a complainant within the two-year period; and 4 the requirements at 49 CFR 1105.7(b) and 1105.8(c) (notice of environmental and historic reports , 49 CFR 1105.12 newspaper publication , and 49 CFR 1152.50(d)(1 notice to government agencies have been met.

As a condition to this exemption, any employee adversely affected by the abandonment shall be protected under *Oregon Short Line Railroad—Abandonment Portion Goshen Branch Between Firth Ammon, in Bingham & Bonneville Counties, Idaho,* 360 I.C.C. 91 (1979). To address whether this condition adequately protects affected employees, a petition for partial revocation under 49 U.S.C. 10502 d must be filed.

Provided no formal expression of intent to file an offer of financial assistance (OFA) has been received,[1] this exemption will be effective on October 1, 2023, unless stayed pending reconsideration. Petitions to stay that do not involve environmental issues,[2] formal expressions of intent to file an OFA under 49 CFR 1152.27(c 2 , and interim trail use/railbanking requests under 49 CFR 1152.29 must be filed by September 11, 2023.[3] Petitions to reopen and requests for public use conditions under 49 CFR 1152.28 must be filed by September 21, 2023.

All pleadings, referring to Docket No. AB 55 Sub-No. 812X), must be filed with the Surface Transportation Board either via e-filing on the Board's website or in writing addressed to 395 E Street SW, Washington, DC 20423–0001. In addition, a copy of each pleading must be served on CSXT's representative, Louis E. Gitomer, Law Offices of Louis E. Gitomer, LLC, 600 Baltimore Avenue, Suite 301, Towson, MD 21204.

If the verified notice contains false or misleading information, the exemption is void ab initio.

CSXT has filed a combined environmental and historic report that addresses the potential effects, if any, of the abandonment on the environment and historic resources. OEA will issue a Draft Environmental Assessment (Draft EA) by September 8, 2023. The Draft EA will be available to interested persons on the Board's website, by writing to OEA, or by calling OEA at (202) 245–0294. If you require an accommodation under the Americans with Disabilities Act, please call (202) 245–0245. Comments on environmental or historic preservation matters must be filed within 15 days after the Draft EA becomes available to the public.

Environmental, historic preservation, public use, or trail use/railbanking conditions will be imposed, where appropriate, in a subsequent decision.

Pursuant to the provisions of 49 CFR 1152.29(e (2), CSXT shall file a notice of consummation with the Board to signify that it has exercised the authority granted and fully abandoned the Line. If consummation has not been effected by CSXT's filing of a notice of consummation by September 1, 2024, and there are no legal or regulatory barriers to consummation, the authority to abandon will automatically expire.

Board decisions and notices are available at *www.stb.gov.*

Decided: August 29, 2023.

By the Board, Mai T. Dinh, Director, Office of Proceedings.

Jeffrey Herzig,

Clearance Clerk.

[FR Doc. 2023–18981 Filed 8–31–23; 8:45 am]

BILLING CODE 4915–01–P

[1] Persons interested in submitting an OFA must first file a formal expression of intent to file an offer, indicating the type of financial assistance they wish to provide (*i.e.,* subsidy or purchase and demonstrating that they are preliminarily financially responsible. *See* 49 CFR 1152.27 c 2 i .

[2] The Board will grant a stay if an informed decision on environmental issues (whether raised by a party or by the Board's Office of Environmental Analysis (OEA) in its independent investigation cannot be made before the exemption's effective date. *See Exemption of Out-of-Serv. Rail Lines,* 5 I.C.C.2d 377 (1989). Any request for a stay should be filed as soon as possible so that the Board may take appropriate action before the exemption's effective date.

[3] Filing fees for OFAs and trail use requests can be found at 49 CFR 1002.2 f 25 and 27 , respectively.

TENNESSEE VALLEY AUTHORITY

Sugar Camp Energy LLC Mine No. 1 Significant Boundary Revision 8 Environmental Impact Statement

AGENCY: Tennessee Valley Authority.

ACTION: Notice of intent.

SUMMARY: The Tennessee Valley Authority TVA) intends to prepare an Environmental Impact Statement evaluating the proposed expansion of mining operations proposed mine expansion by Sugar Camp Energy, LLC Sugar Camp to extract TVA-owned coal reserves in Franklin, Hamilton, and Jefferson counties, Illinois. The proposed 22,414-acre expansion area contains 21,868 acres of coal reserves owned by TVA that are under a coal lease agreement with Sugar Camp. TVA will consider whether to approve Sugar Camp's application to mine TVA-owned coal reserves within the project area. Additionally, TVA will evaluate the divestiture of TVA's mineral rights and associated land rights in Franklin, Hamilton and Jefferson counties, Illinois.

DATES: To ensure considerations, comments on the scope, alternatives being considered, and environmental issues must be received or postmarked, emailed, or submitted online no later than October 2, 2023.

ADDRESSES: Written comments should be sent to Elizabeth Smith, NEPA Specialist, TVA, 400 W. Summit Hill Drive #WT11B, Knoxville, Tennessee 37902. Comments may be sent submitted online at *https://www.tva.gov/NEPA* or by email at *NEPA@tva.gov.*

FOR FURTHER INFORMATION CONTACT: Elizabeth Smith by phone at 865–632–3053, by email at *esmith14@tva.gov,* or by mail at the address above.

SUPPLEMENTARY INFORMATION: This notice is provided in accordance with the Council on Environmental Quality regulations 40 CFR parts 1500 to 1508) and TVA procedures for implementing the National Environmental Policy Act (NEPA . TVA is a federal corporation and instrumentality of the United States government, created in 1933 by an act of Congress to foster the social and economic well-being of the residents of the Tennessee Valley region. As part of its diversified energy strategy, TVA completed a series of land and coal mineral acquisitions from the 1960s through the mid-1980s that resulted in the ownership of approximately 65,000 acres of coal reserves. These reserves consist of approximately 1.35 billion tons of Illinois coal, including portions of the Springfield (also known as Number [No.] 5) and Herrin also known as No. 6 coal seams. TVA executed a coal lease agreement with Sugar Camp in July 2002 to mine portions of the TVA Illinois coal reserves in an environmentally sound manner, as subject to environmental reviews in accordance with NEPA and other applicable laws and regulations. Based in part on TVA's evolving electricity generation priorities, and TVA's diminishing need for coal to supply TVA's electricity generating portfolio, TVA is considering divesting itself of these same land and mineral acquisitions.

Background

On January 4, 2023, Sugar Camp submitted Permit 382 Significant Boundary Revision (SBR 8 application to Illinois Department of Natural Resources (IDNR proposing to expand its underground longwall mining operations at its Sugar Camp Mine No. 1 in Franklin, Hamilton, and Jefferson counties, Illinois, by approximately

22,414 acres the project area). TVA-owned coal reserves underlie approximately 21,868 acres of the project area. Under the proposal, Sugar Camp would extract approximately 122 million raw tons of TVA-owned coal over a 25-year period (this excludes 45M tons currently permitted . Underground mining would be performed using room and pillar and continuous mining techniques during a development period, followed by longwall mining and associated planned subsidence controlled settlement of the ground surface . Planned subsidence would occur within the project area once the coal has been removed through longwall mining methods. Sugar Camp would utilize its existing Sugar Camp Mine No. 1 facilities to process and ship the extracted coal, and expansion of these facilities is not needed to support the proposed mine expansion. Sugar Camp would also construct approximately six bleeder ventilation shafts bleeder shafts, which ventilate the underground mine area) and install associated utilities needed to operate the bleeder shafts within the project area.

Under the terms of the lease agreement, Sugar Camp cannot commence mining of TVA-owned coal reserves until completion of all environmental reviews required under applicable laws and regulations have been finalized. TVA intends to prepare an Environmental Impact Statement EIS) to consider whether to approve Sugar Camp's application to mine the TVA-owned coal reserves underlying the project area and/or divest all remaining TVA-owned mineral reserves in Illinois.

The EIS initiated by TVA will assess the environmental impact of approving the mining of TVA-owned coal under the mine plan and/or divesting all TVA-owned mineral reserves in IL. In doing so, TVA will address the cumulative impacts from other coal mining activities and identified federal and private actions. The cumulative impacts considered will include approved or completed activities associated with Sugar Camp Mine No. 1.

The operations of Sugar Camp Mine No. 1 have previously been subject to TVA review and approval. In 2008, Sugar Camp obtained Underground Coal Mine (UCM Permit No. 382 from IDNR for underground longwall mining operations within approximately 12,103 acres in Franklin and Hamilton counties; the original permit did not include TVA-owned coal reserves. In 2010, Sugar Camp applied to IDNR for an expansion associated with UCM Permit No. 382 to mine TVA-owned coal under an additional 817-acre area. The permit was issued in May 2010. In 2011, TVA prepared an Environmental Assessment (EA) to document the potential effects of Sugar Camp's proposed mining of TVA-owned coal underlying a 2,600-acre area.

In November 2017, Sugar Camp obtained approval from IDNR to expand Sugar Camp Mine No. 1 by 37,972 acres. This proposal included the expansion of operations along the northern perimeter of the original mine perimeter, into a 2,250-acre area referred to as Viking District No. 2. In November 2018, TVA completed an EA that addressed expansion of mining operations into Viking District No. 2. In May 2019, TVA supplemented this EA to consider Sugar Camp's proposal to expand its mining into a 155-acre area within the Viking District No. 3, adjacent to Viking District No. 2.

In August 2019, TVA issued a Notice of Intent in the **Federal Register** to complete an EIS for the mining of approximately 12,125 acres of TVA-owned coal reserves associated with SBR No. 6 of UCM Permit No. 382. In October 2020, TVA issued the Final EIS outlining the analysis of alternatives associated with this additional mining of TVA coal reserves. In November 2020, TVA published a Record of Decision and approved Sugar Camp's application to mine the additional TVA-owned coal reserves under the IDNR-approved SBR No. 6.

Alternatives

TVA has initially identified four alternatives for evaluation in the EIS associated with the proposed purpose and need. These include a No Action Alternative and three Action Alternatives. Under the No Action Alternative, TVA would not approve the requested expansion to mine TVA-owned coal within the project area. Under Action Alternative A, TVA would implement the terms of the existing coal lease agreement, evaluate, and potentially approve the plan to mine 21,868 acres of TVA-owned coal as submitted by Sugar Camp in the current SBR of UCM Permit No. 382. Under Action Alternative B, TVA would implement the terms of the existing coal lease agreement, evaluate, and potentially allow mining of the 21,868 acres of TVA-owned coal, and consider divesting the remaining TVA-owned mineral rights/reserves including coal, oil, and gas in IL, and all associated surface rights. Under Action Alternative C, TVA considers divesting all remaining TVA-owned mineral rights/reserves including coal, oil, and gas in IL, and all associated surface rights, and would not approve Sugar Camp's expansion request as detailed under UCM Permit No. 382.

The EIS will evaluate ways to mitigate impacts that cannot be avoided. The description and analysis of these alternatives in the EIS will inform decision makers, other agencies, and the public about the potential for environmental impacts associated with the proposed mine expansion and/or divesting TVA-owned mineral rights. TVA solicits comment on whether there are other alternatives that should be assessed in the EIS. TVA also requests information and analyses that may be relevant to the project.

Resource Areas and Issues To Be Considered

Public scoping is integral to the process for implementing NEPA and ensures that (1) issues are identified early and properly studied, (2) issues of little significance do not consume substantial time and effort, and 3 the analysis of identified issues is thorough and balanced. This EIS will identify the purpose and need of the Action Alternatives and will contain descriptions of the existing environmental and socioeconomic resources within the area that could be affected by the proposed mine expansion. Evaluation of potential environmental impacts to these resources will include, but not be limited to, air quality and greenhouse gas emissions, surface water, groundwater, wetlands, floodplains, vegetation, wildlife, threatened and endangered species, land use, natural areas and parks and recreation, geology, soils, prime farmland, visual resources, noise, cultural resources, socioeconomics and environmental justice, solid and hazardous waste, public and occupational health and safety, utilities, and transportation. The EIS will analyze measures that would avoid, minimize, or mitigate environmental effects.

The final range of issues to be addressed in the environmental review will be determined, in part, from scoping comments received. TVA is particularly interested in public input on the scope of the EIS, alternatives being considered, and environmental issues that should be addressed as part of this EIS. The preliminary identification of reasonable alternatives and environmental issues in this notice is not meant to be exhaustive or final.

Public Participation

The public is invited to submit comments on the scope of the EIS no later than the date identified in the

DATES section of this notice. Federal, state, and local agencies and Native American Tribes are also invited to provide comments. Information about this project is available on the TVA web page at *www.tva.gov/nepa,* including a link to an online public comment page. Any comments received, including names and addresses, will become part of the administrative record and will be available for public inspection.

After consideration of comments received during the scoping period, TVA will develop a scoping document that will summarize public and agency comments that were received and identify the schedule for completing the EIS process. Following analysis of the resources and issues, TVA will prepare a draft EIS for public review and comment tentatively scheduled for fall 2024; the final EIS and decision is tentatively scheduled for completion in early 2025. In finalizing the EIS and in making its final decision, TVA will consider the comments that it receives on the draft EIS.

Authority: 40 CFR 1501.9.

Rebecca Tolene,

Vice President, Environment and Sustainability.

[FR Doc. 2023–18756 Filed 8–31–23; 8:45 am]

BILLING CODE 8120–08–P

TENNESSEE VALLEY AUTHORITY

Hillsboro III Solar Project

AGENCY: Tennessee Valley Authority.

ACTION: Notice of intent.

SUMMARY: The Tennessee Valley Authority TVA) intends to prepare an environmental impact statement EIS) for the purchase of electricity generated by the proposed Hillsboro III Solar Project in Lawrence County, Alabama. The EIS will assess the potential environmental effects of constructing, operating, and maintaining the proposed 200-megawatt (MW) alternating current (AC solar facility. The proposed 200 MW AC solar facility would occupy approximately 1,500 acres of the 3,761-acre Project Study Area. Public comments are invited concerning the scope of the EIS, alternatives being considered, and environmental issues that should be addressed as a part of this EIS. TVA is also requesting data, information, and analysis relevant to the proposed action from the public; affected federal, state, tribal, and local governments, agencies, and offices; the scientific community; industry; or any other interested party.

DATES: The public scoping period begins with the publication of this Notice of Intent in the **Federal Register**. To ensure consideration, comments must be postmarked, emailed, or submitted online no later than October 2, 2023.

ADDRESSES: Written comments should be sent to Elizabeth Smith, NEPA Specialist, Tennessee Valley Authority, 400 West Summit Hill Drive, WT 11B, Knoxville, Tennessee 37902. Comments may be submitted online at: *www.tva.gov/nepa,* or by email to *nepa@tva.gov.* Please note that TVA encourages comments submitted electronically.

FOR FURTHER INFORMATION CONTACT: Elizabeth Smith by email at *esmith14@tva.gov,* by phone at (865) 632–3053, or by mail at the address above.

SUPPLEMENTARY INFORMATION: This notice is provided in accordance with the Council on Environmental Quality's Regulations (40 CFR parts 1500 to 1508) and TVA's procedures for implementing the NEPA (18 CFR 1318). TVA is an agency and instrumentality of the United States, established by an act of Congress in 1933, to foster the social and economic welfare of the people of the Tennessee Valley region and to promote the proper use and conservation of the region's natural resources. One component of this mission is the generation, transmission, and sale of reliable and affordable electric energy.

Background

In June 2019, TVA completed the final 2019 Integrated Resource Plan IRP and associated EIS. The IRP is a comprehensive study of how TVA will meet the demand for electricity in its service territory over the next 20 years. The 2019 IRP recommends solar expansion and anticipates growth in all scenarios analyzed, with most scenarios anticipating 5,000–8,000 MW and one anticipating up to 14,000 MW by 2038. Customer demand for cleaner energy prompted TVA to release a Request for Proposal RFP for renewable energy resources 2022 Carbon-Free RFP .

TVA is considering entering into a Power Purchase Agreement PPA with Urban Grid Solar to purchase 200 MW AC of power generated by the proposed Hillsboro III Solar Project, hereafter referred to as the Project. The proposed 200 MW AC solar facility would occupy approximately 1,500 acres of the 3,761-acre Project Study Area which is located entirely in Lawrence County, Alabama. The project site is north of Wheeler, Alabama along US Highway 72 Alternate between Courtland and Hillsboro, Alabama. The project site is mostly farmland with areas of woody wetlands, deciduous forest, and hay/pasture. The land surplus is to accommodate relocating the array if any areas need to be avoided as a result of the NEPA review. A map showing the project site is available at *www.tva.gov/nepa.*

Preliminary Proposed Action and Alternatives

In addition to a No Action Alternative, TVA will evaluate the action alternative of purchasing power from the proposed Hillsboro III Solar Project under the terms of a PPA. In evaluating alternatives, TVA considered other solar proposals, prior to selecting the Hillsboro III site for further evaluation. Part of the screening process included a review of transmission options, including key connection points to TVA's transmission system. The Hillsboro site stood out as a viable option for connectivity. Environmental and cultural considerations are also included in TVA's screening. For the proposed site, the solar developer plans to consider the establishment of an alternative footprint so that impacts to cultural and/or biological resources could be avoided. The EIS will also evaluate ways to mitigate impacts that cannot be avoided. The description and analysis of these alternatives in the EIS will inform decision makers, other agencies, and the public about the potential for environmental impacts associated with the proposed solar facility. TVA solicits comments on whether there are other alternatives that should be assessed in the EIS.

Project Purpose and Need

The Hillsboro III Solar Project that was submitted as a result of TVA's 2022 Carbon-Free RFP will help TVA meet immediate needs for additional renewable generating capacity in response to customer demands and fulfill the renewable energy goals established in the 2019 IRP. To meet these goals, public scoping is integral to the process for implementing NEPA and ensures that (1) issues are identified early and properly studied, (2) issues of little significance do not consume substantial time and effort, and 3 the analysis of identified issues is thorough and balanced. This EIS will identify the purpose and need of the project and will contain descriptions of the existing environmental and socioeconomic resources within the area that could be affected by the proposed solar facility, including the documented historical, cultural, and environmental resources. Evaluation of potential environmental impacts to these resources will include, but not be limited to, air quality and greenhouse gas emissions, surface

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Appendix B – NPDES Permit for Sugar Camp Mine No. 1

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 · (217) 782-3397

JB PRITZKER, GOVERNOR JOHN J. KIM, DIRECTOR

618/993-7200

May 3, 2021

Sugar Camp Energy, LLC
11351 North Thompsonville Road
Macedonia, Illinois 62860

Re: Sugar Camp Energy, LLC
Sugar Camp Mine No. 1
NPDES Permit No. IL0078565
Bureau ID #W0558010004
Permit Modification (Without Public Notice)

Gentlemen:

The Illinois Environmental Protection Agency has examined the request for modification of the above-referenced NPDES permit as stated in your letter of August 5, 2019. Our final determination is to modify the Permit as follows:

This modification is for address change only.

Please note that this modified permit does not include any additional pending revisions submitted subsequent to the previous Permit issuance and/or modifications.

Enclosed is a copy of the modified Permit. Because the changes made in the Permit were minor, no formal Public Notice of the modification will be issued.

Should you have questions or comments, please contact Iwona Ward at 618/993-7200.

Sincerely,

Darin E. LeCrone, P.E.
Manager, Industrial Unit, Permit Section
Division of Water Pollution Control

DEL:IKW:cs/7832c/9-12-19

Enclosure: Modified Permit

cc: IDNR/Division of Water Resources
IDNR/Office of Mine and Minerals/Land Reclamation
Marion Region /Mine Pollution Control Program
BOW/DWPC/CAS
BOW/DWPC/Records

NPDES Permit No. IL0078565

Illinois Environmental Protection Agency

Division of Water Pollution Control

1021 North Grand Avenue, East

P.O. Box 19276

Springfield, Illinois 62794-9276

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Modified NPDES Permit

Expiration Date: April 30, 2021

Issue Date: May 24, 2016
Effective Date: May 24, 2016
Modification Date: May 3, 2021

Name and Address of Permittee:

Sugar Camp Energy, L.L.C.
11351 North Thompsonville Road
Macedonia, Illinois 62860

Facility Name and Address:

Sugar Camp Energy, L.L.C.
Sugar Camp Mine No. 1
11351 Thompsonville Road
Macedonia, Illinois 62860
8.5 miles northeast of Benton, Illinois
Franklin County

Discharge Number and Classification:		Receiving waters
001, 006, 007, 010	Alkaline Mine Drainage	Unnamed tributary to Middle Fork Big Muddy River
002, 013, 014	Alkaline Mine Drainage	Middle Fork Big Muddy River
003, 004, 008	Alkaline Mine Drainage	Unnamed tributary to Akin Creek
005	Alkaline Mine Drainage	Akin Creek
015, 016	Alkaline Mine Drainage	Unnamed tributary to Sugar Camp Creek
017	Alkaline Mine Drainage	Big Muddy River
A10	Sanitary Wastewater	Pond 010

In compliance with the provisions of the Illinois Environmental Protection Act, Subtitle C and/or Subtitle D Rules and Regulations of the Illinois Pollution Control Board, and the Clean Water Act, the above-named permittee is hereby authorized to discharge at the above location to the above-named receiving stream in accordance with the standard conditions and attachments herein.

Permittee is not authorized to discharge after the above expiration date. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit the proper application as required by the Illinois Environmental Protection Agency (IEPA) not later than 180 days prior to the expiration date.

Darin E. LeCrone, P.E.,
Manager, Industrial Unit, Permit Section
Division of Water Pollution Control

DEL:IKW:cs/7183c/9-12-19

Modification Date: May 3, 2021

NPDES Coal Mine Permit

NPDES Permit No. IL0078565

Effluent Limitations and Monitoring

From the effective date of this Permit until the expiration date, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfall*: 001, 002, 006, 007 (Alkaline Mine Drainage)

Discharge Condition	Parameters											
	Total Suspended Solids (mg/l) ***		Iron (total) (mg/l) ***		pH** (S.U.) ***	Alkalinity/ Acidity ***	Sulfate (mg/l) ***	Chloride (mg/l) ***	Mn (total) (mg/l) ***	Hardness ***	Flow (MGD)	Settleable Solids (ml/l)
	30 day average	daily maximum	30 day average	daily maximum								
I	35	70	3.0	6.0	6.5-9.0	Alk.>Acid	1614	500	1.0	Monitor only	Measure When Sampling	-
II	-	-	-	-	6.0-9.0	-	1614	500	-	Monitor only	Measure When Sampling	0.5
III	-	-	-	-	6.0-9.0	-	1614	500	-	Monitor only	Measure When Sampling	-
IV	35	70	3.0	6.0	6.5-9.0	Alk.>Acid	1614	500	1.0	Monitor only	Measure When Sampling	-

I Dry weather discharge (base flow or mine pumpage) from the outfall.

II In accordance with 35 Ill. Adm. Code 406.110(a), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b). The 10-year, 24-hour precipitation event for this area is considered to be 4.62 inches.

III In accordance with 35 Ill. Adm. Code 406.110(d), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period greater than the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b).

IV Discharges continuing 24 hours after cessation of precipitation event that resulted in discharge. For outfalls which have no allowed mixing, monitoring requirements and permit limitations of Discharge Condition IV are identical to Discharge Condition I to which the outfall discharge has reverted.

Sampling during all Discharge Conditions shall be performed utilizing the grab sampling method.

*** There shall be a minimum of nine (9) samples collected during the quarter when the pond is discharging. Of these 9 samples, a minimum of one sample each month shall be taken during either Discharge Condition I or IV should such discharge condition occur. A "no flow" situation is not considered to be a sample of the discharge. In the event that Discharge Conditions II and/or III occur, grab sample of each discharge caused by the above precipitation events (Discharge Conditions II and/or III) shall be taken and analyzed for the parameters identified in the table above during at least 3 separate events each quarter. For quarters in which there are less than 3 such precipitation events resulting in discharges, a grab sample of the discharge shall be required whenever such precipitation event(s) occur(s). Should a sufficient number of discharge events occur during the quarter, the remaining three (3) quarterly samples may be taken during any of the Discharge Conditions described above.

The water quality standards for sulfate and chloride must be met in discharges from the above referenced outfall as well as in the receiving stream during all Discharge Conditions.

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* The Permittee is subject to the limitations, monitoring, and reporting requirements of Special Condition No. 13 for the discharges from Outfalls 001, 006, 007 and the unnamed tributary to Middle Fork Big Muddy River receiving such a discharge and the discharges from Outfall No. 002 and Middle Fork Big Muddy River receiving such discharges. Also, discharges from Outfall 001 shall be subject to the limitations, monitoring, and reporting requirements of Special Condition No. 18.

** No discharge is allowed from any above referenced permitted outfall during "low flow" or "no flow" conditions in the receiving stream unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.204 for pH.

Modification Date: May 3, 2021

NPDES Coal Mine Permit

NPDES Permit No. IL0078565

Effluent Limitations and Monitoring

From the effective date of this Permit until the expiration date, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfall*: 003, 004, 005, 008 (Alkaline Mine Drainage)

Discharge Condition	Parameters											
	Total Suspended Solids (mg/l) ***		Iron (total) (mg/l) ***		pH** (S.U.) ***	Alkalinity/ Acidity ***	Sulfate (mg/l) ***	Chloride (mg/l) ***	Mn (total) (mg/l) ***	Hardness ***	Flow (MGD)	Settleable Solids (ml/l)
	30 day average	daily maximum	30 day average	daily maximum								
I	35	70	3.0	6.0	6.5-9.0	Alk.>Acid	2217	500	1.0	Monitor only	Measure When Sampling	-
II	-	-	-	-	6.0-9.0	-	2217	500	-	Monitor only	Measure When Sampling	0.5
III	-	-	-	-	6.0-9.0	-	2217	500	-	Monitor only	Measure When Sampling	-
IV	35	70	3.0	6.0	6.5-9.0	Alk.>Acid	2217	500	1.0	Monitor only	Measure When Sampling	-

I Dry weather discharge (base flow or mine pumpage) from the outfall.

II In accordance with 35 Ill. Adm. Code 406.110(a), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b). The 10-year, 24-hour precipitation event for this area is considered to be 4.62 inches.

III In accordance with 35 Ill. Adm. Code 406.110(d), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period greater than the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b).

IV Discharges continuing 24 hours after cessation of precipitation event that resulted in discharge. For outfalls which have no allowed mixing, monitoring requirements and permit limitations of Discharge Condition IV are identical to Discharge Condition I to which the outfall discharge has reverted.

Sampling during all Discharge Conditions shall be performed utilizing the grab sampling method.

*** There shall be a minimum of nine (9) samples collected during the quarter when the pond is discharging. Of these 9 samples, a minimum of one sample each month shall be taken during either Discharge Condition I or IV should such discharge condition occur. A "no flow" situation is not considered to be a sample of the discharge. In the event that Discharge Conditions II and/or III occur, grab sample of each discharge caused by the above precipitation events (Discharge Conditions II and/or III) shall be taken and analyzed for the parameters identified in the table above during at least 3 separate events each quarter. For quarters in which there are less than 3 such precipitation events resulting in discharges, a grab sample of the discharge shall be required whenever such precipitation event(s) occur(s). Should a sufficient number of discharge events occur during the quarter, the remaining three (3) quarterly samples may be taken during any of the Discharge Conditions described above.

The water quality standards for sulfate and chloride must be met in discharges from the above referenced outfall as well as in the receiving stream during all Discharge Conditions.

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* The Permittee is subject to the limitations, monitoring, and reporting requirements of Special Condition No. 13 for the discharges from Outfalls 003, 004, 008 and the unnamed tributary to Akin Creek receiving such a discharges, and the discharges from Outfall No. 005 and Akin Creek receiving such discharges. Also, discharges from Outfalls 003 and 008 shall be subject to the limitations, monitoring, and reporting requirements of Special Condition No. 18.

** No discharge is allowed from any above referenced permitted outfall during "low flow" or "no flow" conditions in the receiving stream unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.204 for pH.

Modification Date: May 3, 2021

NPDES Coal Mine Permit

NPDES Permit No. IL0078565

Effluent Limitations and Monitoring

From the effective date of this Permit until the expiration date, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfall*: 010 (Alkaline Mine Drainage)

Discharge Condition	Parameters										
	Total Suspended Solids (mg/l) ***		Iron (total) (mg/l) ***		pH** (S.U.) ***	Alkalinity/ Acidity ***	Sulfate (mg/l) ***	Chloride (mg/l) ***	Hardness ***	Flow (MGD)	Settleable Solids (ml/l)
	30 day average	daily maximum	30 day average	daily maximum							
I	35	70	3.0	6.0	6.5-9.0	Alk.>Acid	1614	500	Monitor only	Measure When Sampling	-
II	-	-	-	-	6.0-9.0	-	1614	500	Monitor only	Measure When Sampling	0.5
III	-	-	-	-	6.0-9.0	-	1614	500	Monitor only	Measure When Sampling	-
IV	35	70	3.0	6.0	6.5-9.0	Alk.>Acid	1614	500	Monitor only	Measure When Sampling	-

I Dry weather discharge (base flow or mine pumpage) from the outfall.

II In accordance with 35 Ill. Adm. Code 406.110(a), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b). The 10-year, 24-hour precipitation event for this area is considered to be 4.62 inches.

III In accordance with 35 Ill. Adm. Code 406.110(d), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period greater than the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b).

IV Discharges continuing 24 hours after cessation of precipitation event that resulted in discharge. For outfalls which have no allowed mixing, monitoring requirements and permit limitations of Discharge Condition IV are identical to Discharge Condition I to which the outfall discharge has reverted.

Sampling during all Discharge Conditions shall be performed utilizing the grab sampling method.

*** There shall be a minimum of nine (9) samples collected during the quarter when the pond is discharging. Of these 9 samples, a minimum of one sample each month shall be taken during either Discharge Condition I or IV should such discharge condition occur. A "no flow" situation is not considered to be a sample of the discharge. In the event that Discharge Conditions II and/or III occur, grab sample of each discharge caused by the above precipitation events (Discharge Conditions II and/or III) shall be taken and analyzed for the parameters identified in the table above during at least 3 separate events each quarter. For quarters in which there are less than 3 such precipitation events resulting in discharges, a grab sample of the discharge shall be required whenever such precipitation event(s) occur(s). Should a sufficient number of discharge events occur during the quarter, the remaining three (3) quarterly samples may be taken during any of the Discharge Conditions described above.

The water quality standards for sulfate and chloride must be met in discharges from the above referenced outfall as well as in the receiving stream during all Discharge Conditions.

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* The Permittee is subject to the limitations, monitoring, and reporting requirements of Special Condition No. 13 for the discharges from Outfall 010 and unnamed tributary to Middle Fork Big Muddy River receiving such discharges.

** No discharge is allowed from any above referenced permitted outfall during "low flow" or "no flow" conditions in the receiving stream unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.204 for pH.

Modification Date: May 3, 2021

NPDES Coal Mine Permit

NPDES Permit No. IL0078565

Effluent Limitations and Monitoring

From the effective date of this Permit until the expiration date, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfall*: 013 (Alkaline Mine Drainage)

Discharge Condition	Parameters												
	Total Suspended Solids (mg/l) ***		Iron (total) (mg/l) ***		pH** (S.U.) ***	Alkalinity/ Acidity ***	Sulfate (mg/l) ***	Chloride (mg/l) ***	Mn (total) (mg/l) ***		Hardness ***	Flow (MGD)	Settleable Solids (ml/l)
	30 day average	daily maximum	30 day average	daily maximum					30 day average	daily maximum			
I	35	70	3.0	6.0	6.5-9.0	Alk.>Acid	1614	500	2.0	4.0	Monitor only	Measure When Sampling	-
II	-	-	-	-	6.0-9.0	-	2000	See Special Condition No. 14	-	-	Monitor only	Measure When Sampling	0.5
III	-	-	-	-	6.0-9.0	-	2000	See Special Condition No. 14	-	-	Monitor only	Measure When Sampling	-
IV	35	70	3.0	6.0	6.0-9.0	Alk.>Acid	2000	See Special Condition No. 14	2.0	4.0	Monitor only	Measure When Sampling	-

I Dry weather discharge (base flow or mine pumpage) from the outfall at times of "low flow" or "no flow" conditions in the receiving stream as defined in Special Condition No. 14.

II In accordance with 35 Ill. Adm. Code 406.110(a), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b). The 10-year, 24-hour precipitation event for this area is considered to be 4.62 inches.

III In accordance with 35 Ill. Adm. Code 406.110(d), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period greater than the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b).

IV Discharges continuing 24 hours after cessation of precipitation event that resulted in discharge. At such time that receiving stream flow subsides, monitoring requirements and permit limitations shall revert to Discharge Condition 1.

Sampling during all Discharge Conditions shall be performed utilizing the grab sampling method.

*** There shall be a minimum of nine (9) samples collected during the quarter when the pond is discharging. Of these 9 samples, a minimum of one sample each month shall be taken during either Discharge Condition I or IV should such discharge condition occur. A "no flow" situation is not considered to be a sample of the discharge. In the event that Discharge Conditions II and/or III occur, grab sample of each discharge caused by the above precipitation events (Discharge Conditions II and/or III) shall be taken and analyzed for the parameters identified in the table above during at least 3 separate events each quarter. For quarters in which there are less than 3 such precipitation events resulting in discharges, a grab sample of the discharge shall be required whenever such precipitation event(s) occur(s). Should a sufficient number of discharge events occur during the quarter, the remaining three (3) quarterly samples may be taken during any of the Discharge Conditions described above.

Discharges from the above referenced outfall that are subject to the requirements of Discharge Conditions II, III and/or IV must meet the water quality standards for sulfate and chloride in the receiving stream during all Discharge Conditions as determined in accordance with Special Condition No. 14.

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* The Permittee is subject to the limitations, monitoring, and reporting requirements of Special Condition No. 14 for the discharges from Outfall 013 and Middle Fork Big Muddy River receiving such discharges. Also, discharges from Outfall 013 shall be subject to the limitations, monitoring, and reporting requirements of Special Condition No. 18.

** No discharge is allowed from any above referenced permitted outfall during "low flow" or "no flow" conditions in the receiving stream unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.204 for pH.

Modification Date: May 3, 2021

NPDES Coal Mine Permit

NPDES Permit No. IL0078565

Effluent Limitations and Monitoring

From the effective date of this Permit until the expiration date, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfall*: 014 (Alkaline Mine Drainage)

Discharge Condition	Parameters												
	Total Suspended Solids (mg/l) ***		Iron (total) (mg/l) ***		pH** (S.U.) ***	Alkalinity/ Acidity ***	Sulfate (mg/l) ***	Chloride (mg/l) ***	Mn (total) (mg/l) ***		Hardness ***	Flow (MGD)	Settleable Solids (ml/l)
	30 day average	daily maximum	30 day average	daily maximum					30 day average	daily maximum			
I	35	70	3.0	6.0	6.5-9.0	Alk.>Acid	1614	500	2.0	4.0	Monitor only	Measure When Sampling	-
II	-	-	-	-	6.0-9.0	-	1614	500	-	-	Monitor only	Measure When Sampling	0.5
III	-	-	-	-	6.0-9.0	-	1614	500	-	-	Monitor only	Measure When Sampling	-
IV	35	70	3.0	6.0	6.0-9.0	Alk.>Acid	1614	500	2.0	4.0	Monitor only	Measure When Sampling	-

I Dry weather discharge (base flow or mine pumpage) from the outfall.

II In accordance with 35 Ill. Adm. Code 406.110(a), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b). The 10-year, 24-hour precipitation event for this area is considered to be 4.62 inches.

III In accordance with 35 Ill. Adm. Code 406.110(d), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period greater than the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b).

IV Discharges continuing 24 hours after cessation of precipitation event that resulted in discharge. For outfalls which have no allowed mixing, monitoring requirements and permit limitations of Discharge Condition IV are identical to Discharge Condition I to which the outfall discharge has reverted.

Sampling during all Discharge Conditions shall be performed utilizing the grab sampling method.

*** There shall be a minimum of nine (9) samples collected during the quarter when the pond is discharging. Of these 9 samples, a minimum of one sample each month shall be taken during either Discharge Condition I or IV should such discharge condition occur. A "no flow" situation is not considered to be a sample of the discharge. In the event that Discharge Conditions II and/or III occur, grab sample of each discharge caused by the above precipitation events (Discharge Conditions II and/or III) shall be taken and analyzed for the parameters identified in the table above during at least 3 separate events each quarter. For quarters in which there are less than 3 such precipitation events resulting in discharges, a grab sample of the discharge shall be required whenever such precipitation event(s) occur(s). Should a sufficient number of discharge events occur during the quarter, the remaining three (3) quarterly samples may be taken during any of the Discharge Conditions described above.

The water quality standards for sulfate and chloride must be met in discharges from the above referenced outfall as well as in the receiving stream during all Discharge Conditions.

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* The Permittee is subject to the limitations, monitoring, and reporting requirements of Special Condition No. 13 for the discharges from Outfall 014 and Middle Fork Big Muddy River receiving such discharges

** No discharge is allowed from any above referenced permitted outfall during "low flow" or "no flow" conditions in the receiving stream unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.204 for pH.

NPDES Coal Mine Permit

NPDES Permit No. IL0078565

Effluent Limitations and Monitoring

From the effective date of this Permit until the expiration date, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfall*: 015, 016 (Alkaline Mine Drainage)

Discharge Condition	Parameters												
	Total Suspended Solids (mg/l) ***		Iron (total) (mg/l) ***		pH** (S.U.) ***	Alkalinity/ Acidity ***	Sulfate (mg/l) ***	Chloride (mg/l) ***	Mn (total) (mg/l) ***		Hardness ***	Flow (MGD)	Settleable Solids (ml/l)
	30 day average	daily maximum	30 day average	daily maximum					30 day average	daily maximum			
I	35	70	3.0	6.0	6.5-9.0	Alk.>Acid	1668	500	2.0	4.0	Monitor only	Measure When Sampling	-
II	-	-	-	-	6.0-9.0	-	1668	500	-	-	Monitor only	Measure When Sampling	0.5
III	-	-	-	-	6.0-9.0	-	1668	500	-	-	Monitor only	Measure When Sampling	-
IV	35	70	3.0	6.0	6.0-9.0	Alk.>Acid	1668	500	2.0	4.0	Monitor only	Measure When Sampling	-

I Dry weather discharge (base flow or mine pumpage) from the outfall.

II In accordance with 35 Ill. Adm. Code 406.110(a), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b). The 10-year, 24-hour precipitation event for this area is considered to be 4.62 inches.

III In accordance with 35 Ill. Adm. Code 406.110(d), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period greater than the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.106(b).

IV Discharges continuing 24 hours after cessation of precipitation event that resulted in discharge. For outfalls which have no allowed mixing, monitoring requirements and permit limitations of Discharge Condition IV are identical to Discharge Condition I to which the outfall discharge has reverted.

Sampling during all Discharge Conditions shall be performed utilizing the grab sampling method.

*** There shall be a minimum of nine (9) samples collected during the quarter when the pond is discharging. Of these 9 samples, a minimum of one sample each month shall be taken during either Discharge Condition I or IV should such discharge condition occur. A "no flow" situation is not considered to be a sample of the discharge. In the event that Discharge Conditions II and/or III occur, grab sample of each discharge caused by the above precipitation events (Discharge Conditions II and/or III) shall be taken and analyzed for the parameters identified in the table above during at least 3 separate events each quarter. For quarters in which there are less than 3 such precipitation events resulting in discharges, a grab sample of the discharge shall be required whenever such precipitation event(s) occur(s). Should a sufficient number of discharge events occur during the quarter, the remaining three (3) quarterly samples may be taken during any of the Discharge Conditions described above.

The water quality standards for sulfate and chloride must be met in discharges from the above referenced outfall as well as in the receiving stream during all Discharge Conditions.

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* The Permittee is subject to the limitations, monitoring, and reporting requirements of Special Condition No. 13 for the discharges from Outfalls 015, 016 and unnamed tributary to Sugar Camp Creek receiving such discharges.

** No discharge is allowed from any above referenced permitted outfall during "low flow" or "no flow" conditions in the receiving stream unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.204 for pH.

Modification Date: May 3, 2021

NPDES Coal Mine Permit

NPDES Permit No. IL0078565

Effluent Limitations and Monitoring

From the effective date of this Permit until the expiration date, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfall*: 017* (Alkaline Mine Drainage)

Parameters											
Total Suspended Solids (mg/l)		Iron (total) (mg/l)		pH** (S.U.)	Alkalinity/ Acidity	Sulfate (mg/l)	Chloride (mg/l)	Mn (total) (mg/l)		Hardness	Flow (MGD)
30 day average	daily maximum	30 day average	daily maximum					30 day average	daily maximum		
35	70	3.0	6.0	6.5-9.0	Alk.>Acid	2000	See Special Condition No. 16	2.0	4.0	Monitor only	Measure When Sampling

All sampling shall be performed utilizing the grab sampling method.

* Operation and management of pumpage to Outfall 017 is subject to the requirements of Special Condition No. 16. Also, discharges from Outfall 017 shall be subject to the limitations, monitoring, and reporting requirements of Special Condition No. 18.

Modification Date: May 3, 2021

NPDES Coal Mine Permit

NPDES Permit No. IL0078565

Effluent Limitations and Monitoring

From the effective date of this Permit until the expiration date, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfall*: A10 (Sanitary Wastewater)

Parameters										
Total Suspended Solids **				BOD_5 **				pH (S.U.) **	Fecal Coliform **	Flow (MGD)
Load Limits (lbs/day)		Concentration Limits (mg/l)		Load Limits (lbs/day)		Concentration Limits (mg/l)				
30 day average	daily maximum	30 day average	daily maximum	30 day average	daily maximum	30 day average	daily maximum		daily maximum	
0.37	0.75	30	60	0.37	0.75	30	60	6.0-9.0	≤400/100 ml	Measure When Sampling

* Sample only when Outfall A10 is discharging.

** A minimum of three (3) samples per month shall be collected and analyzed for the indicated parameter; however, such sampling and analysis is required only if and/or when a discharge occurs from Outfall A10. No more than one (1) sample shall be collected during any individual monitoring event.

Effluent Limitations and Monitoring

Upon completion of Special Condition 10 and approval from the Agency, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfall*: 001, 002, 006, 007, 010, 013, 014 (Reclamation Area Drainage)

Discharge Condition	Parameters					
	pH** (S.U.) ***	Sulfate (mg/l) ***	Chloride (mg/l) ***	Hardness ***	Flow (MGD)	Settleable Solids (ml/l) ***
I	6.5-9.0	1614	500	Monitor only	Measure When Sampling	0.5
II	6.0-9.0	1614	500	Monitor only	Measure When Sampling	0.5
III	6.0-9.0	1614	500	Monitor only	Measure When Sampling	-
IV	6.5-9.0	1614	500	Monitor only	Measure When Sampling	0.5

I Dry weather discharge (base flow, if present) from the outfall.

II In accordance with 35 Ill. Adm. Code 406.109(b), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations. The 10-year, 24-hour precipitation event for this area is considered to be 4.62 inches.

III In accordance with 35 Ill. Adm. Code 406.109(c), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period greater than the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.109(b).

IV Discharges continuing 24 hours after cessation of precipitation event that resulted in discharge. For reclamation area discharges, monitoring requirements and permit limitations of Discharge Condition IV are identical to Discharge Condition I to which the outfall discharge has reverted.

Sampling during all Discharge Conditions shall be performed utilizing the grab sampling method. A "no flow" situation is not considered to be a sample of the discharge.

*** One sample per month (1/month) shall be collected if and/or when a discharge occurs under either Discharge Condition I, II or IV and analyzed for the parameters identified in the table above. In addition, at least three (3) grab samples shall be taken each quarter from separate precipitation events under Discharge Condition III and analyzed for parameters indicated in the above table. For quarters in which there are less than 3 such precipitation events, a grab sample of the discharge shall be required whenever such precipitation event(s) occur(s).

The water quality standards for sulfate and chloride must be met in discharges from the above referenced outfall as well as in the receiving stream.

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* The Permittee is subject to the limitations, monitoring, and reporting requirements of Special Condition No. 13, 14 and 15 for the discharges from Outfalls 001, 006, 007, 010 and the unnamed tributary to Middle Fork Big Muddy River receiving such discharges, and discharges from Outfalls 002, 013 and 014 and Middle Fork Big Muddy River receiving such discharges.

** No discharge is allowed from any above referenced permitted outfall during "low flow" or "no flow" conditions in the receiving stream unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.204 for pH.

Effluent Limitations and Monitoring

Upon completion of Special Condition 10 and approval from the Agency, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfall*: 003, 004, 005, 008 (Reclamation Area Drainage)

Discharge Condition	Parameters					
	pH** (S.U.) ***	Sulfate (mg/l) ***	Chloride (mg/l) ***	Hardness ***	Flow (MGD)	Settleable Solids (ml/l) ***
I	6.5-9.0	2217	500	Monitor only	Measure When Sampling	0.5
II	6.0-9.0	2217	500	Monitor only	Measure When Sampling	0.5
III	6.0-9.0	2217	500	Monitor only	Measure When Sampling	-
IV	6.5-9.0	2217	500	Monitor only	Measure When Sampling	0.5

I Dry weather discharge (base flow, if present) from the outfall.

II In accordance with 35 Ill. Adm. Code 406.109(b), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations. The 10-year, 24-hour precipitation event for this area is considered to be 4.62 inches.

III In accordance with 35 Ill. Adm. Code 406.109(c), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period greater than the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.109(b).

IV Discharges continuing 24 hours after cessation of precipitation event that resulted in discharge. For reclamation area discharges, monitoring requirements and permit limitations of Discharge Condition IV are identical to Discharge Condition I to which the outfall discharge has reverted.

Sampling during all Discharge Conditions shall be performed utilizing the grab sampling method. A "no flow" situation is not considered to be a sample of the discharge.

*** One sample per month (1/month) shall be collected if and/or when a discharge occurs under either Discharge Condition I, II or IV and analyzed for the parameters identified in the table above. In addition, at least three (3) grab samples shall be taken each quarter from separate precipitation events under Discharge Condition III and analyzed for parameters indicated in the above table. For quarters in which there are less than 3 such precipitation events, a grab sample of the discharge shall be required whenever such precipitation event(s) occur(s).

The water quality standards for sulfate and chloride must be met in discharges from the above referenced outfall as well as in the receiving stream.

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* The Permittee is subject to the limitations, monitoring, and reporting requirements of Special Condition No. 13 for the discharges from Outfalls 003, 004, 008 and unnamed tributary to Akin Creek receiving such a discharges and discharges from Outfall 005 and Akin Creek receiving such discharges.

** No discharge is allowed from any above referenced permitted outfall during "low flow" or "no flow" conditions in the receiving stream unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.204 for pH.

Effluent Limitations and Monitoring

Upon completion of Special Condition 10 and approval from the Agency, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfall*: 015, 016 (Reclamation Area Drainage)

Discharge Condition	Parameters					
	pH** (S.U.) ***	Sulfate (mg/l) ***	Chloride (mg/l) ***	Hardness ***	Flow (MGD)	Settleable Solids (ml/l) ***
I	6.5-9.0	1668	500	Monitor only	Measure When Sampling	0.5
II	6.0-9.0	1668	500	Monitor only	Measure When Sampling	0.5
III	6.0-9.0	1668	500	Monitor only	Measure When Sampling	-
IV	6.5-9.0	1668	500	Monitor only	Measure When Sampling	0.5

I Dry weather discharge (base flow, if present) from the outfall.

II In accordance with 35 Ill. Adm. Code 406.109(b), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations. The 10-year, 24-hour precipitation event for this area is considered to be 4.62 inches.

III In accordance with 35 Ill. Adm. Code 406.109(c), any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period greater than the 10-year, 24-hour precipitation event (or snowmelt of equivalent volume) shall comply with the indicated limitations instead of those in 35 Ill. Adm. Code 406.109(b).

IV Discharges continuing 24 hours after cessation of precipitation event that resulted in discharge. For reclamation area discharges, monitoring requirements and permit limitations of Discharge Condition IV are identical to Discharge Condition I to which the outfall discharge has reverted.

Sampling during all Discharge Conditions shall be performed utilizing the grab sampling method. A "no flow" situation is not considered to be a sample of the discharge.

*** One sample per month (1/month) shall be collected if and/or when a discharge occurs under either Discharge Condition I, II or IV and analyzed for the parameters identified in the table above. In addition, at least three (3) grab samples shall be taken each quarter from separate precipitation events under Discharge Condition III and analyzed for parameters indicated in the above table. For quarters in which there are less than 3 such precipitation events, a grab sample of the discharge shall be required whenever such precipitation event(s) occur(s).

The water quality standards for sulfate and chloride must be met in discharges from the above referenced outfall as well as in the receiving stream.

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* The Permittee is subject to the limitations, monitoring, and reporting requirements of Special Condition No. 13 for the discharges from Outfalls 015, 016 and unnamed tributary to Sugar Camp Creek receiving such discharges.

** No discharge is allowed from any above referenced permitted outfall during "low flow" or "no flow" conditions in the receiving stream unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.204 for pH.

Effluent Limitations and Monitoring

Upon completion of Special Condition No. 11 and approval from the Agency, the effluent of the following discharge shall be monitored and limited at all times as follows:

Outfalls: 001, 002, 003, 004, 005, 006, 007, 008, 010, 013, 014, 015, 016, (Stormwater Discharge)

Parameters	
pH* (S.U.) **	Settleable Solids (ml/l) **
6.0-9.0	0.5

Stormwater discharge monitoring is subject to the following reporting requirements:

Analysis of samples must be submitted with second quarter Discharge Monitoring Reports.

If discharges can be shown to be similar, a plan may be submitted by November 1 of each year preceding sampling to propose grouping of similar discharges and/or updated previously submitted groupings. If updating of a previously submitted plan is not necessary, a written notification to the Agency, indicating such is required. Upon approval from the Agency, one representative sample for each group may be submitted.

Annual stormwater monitoring is required for all discharges until Final SMCRA Bond is released and approval to cease such monitoring is obtained from the Agency.

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* No discharge is allowed from any above referenced permitted outfalls during "low flow" or "no flow" conditions in the receiving stream unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.204 for pH.

** One (1) sample per year shall be collected and analyzed for the indicated parameter; however, such sampling and analysis is required only if and/or when a discharge occurs from the individual Outfall(s) identified above.

NPDES Permit No. IL 0078565

Construction Authorization No.5212-13

Authorization is hereby granted to the above designee to construct and operate the mine and mine refuse area described as follows:

An underground mine containing a total of 2664.31 acres, as described and depicted in IEPA Log No 5212-13, located in Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 26, 27 and 35, Township 6 South, Range 4 East, and Sections 25, 26, 27, 28, 29, 33, 34 and 35, Township 5 South, Range 4 East; Franklin County; Sections 5, 6, 7 and 8, Township 6 South, Range 5 East, Sections 30 and 31, Township 5 South, Range 5 East, and Sections 1 and 6, Township 6 South, Range 4 East, Hamilton County, Illinois. This total area is comprised of the following parcels:

Main Site
The surface facilities at the main site of this underground mine (OMM Permit No. 382) contains 1264.0 acres, included in the above cited total Permit acreage, as described and depicted in IEPA Log No. 1357-07, located in Sections 2, 3, 4, 9 and 10, Township 6 South, Range 4 East, Franklin County, Illinois. The surface facilities at this site contain an incline slope to reach the coal seam, two vertical shafts, coal preparation plant, reclaim tunnels, rail loading loop, rail loadout, parking lots, access roads, drainage control structures, office buildings, change rooms, assembly rooms, warehousing facilities, administration building, storage facilities, elevator facilities, ventilation facilities, refuse disposal areas, overland conveyors, screens, crusher, power distribution facilities, power lines, water lines, parking lots, topsoil and subsoil stockpile areas and Reverse Osmosis (RO) Water Treatment System.

Surface drainage control for the main mine site is provided by eight (8) sedimentation ponds with discharges designated as Outfalls 001, 002, 003, 004, 005, 006, 007 and 008 as discussed further below.

The following operational projects are incorporated into this permit:
As proposed and depicted in IEPA Log No. 0380-08 the freshwater lake originally design as separate impoundments identified as freshwater Pond 001 and 001A will be constructed as one large cell rather than two. The discharge structure identified as Outfall 001 will remain at the same location as previously approved.

As proposed and depicted in IEPA Log No. 0506-08 Sedimentation Basin 008 will be modified by increasing the embankment length and height to increase the normal pool elevation by approximately 11.0 feet to an elevation of 442.0 msl.

A sanitary wastewater treatment system will be constructed as described in IEPA Log No. 8562-10. The system consists of 3-1000 gallon septic tanks in series with the first two tanks equipped with effluent filters. Final treatment is provided by a buried sand filter 30'x50' in size. The treatment system was approved by the Bi-County Health Department, Marion Illinois.

As proposed in EPA Log No. 7250-11 the mining operations plan is revised to include the installation of two boreholes into the underground mining operations. First borehole will be located north of the silo within the supply yard and the second borehole located north and west of the silo also within the supply yard. These boreholes will be used to supply materials to the underground mine.

As proposed and depicted in IEPA Log. 5225-13 Underground Injection Control (UIC) deep wells will be constructed. Utilization and operation of this well shall be subject to the permitting and operations requirements of the Agency approval from the Bureau of Land for the UIC Well.

As previously approved under Subtitle D Permit No. 2014-MA-4185 two Reverse Osmosis (RO) Plants were constructed at Sugar Camp Mine main site area. As described in IEPA Log Nos 4185-14, 4185-14-A and 4470-14, a 2,400 to 3,000 GPM permanent RO Water Treatment System will be utilized to treat the high-chloride water being pumped from the underground mine workings, existing refuse disposal area and/or surface ponds. This system consists of two (2) buildings each designated to treat approximately 1,200 to 1,500 GPM of water per system. The permanent RO system was installed as proposed and depicted on the Plot Plan Layout, System P&ID (Piping & Instrumentation diagram) and Sugar Camp Flow Diagram contained in IEPA Log No. 4185-14. Prior to the high chloride water entering the RO system, such water may go through any or all of the following partial list of filtration and/or treatment facilities or processes:

1. Feed water may initially be pumped into a 10,000 gallon contact tank at which point 12.5% Sodium Hypochlorite is added.

2. A pH control and coagulant may be added to the water exiting the contact tank prior to being directed to six (6) 12-foot diameter multi-media filters following which the filtered water will be stored in a 10,000 gallon Filtered Water Tank.

3. Water pumped from the Filtered Water Tank will be treated with an Antiscalant and Sodium Bisulfate prior to entry into the RO No. 1 system. Reject from the RO No. 1 system will be stored in a 10,000 gallon Intermediate Storage Tank.

4. The initial reject water from the Intermediate Storage Tank will be pumped to the second side, or stage, of the RO No. 1 system with the concentrate from this second (2nd) stage, as well as any excess backwash water, being pumped to the refuse disposal area (RDA).

5. The RO No. 2 system will be operated in a manner similar to that described above for the RO No. 1 system.

6. Permeate (clean water) from both RO No. 1 and RO No. 2 may be directed to Sedimentation Basin 001 with the water in this basin used as make-up water for the preparation plant.

North Refuse Disposal Area
As previously approved under Subtitle D Permit No. 2015-MA-3259, North Refuse Disposal Area was constructed north from Sugar Camp Mine Site. As described and depicted in IEPA Log No. 3259-15 topsoil removal, grading, foundation preparation and installation of four (4) foot compacted clay liner was developed. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

Sugar Camp Mine – North Refuse Facility for an underground coal mine, located immediately north of the main site, also identified as OMM Permit No. 434 area, contains of a total of 1,159.42 acres, as described and depicted in IEPA Log Nos. 4544-14, 4544-14-C and 3350-15. The area, which is included in the above cited total permit acreage is located in Sections 28, 29 and 33, Township 5 South, Range 4 East and Sections 4 and 5, Range 6 South, Township 4 East, Franklin County, Illinois. The surface facilities at this refuse disposal area contains haulroads/transportation facilities, conveyor belt, drainage control structures, sedimentation ponds, fine and coarse coal refuse disposal area, topsoil and subsoil stockpile areas. Construction of this disposal area as proposed is subject to Condition No. 12.

Surface drainage control for the new North Refuse Disposal Area will be provided by four sedimentation ponds with discharges designated as Outfalls 013, 014, 015 and 016 as discussed further below.

NW Portal
A satellite surface facilities permit area identified as Sugar Camp Mine NW Portal, (OMM Permit No. 382), previously approved under NPDES Permit No. IL0079472 is hereby incorporated into this NPDES Permit.

Surface facilities in support of an underground mine containing a total of 19.8 acres, included in the above cited total Permit acreage, as described and depicted in IEPA Log Nos. 8389-10 and 8389-10-A, located in Sections 28, Township 5 South, Range 4 East, Franklin County, Illinois. These surface facilities, in support of the underground mine, contains the intake shaft with man elevator, parking lots, access roads, drainage control structures, bath house, change rooms, topsoil and subsoil stockpile areas, shaft excavation stockpile, shaft construction drill pit, sediment pond and wastewater treatment system. As described and depicted in the IEPA Log No. 5150-13 additional structures supporting underground mine are proposed for this facility. This facility is not approved for coal stockpiling or coal refuse disposal.

Surface drainage control for this area is provided by one (1) sedimentation pond with discharge designated as Outfall 010, classified as alkaline mine drainage as discussed further below.

Discharge from the sanitary wastewater treatment system, identified as Outfall A10, will be tributary to Pond 010 via Ditch 010-B.

Mixing Zone (Big Muddy River)
Excess water will be transported from the Sugar Camp Complex to Outfall 017 on the Big Muddy River through a high-density polyethylene (HDPE) pipeline. Water will be pumped from the water holding cell by pumps through approximately 13.8 miles of pipe to the diffuser located at the mixing zone location. The pipeline ROW will be approximately 50 feet in width with a total permitted area of approximately 84 acres.

During the operations of the pipeline, continuous flow monitors will be installed to provide protection against leakage. Flow will be monitored near the pump discharge while the pipeline is within the sediment control structures of Sugar Camp Complex. Flow will also be monitored at the mixing zone location. This instrumentation will be connected to an alarm system and flow data will be transmitted to a central location for tracking and assessing system operations. The flow monitoring system operation and maintenance is subject to the requirements of Condition No. 16.

Drainage control at the Sugar Camp Mine
Surface drainage control is provided by fourteen (14) sedimentation ponds and one (1) sanitary wastewater discharge with discharges designated as Outfalls 001, 002, 003, 004, 005, 006, 007, 008, 010, A10, 013, 014, 015, 016 and 017 all classified as alkaline mine drainage.

Discharge from the sanitary wastewater treatment system, identified as Outfall A10, will be tributary to Pond 010 via Ditch 010-B.

Location and receiving stream of the Outfalls at this facility is as follows:

Outfall	Latitude			Longitude			
Number	DEG	MIN	SEC	DEG	MIN	SEC	Receiving Waters
001	38°	01'	55"	88°	46'	00"	Unnamed tributary to Middle Fork Big Muddy River
002	38°	01'	52"	88°	46'	43"	Middle Fork Big Muddy River
003	38°	01'	32"	88°	46'	44"	Unnamed tributary to Akin Creek
004	38°	01'	32"	88°	45'	36"	Unnamed tributary to Akin Creek
005	38°	01'	07"	88°	45'	29"	Akin Creek
006	38°	02'	10"	88°	45	36"	Unnamed tributary to Middle Fork Big Muddy River
007	38°	02'	09"	88°	45'	38"	Unnamed tributary to Middle Fork Big Muddy River
008	38°	01'	29"	88°	45'	18"	Unnamed tributary to Akin Creek
010	37°	41'	17"	89°	58'	58"	Unnamed tributary to Middle Fork Big Muddy River
A10	37°	41'	19"	89°	58'	55"	Pond 010
013	38°	02'	17"	88°	46'	13"	Middle Fork, Big Muddy River
014	38°	03'	07"	88°	45'	39"	Middle Fork, Big Muddy River
015	38°	03'	09"	88°	46'	37"	Unnamed tributary to Sugar Camp Creek
016	38°	03'	11"	88°	46'	52"	Unnamed tributary to Sugar Camp Creek
017	38°	01'	8.85"	88°	57'	56.79"	The Big Muddy River

Compacted clay liners as described below for the refuse disposal area shall also be constructed for Sedimentation Basins 001, 003, 004, 013, 014, 015 and 016 which receive pumpage and/or runoff from coal stockpiles and/or coal refuse disposal activities. Construction of the four (4) foot compacted clay liners for the sedimentation basins shall also be subject to and in accordance with the specifications and testing requirements of Condition No. 12.

Refuse disposal:
Coarse and fine coal refuse disposal shall be performed at Sugar Camp Mine facilities as proposed and described in IEPA Log Nos. 1357-07 and 1357-07-B. Foundation preparation for the coarse refuse disposal areas and the fine coal refuse areas (RDA No. 1) shall consist of the construction of a four (4) foot compacted clay liner subject to and in accordance with Condition No. 12. Construction, development and utilization of Slurry Cell No. 1 is subject to Condition No. 14.

As proposed and described in IEPA Log Nos. 7245-11 (Revision No. 1 to OMM Permit No. 382), the coarse refuse embankment originally proposed as non-impounding structure will be enclosed to develop an impounding structure for slurry disposal. A four foot clay liner will be constructed, which eliminates the need for the keyway, which has been eliminated from the design under IEPA Log No. 7245-11-B. The coarse refuse embankment will be constructed in three phases. Phases 1, 2 and 3 will be constructed with top elevations of approximately 445 feet, 470 feet and 480 feet above msl, respectively

As proposed and depicted in IEPA Log Nos. 4112-14, 4112-14-A and 4112-14-B, the top elevation of the embankment of refuse disposal area No. 1 will be raised to a total height of approximately 86 feet to a final crest elevation of 496.0 feet (phase V).

As previously approved under Subtitle D Permit No. 2014-MW-4357, a non-impounding coarse refuse disposal area was developed and operated at Sugar Camp Mine main site area. As described in IEPA Log Nos 4357-14 and 4357-14-B an expansion to the northwest of the existing Refuse Disposal Area (RDA) No. 1 embankment was developed. Development of this area for the refuse disposal included construction of a low permeability liner consisting of four (4) foot compacted clay with a hydraulic conductivity of $1x10^{-7}$ cm/sec., or less. Compacted clay liner shall also be subject to and in accordance with the specifications and testing requirements of Condition No. 12.

IBR Areas and pump installation:
As proposed and depicted in IEPA Log No. 7165-11, an additional area of 0.6 acres located in Section 1, Township 6 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for construction of access road, installation of borehole to transport concrete into the underground mine and soil storage areas. This area was later modified under IEPA Log No. 7550-11 (see discussion below) to enlarge the area by 0.4 acres and to install turbine Pump No. 3. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 7550-11, an additional area of 8.72 acres located in Sections 1, 10, 11 and 12 Township 6 South, Range 4 East, Franklin County and Section 6, Township 6 South, Range 5 East, Hamilton County is incorporated into the NPDES Permit. This area includes 0.52 acres identified as turbine pump site 1, an additional 0.04 acres added to turbine pump site 3 (Log No. 7165-11, see discussion above), and a water pipeline corridor consisting of 7.54 acres to connect turbine pump site Nos. 1, 2, 3 and 4 with the main mine site. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 5037-13, an additional area of 1.4 acres located in Section 1, Township 6 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for construction of access roads work area and two-16" boreholes. A pump will be set in each of the boreholes with pumpage being directed to the main pipeline which conveys underground mine pumpage to the main mine site. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 5064-13, an additional area of 0.7 acres located in Section 1, Township 6 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for construction of a single 16" borehole. A pump will be set in this borehole with pumpage being directed to the main pipeline which conveys underground mine pumpage to the main mine site. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 5222-13, an additional area of 5.2 acres located in Sections 30 and 31, Township 5 South, Range 5 East, Hamilton County is incorporated into the NPDES Permit for construction of a buried 12" waterline from the number two bleeder shaft to the main pipeline which conveys underground mine pumpage to the main mine site. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 5479-13, an additional area of 3.2 acres located in Sections 1 and 12, Township 6 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for installation of two boreholes. A pump will be set in each borehole with pumpage being directed to the main pipeline which conveys underground mine pumpage to the main mine site. Activity within this area will include improving an existing access road. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log Nos. 4015-14 and 4015-14-A, an additional area of 7.1 acres located in Sections 26, 27 and 35, Township 6 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for construction of six boreholes, improvement of access roads, installation of ventilation fan and small structure to enclose air-compressor. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 4129-14, an additional area of 2.0 acres located in Section 11, Township 6 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for construction of four boreholes and access roads. Pumps will be installed in two of the boreholes with pumpage directed to the pipeline which conveys underground pumpage to the main mine site. The remaining two boreholes will be utilized to provide electrical service and aggregate/concrete to the underground mining operations. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 4130-14, an additional area of 3.4 acres located in Section 12, Township 6 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for construction of three boreholes and access roads. A pump will be installed in one of the boreholes with pumpage directed to the pipeline which conveys underground pumpage to the main mine site. The remaining two boreholes will be utilized to provide compressed air and aggregate/concrete to the underground mining operations. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 4147-14, an additional area of 10.2 acres located in Sections 27 and 34, Township 5 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for installation of a buried waterline to convey underground pumpage from the Viking Portal (NW Portal) to the main mine site. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 4236-14, an additional area of 0.5 acres located in Section 10, Township 6 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for construction of four boreholes and two concrete pads. Two service boreholes will provide essential power and compress air to the underground operations. A pump will be installed in one of the boreholes with pumpage directed to the pipeline which conveys underground pumpage to the main mine site. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 4285-14, an additional area of 5.0 acres located in Section 30, Township 5 South, Range 5 East, Hamilton County is incorporated into the NPDES Permit for installation of turbine pump borehole to maintain underground safety conditions. A buried waterline convey underground pumpage to the main mine site. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 4320-14, an additional area of 14.28 acres located in Section 4, Township 6 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for the new topsoil stockpile storage area. Runoff from the area approved herein will be controlled by diversion ditches 002-A, 002-B and 002-C reporting to basin 002.

As proposed and depicted in IEPA Log No. 4340-14, an additional area of 6.3 acres located in Sections 25 and 26, Township 5 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for installation of vertical turbine pump and installation of a combination compressed air/electrical power supply. A buried waterline will be installed to convey underground pumpage to the main mine site. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 4488-14, an additional area of 0.9 acres located in Section 7, Township 6 South, Range 5 East, Hamilton County is incorporated into the NPDES Permit for installation of vertical turbine pump to pump water from the underground workings. A buried waterline convey underground pumpage to the main mine site. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 4510-14, an additional area of 3.0 acres located in Section 7, Township 6 South, Range 5 East, Hamilton County is incorporated into the NPDES Permit for construction of an access road, installation of vertical turbine pumps to pump water from the underground workings to maintain required underground mine ventilation and safety conditions. A buried waterline convey underground pumpage to the main mine site. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log Nos. 3140-15 and 3140-15-A, an additional area of 3.9 acres located in Section 35, Township 5 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for construction of a belt air fan/borehole to add capacity of fresh air to underground workings area. Combination of power and communication borehole to add utilities for underground workings will be also constructed. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As proposed and depicted in IEPA Log No. 2031-16, an additional area of 4.7 acres located in Section 36, Township 5 South, Range 4 East, Franklin County is incorporated into the NPDES Permit for construction of two boreholes for installation of a vertical turbine pumps to pump water from the underground workings to maintain required underground mine ventilation and safety conditions. A buried waterline convey underground pumpage to the main mine site. Runoff from the area approved herein will be controlled by silt fence, mulching, seeding, vegetation, rock check dams, erosion control blankets, etc.

As previously approved under Subtitle D Permits, an additional 55.91 acres of permit area is incorporated into this permit and described as follows:

Main site

A non-contiguous area as described in IEPA Log No. 6166-12 (OMM Permit No. 382) consisting of 1.9 acres, located in Section 6, Township 6 South, Range 4 East, Hamilton County, to be used for construction of the vertical turbine pump in a mine service borehole, a small laydown area and an access road. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 4199-14 (OMM Permit No. 382) consisting of 1.5 acres, located in Section 25, Township 5 South, Range 4 East, Franklin County, to be utilized for the construction of a borehole to provide compressed air to underground working area. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 3343-15 (OMM Permit No. 382) consisting of 6.3 acres, located in Section 8, Township 6 South, Range 5 East, Hamilton County, to be utilized for the construction of a bleeder shaft for additional fresh air to the underground ventilation passages. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 7321-11 (OMM Permit No. 382) consisting of 0.71 acres, located in Section 2, Township 6 South, Range 4 East, Franklin County, to be utilized for the construction of the emergency concrete borehole to transport concrete into the mine and access road. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 7551-11 (OMM Permit No. 382) consisting of 1.4 acres, located in Section 1, Township 6 South, Range 4 East, Franklin County, to be utilized for the construction of the compressed air borehole facility to supply high pressure air to run under ground water pumps for underground water management control. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 6085-12 (OMM Permit No. 382) consisting of 0.1 acres, located in Section 1, Township 6 South, Range 4 East, Franklin County, to be utilized for the construction of buried waterline. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 6137-12 (OMM Permit No. 382) consisting of 0.9 acres, located in Section 5, Township 6 South, Range 5 East, Hamilton County, to be utilized for the construction of the two vertical turbine pumps in two mine service boreholes, a rock dust bin, pad and borehole, a small laydown area and an access road. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 6236-12 (OMM Permit No. 382) consisting of 1.5 acres, located in Section 5, Township 6 South, Range 5 East, Hamilton County, to be utilized for the construction of the Pumpable Concrete Crib Borehole Facility, which consists of two mine service boreholes (concrete and compressed air), a surface structure, a rock dust borehole, bin and concrete pad, a laydown area and a road entrance. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 4148-14 (OMM Permit No. 382) consisting of 0.5 acres, located in Section 30, Township 5 South, Range 5 East, Hamilton County, to be utilized for the construction of concrete mine service boreholes. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 6157-12 (OMM Permit No. 382) consisting of 0.8 acres, located in Section 6, Township 6 South, Range 5 East, Hamilton County, to be utilized for the construction of the two vertical turbine pumps in two mine service boreholes, a small laydown area and an access road. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 6300-12 (OMM Permit No. 382) consisting of 2.7 acres, located in Section 6, Township 6 South, Range 5 East, Hamilton County, to be utilized for the construction of two boreholes, install two vertical turbine pumps, construct a small open work yard and bury a waterline. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 6428-12 (OMM Permit No. 382) consisting of 16.5 acres, located in Sections 30 and 31, Township 5 South, Range 5 East, Hamilton County, to be utilized for the construction of the air-shaft, topsoil and subsoil storage areas and access road. Boring activities and air-shaft construction will require the excavation and development of a non-discharging cuttings pond as depicted in the referenced project. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 6469-12 (OMM Permit No. 382) consisting of 3.7 acres, located in Section 1, Township 6 South, Range 4 East, Franklin County, to be utilized for the construction of two mine service boreholes, two vertical pumps, two water lines and an access road. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 6606-12 (OMM Permit No. 382) consisting of 1.7 acres, located in Section 33, Township 5 South, Range 4 East, Franklin County, to be utilized for the construction of a concrete borehole structure to protect the air compressor, improve an existing road entrance and construct an access road. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 5024-13 (OMM Permit No. 382) consisting of 1.6 acres, located in Section 1, Township 6 South, Range 4 East, Franklin County, to be utilized for the construction of concrete mine service borehole and access road. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 5126-13 (OMM Permit No. 382) consisting of 0.8 acres, located in Section 10, Township 6 South, Range 4 East, Franklin County, to be utilized for the construction of the two mine service boreholes to deliver compressed air and concrete to the underground works, access road and open work area. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 5131-13 (OMM Permit No. 382) consisting of 1.4 acres, located in Section 10, Township 6 South, Range 4 East, Franklin County, to be utilized for the construction of a mine ventilation drill hole and access road. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 5295-13 (OMM Permit No. 382) consisting of 0.4 acres, located in Section 11, Township 6 South, Range 4 East, Franklin County, to be utilized for the construction of concrete mine service boreholes and access road. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

A non-contiguous area as described in IEPA Log No. 2030-16 (OMM Permit No. 382) consisting of 1.2 acres, located in Section 33, Township 5 South, Range 4 East, Franklin County, to be utilized for the construction of a borehole to provide compressed air to underground working area. Alternate drainage control will be provided by the use of silt fence, straw bale dikes, graveled areas and re-vegetation. Runoff from the corridor areas will be monitored in accordance with stormwater monitoring requirements.

Groundwater monitoring for the main facility will consist of Monitoring Well Nos. GW-1 through GW-12, as depicted in IEPA Log No. 1357-07-B. Well Nos. GW-9, GW-10, GW-11 and GW-12 will monitor effects of the initial refuse disposal area. Groundwater monitoring requirements are outlined in Condition No. 15.

Groundwater monitoring for the North Refuse Disposal facility will consist of nine (9) new Monitoring Wells Nos. MW-31, MW-32, MW-33, MW-34, MW-35, MW-36, MW-37, MW-38 and MW-38R will monitor effects of the initial refuse disposal area. Groundwater monitoring requirements are outlined in Condition No. 15.

This Construction Authorization replaces Construction Authorization Nos. 1357-07 and 8389-10.

The abandonment plan shall be executed and completed in accordance with 35 Ill. Adm. Code 405.109.

All water remaining upon abandonment must meet the requirements of 35 Ill. Adm. Code 406.202. For the constituents not covered by 35 Ill. Adm. Code Parts 302 or 303, all water remaining upon abandonment must meet the requirements of 35 Ill. Adm. Code 406.106.

NPDES Permit No. IL 0078565

Construction Authorization No.5212-13

This Authorization is issued subject to the following Conditions. If such Conditions require additional or revised facilities, satisfactory engineering plan documents must be submitted to this Agency for review and approval to secure issuance of a Supplemental Authorization to Construct.

1. If any statement or representation is found to be incorrect, this permit may be revoked and the permittee thereupon waives all rights thereunder.

2. The issuance of this permit (a) shall not be considered as in any manner affecting the title of the premises upon which the mine or mine refuse area is to be located; (b) does not release the permittee from any liability for damage to person or property caused by or resulting from the installation, maintenance or operation of the proposed facilities; (c) does not take into consideration the structural stability of any units or parts of the project; and (d) does not release the permittee from compliance with other applicable statutes of the State of Illinois, or with applicable local laws, regulations or ordinances.

3. Final plans, specifications, application and supporting documents as submitted by the person indicated on Page 1 as approved shall constitute part of this permit in the records of the Agency.

4. There shall be no deviations from the approved plans and specifications unless revised plans, specifications and application shall first have been submitted to the Agency and a supplemental permit issued.

5. The permit holder shall notify the Agency (217/782-3637) immediately of an emergency at the mine or mine refuse area which causes or threatens to cause a sudden discharge of contaminants into the waters of Illinois and shall immediately undertake necessary corrective measures as required by 35 Ill. Adm. Code 405.111. (217/782-3637 for calls between the hours of 5:00 p.m. to 8:30 a.m. and on weekends.)

6. The termination of an NPDES discharge monitoring point or cessation of monitoring of an NPDES discharge is not authorized by this Agency until the permittee submits adequate justification to show what alternate treatment is provided or that untreated drainage will meet applicable effluent and water quality standards.

7. Initial construction activities in areas to be disturbed shall be for collection and treatment facilities only. Prior to the start of other activities, surface drainage controls shall be constructed and operated to avoid violations of the Act or Subtitle D. At such time as runoff water is collected in the sedimentation pond, a sample shall be collected and analyzed, for the parameters designated as 1M through 15M under Part 5-C of Form 2C and the effluent parameters designated herein with the results sent to this Agency. Should additional treatment be necessary to meet the standards of 35 Ill. Adm. Code 406.106 or applicable water quality standards, a Supplemental Permit must be obtained. Discharge from ponds is not allowed unless applicable effluent and water quality standards are met in the basin discharge(s).

8. This Agency must be informed in writing and an application submitted if drainage, which was previously classified as alkaline (pH greater than 6.0), becomes acid (pH less than 6.0) or ferruginous (base flow with an iron concentration greater than 10 mg/l). The type of drainage discharging to the basin should be reclassified in a manner consistent with the applicable provisions of 35 Ill. Adm. Code Part 406. The application should discuss the treatment method and demonstrate how the discharge will meet the applicable standards.

9. A permittee has the obligation to add a settling aid if necessary to meet the suspended solids or settleable solids effluent standards. The selection of a settling aid and the application practice shall be in accordance with a. or b. below

   a. Alum ($Al_2(SO_4)_3$), hydrated lime ($Ca(OH)_2$), soda ash (Na_2CO_3), alkaline pit pumpage, acetylene production by-product (tested for impurities), and ground limestone are acceptable settling aids and are hereby permitted for alkaline mine drainage sedimentation ponds.

   b. Any other settling aids such as commercial flocculents and coagulants are permitted only on prior approval from the Agency. To obtain approval a permittee must demonstrate in writing to the Agency that such use will not cause a violation of the toxic substances standard of 35 Ill. Adm. Code 302.210 or of the appropriate effluent and water quality standards of 35 Ill. Adm. Code parts 302, 304, and 406.

10. A general plan for the nature and disposition of all liquids used to drill boreholes shall be filed with this Agency prior to any such operation. This plan should be filed at such time that the operator becomes aware of the need to drill unless the plan of operation was contained in a previously approved application.

11. Any of the following shall be a violation of the provisions required under 35 Ill. Adm. Code 406.202:

    a. It is demonstrated that an adverse effect on the environment in and around the receiving stream has occurred or is likely to occur.

    b. It is demonstrated that the discharge has adversely affected or is likely to adversely affect any public water supply.

    c. The Agency determines that the permittee is not utilizing Good Mining Practices in accordance with 35 Ill. Adm. Code 406.204 which are fully described in detail in Sections 406.205, 406.206, 406.207 and 406.208 in order to minimize the discharge of total dissolved solids, chloride, sulfate, iron and manganese. To the extent practical, such Good Mining Practices shall be implemented to:

        i. Stop or minimize water from coming into contact with disturbed areas through the use of diversions and/or runoff controls (Section 406.205).

        ii. Retention and control within the site of waters exposed to disturbed materials utilizing erosion controls, sedimentation controls, water reuse or recirculation, minimization of exposure to disturbed materials, etc. (Section 406.206).

        iii. Control and treatment of waters discharged from the site by regulation of flow of discharges and/or routing of discharges to more suitable discharge locations (Section 406.207).

        iv. Utilized unconventional practices to prevent the production or discharge of waters containing elevated contaminant concentrations such as diversion of groundwater prior to entry into a surface or underground mine, dewatering practices to remove clean water prior to contacting disturbed materials and/or any additional practices demonstrated to be effective in reducing contaminant levels in discharges (Section 406.208).

    d. The Agency determines that the permittee is not utilizing Best Management Practices associated with coal refuse disposal activities in order to minimize the discharge of total dissolved solids, chloride, sulfate, iron and manganese. As stated in IEPA Log No. 1357-07-G, the Best Management Practices to be implemented are:

        Coarse Refuse Disposal:

        i. Maximization of the distribution of un-oxidized coarse refuse so as to minimize the exposure to oxidation and weathering.

        ii. Concurrent compaction of coarse refuse; placement of material lifts, grading and compaction of disposed materials including side slopes.

        iii. Minimization of long term end dumped storage of loose coarse refuse.

        iv. Alkaline amendment of coarse refuse as, or if, necessary for permitted water quality standard compliance, including the use of agricultural lime or other similarly alkaline materials so as to achieve a NNP in excess of 10 tons per 1000 tons of material.

        v. Oxidation management as part of the final reclamation process to enhance coarse refuse alkalinity.

        Fine Refuse (Slurry) Disposal:

        i. Maintenance of adequate water depth over fine refuse to maximize retention time and differential separation of slurried material.

        ii. Sequential movement of slurry input point to assure better distribution of material.

        iii. As part of the final reclamation process, incremental limestone amendment over the appropriate time period to evaluate soil cover alternatives, if necessary.

12. The four (4) foot compacted clay liner to be constructed beneath the coarse refuse disposal area, fine coal refuse area (Slurry Cell No. 1 and North Refuse Disposal Area), and Sedimentation Basins 001, 003, 004, and 013 shall be subject to the following specifications and procedures as detailed in IEPA Log Nos. 1357-07-B and 4544-14.

Construction Specifications

a. All soils to be used for compacted clay liner shall be free of grass, vines, vegetation, and rock or stones greater than 4 inches in diameter.

b. Each location at which a compacted clay liner is to be constructed shall be excavated to the proposed base elevation and then over-excavated an additional three (3) feet. One (1) foot of the resulting base material shall be scarified and re-compacted to achieve the minimum permeability requirements cited below.

c. Each successive soil lift shall be placed to a 6 to 8 inch loose thickness; however, in no instance shall the loose lift thickness exceed the length of the pads or feet on the compactor or roller.

d. Each soil lift shall be compacted to the minimum Standard Proctor (ASTM D698) density identified in Item no. 12(q) below, at a moisture content of 0% to 5% above the optimum moisture content of the soil.

e. Inter-lift surfaces shall be adequately scarified to ensure inter-lift bonding.

f. Liner construction shall be performed to ensure consistent achievement of density, moisture content, and hydraulic conductivity for each successive lift.

g. The placement of frozen material or the placement of material on frozen ground shall be prohibited.

h. Contemporaneous placement or protective covering shall be provided to prevent drying, desiccation and/or freezing where necessary.

i. Liner construction shall be completed in a manner which reduces void spaces within the soil and liner.

j. All construction stakes shall be removed during construction, and all test holes (Shelby tube samples) are to be backfilled with bentonite.

k. The compacted clay liner shall be constructed in a manner to achieve a uniform barrier with a hydraulic conductivity of $1X10^{-7}$ cm/sec.

l. In the event that acceptable compaction results are not achieved, the soil lift shall be re-processed or removed and replaced. If moisture content is less than optimum, or greater than 5% above optimum, the failing material shall be wetted or dried to a moisture content within specification and re-compacted. If the dry density is below specification, the failing material shall be re-compacted until a passing test is achieved.

m. In the event of a failing conductivity test, the soil may be removed or re-compacted and retested until a passing result is obtained; or the soil immediately above and below the test specimen from the same Shelby tube may be tested. If both tests pass, the original test shall be nullified. If either test fails, that portion of the liner shall be rejected and shall be reconstructed and retested until passing results are obtained. The limits of necessary reconstruction shall be determined by additional sampling and testing within the failed region, thereby isolating the failing area of work.

Testing Specifications

n. Prior to initiating soil liner construction, borrow soils shall be identified, qualified, and verified. At a minimum, a representative sample of each soil type identified within the borrow area is to be collected and analyzed for gradation, compaction, and hydraulic conductivity characteristics.

o. Samples collected from the borrow area shall be evaluated in accordance with ASTM D422, D4318 and D2487 to ensure classification criteria are met.

p. Samples collected from the borrow area shall be tested in accordance with ASTM D698 to determine maximum dry density and optimum moisture content of the soil.

q. Samples collected from the borrow area shall be compacted to 90% and 95% standard Proctor density at or near optimum moisture content. The hydraulic conductivity of the re-compacted samples shall be determined in accordance with ASTM D5084 procedures. The results of this testing shall be used to establish the minimum dry density for soil liner compaction necessary to achieve a hydraulic conductivity of $1X10^{-7}$ cm/sec or less.

r. Moisture and density testing by nuclear methods (ASTM D2922 and D3017) shall be conducted at a rate of at least one test per 1,000 cubic yards placed. Testing locations shall be random, and shall not be known to the earthwork contractor prior to lift placement.

s. To ensure the accuracy and reproducibility of the nuclear testing, all nuclear density gauges shall be certified to calibration. Soil compaction tests shall be double-checked with independent test methods. A drive cylinder test and laboratory moisture content determination shall be conducted and compared to gauge readings. These independent checks shall be made at the outset of construction and on a bi-weekly basis (e.g., every ten working days) thereafter.

t. Samples for hydraulic conductivity verification shall be retrieved from the compacted soil liner and tested in accordance with ASTM D5084 procedures. Samples shall be retrieved using three-inch Shelby tubes. Samples shall be completed at a frequency of one sample/test per 20,000 cubic yards placed. The vertical location of the recovered samples shall be varied so that representative portions or lifts of the constructed liner are tested. Testing locations shall be random, and shall not be known to the earthwork contractor prior to soil liner construction.

u. Survey checks shall be conducted at a maximum spacing of 100 ft. centers, and at 100 ft. intervals along each line where a break in slope occurs, to verify liner thickness. To verify liner thickness, the survey checks shall be taken before and after liner construction.

13. Synthetic (geo-membrane) liners proposed to be installed beneath any future facility at this mine site shall be subject to the following specifications and procedures:

Site preparation

a. Subgrade material below geo-membrane liner shall consist of structural fill and/or in-situ soils.

b. The subgrade shall be inspected and cleared of any potentially deleterious materials.

c. Subgrade material will consist of relatively homogeneous, fine-grained soils and be free of debris; vegetation, frozen materials, foreign objects and organics. The subgrade surface shall be solid, uniform and smooth.

Liner material and placement

d. The synthetic liner will consist of a High Density Polyethylene (HDPE) Geo-membrane and will be installed directly above the subgrade soils.

e. The HDPE Geo-membrane shall be installed in accordance with manufacturer's requirements.

f. A 12-ounce per square yard non-woven geotextile cushion will be placed above the HDPE liner to prevent puncture during protective cover placement.

Protective cover

g. A protective cover component will be placed directly above the liner system and will consist of a minimum thickness of 12 inches of homogeneous fine grained soils (clays and silts) and coarse grained sands. This cover material shall be free of debris, vegetation, frozen materials, foreign objects and organics.

14. RDA No. 1 shall be constructed as proposed in IEPA Log Nos. 1357-07, 1357-07-B, 7245-11, 7245-11-B, 4112-14, 4112-14A, 4112-14-B and 4164-14. The fine coal refuse (slurry) disposal area located within the coarse refuse embankment of Refuse Disposal Area (RDA) No. 1 and North Refuse Disposal Area shall be operated as a closed circuit system in conjunction with the preparation plant and RO system.

15. Groundwater monitoring requirements for the OMM Permit No. 382 area as approved under IEPA Log Nos. 1357-07 and 1357-07-B and groundwater monitoring requirements for the OMM Permit No. 434 as approved under IEPA Log Nos. 4544-14 and 4544-14-D are as follows:

a. Groundwater monitoring shall consist of Well Nos. GW-1 through GW-12 and Well Nos. MW-31, MW-32, MW-33, MW-34, MW-35, MW-36, MW-37, MW-38 and MW-38R.

b. Ambient background monitoring shall be performed for all referenced wells. Such ambient monitoring shall consist of six (6) samples collected during the first year (approximately bi-monthly) following well installation but no later than during the first year of operation or disturbance to determine ambient background concentrations. Background monitoring shall include the following list of constituents:

Aluminum	Fluoride	Sulfate
Antimony	Iron (dissolved)	Thallium
Arsenic	Iron (total)	Total Dissolved Solids
Barium	Lead	Vanadium
Beryllium	Manganese (dissolved)	Zinc
Boron	Manganese (total)	pH
Cadmium	Mercury	Acidity
Chloride	Molybdenum	Alkalinity
Chromium	Nickel	Hardness
Cobalt	Phenols	Static Water Elevation
Copper	Selenium	
Cyanide	Silver	

c. Following the ambient monitoring as required under Condition No. 15(b) above, routine monitoring shall continue on a quarterly basis as follows:

i. Monitoring Well Nos. GW-9, GW-10, GW-11, GW-12, MW-31, MW-32, MW-33, MW-34, MW-35, MW-36, MW-37, MW-38 and MW-38R associated with refuse disposal shall continue to be monitored quarterly for the contaminates identified in 15(b) above.

ii. Monitoring Well Nos. GW-1, GW-2, GW-3, GW-4, GW-5, GW-6, GW-7 and GW-8 shall be monitored quarterly as required by IDNR/OMM for the following list of constituents:

Iron (dissolved)	Hardness
Iron (total)	Acidity
Manganese (dissolved)	Alkalinity
Manganese (total)	pH
Sulfate	Water Elevation
Total Dissolved Solids	

d. Following completion of active mining and reclamation, post-mining monitoring of all above referenced wells shall consist of six (6) samples collected during a 12-month period (approximately bi-monthly) to determine post-mining concentrations. Post-mining monitoring shall include the list of constituents identified in Condition No. 15(b) above.

e. Groundwater monitoring reports shall be submitted to the Agency in accordance with Special Condition Nos. 3 and 5 of this NPDES permit.

Should electronic filing of groundwater monitoring data through IDNR/OMM be elected, electronic notification shall be provided to the Agency upon submittal of groundwater data to IDNR/OMM.

f. A statistically valid representation of background and/or post mining water quality required under Condition No. 15(b) and 15(d) above shall be submitted utilizing the following method. This method shall be used to determine the upper 95 percent confidence limit for each parameter listed above.

Should the Permittee determine that an alternate statistical method would be more appropriate based on the data being evaluated, the Permittee may request utilization of such alternate methodology. Upon approval from the Agency, the alternate methodology may be utilized to determine a statistically valid representation of background and/or post mining water quality.

The following method should be used to predict the confidence limit when single groundwater samples are taken from each monitoring (test) well.

i. Determine the arithmetic mean $\left(\overline{X}_b\right)$ of each indicator parameter for the sampling period. If more than one well is used, an equal number of samples must be taken from each well.

$$\overline{X}_b = \frac{X_1 + X_2 + \ldots X_n}{n}$$

Where:

$\overline{X}_b$ = Average value for a given chemical parameter

X_n = Values for each sample

n = the number of samples taken

ii. Calculate the background and/or post mining variance (S_b^2) and standard deviation (S_b) for each parameter using the values (X_n) from each sample of the well(s) as follows:

$$S_b^2 = \frac{(X_1 - \overline{X}_b)^2 + (X_2 - \overline{X}_b)^2 + \ldots + (X_n - \overline{X}_b)^2}{n-1}$$

$$S_b = \sqrt{S_b^2}$$

iii. Calculate the upper confidence limit using the following formula:

$$CL = \overline{X}_b \pm t\sqrt{1 + 1/n}\ (S_b)$$

Where:

CL = upper confidence limit prediction
(upper and lower limits should be calculated for pH)
t = one-tailed t value at the required significance
level and at n-1 degrees of freedom from Table 1
(a two-tailed t value should be used for pH)

iv. If the values of any routine parameter for any monitoring well exceed the upper confidence limit for that parameter, the permittee shall conclude that a statistically significant change has occurred at that well.

v. When some of the background and/or post mining values are less than the Method Detection Limit (MDL), a value of one-half (1/2) the MDL shall be substituted for each value that is reported as less than the MDL. All other computations shall be calculated as given above.

If all the background and/or post mining values are less than the MDL for a given parameter, the Practical Quantitation Limit (PQL), as given in 35 Ill. Adm. Code Part 724 Appendix I shall be used to evaluate data from monitoring wells. If the analytical results from any monitoring well exceed two (2) times the PQL for any single parameter, or if they exceed the PQLs for two or more parameters, the permittee shall conclude that a statistically significant change has occurred.

Table 1
Standard t-Tables Level of Significance

Degrees of freedom	t-values (one-tail)		t-values (two-tail)*	
	99%	95%	99%	95%
4	3.747	2.132	4.604	2.776
5	3.365	2.015	4.032	2.571
6	3.143	1.943	3.707	2.447
7	2.998	1.895	3.499	2.365
8	2.896	1.860	3.355	2.306
9	2.821	1.833	3.250	2.262
10	2.764	1.812	3.169	2.228
11	2.718	1.796	3.106	2.201
12	2.681	1.782	3.055	2.179
13	2.650	1.771	3.012	2.160
14	2.624	1.761	2.977	2.145
15	2.602	1.753	2.947	2.131
16	2.583	1.746	2.921	2.120
17	2.567	1.740	2.898	2.110
18	2.552	1.734	2.878	2.101
19	2.539	1.729	2.861	2.093
20	2.528	1.725	2.845	2.086
21	2.518	1.721	2.831	2.080
22	2.508	1.717	2.819	2.074
23	2.500	1.714	2.807	2.069
24	2.492	1.711	2.797	2.064
25	2.485	1.708	2.787	2.060
30	2.457	1.697	2.750	2.042
40	2.423	1.684	2.704	2.021

Adopted from Table III of "Statistical Tables for Biological Agricultural and Medical Research" (1947, R.A. Fisher and F. Yates).

* For pH only when required.

16. System performance and operation will be continuously monitored with instrumentation designed to provide warning of potential problems. The entire system is to be inspected weekly when operating. Any items of concern noted from system inspections are to be addressed immediately and, if necessary, pumping operations are to be suspended until the issue is resolved.

17. The following additional sediment and erosion control measures shall be implemented at this facility:

    a. Establish and maintain vegetative cover in areas currently cropland.
    b. Soil stockpiles will be seeded with grasses and/or legumes to minimize exposure to excessive water and wind erosion.
    c. Organic mulch or chemical binders will be used as required by IDNR on the side slopes of the stockpiles.
    d. Seeding with small grain or grass cover and applying straw mulch will be used where practicable and the installation of sediment basin will be used as a means of controlling suspended solids from exposed areas where topsoil has been removed.
    e. Final vegetation will be established on all disturbed areas.
    f. Disturbed areas will be seeded and mulched to provide a vegetative cover to prevent erosion.
    g. During construction, sediment control measures such as silt fences, straw bale dikes, riprap check dams and mulching will be used to minimize erosion and prevent sediment from leaving the permit area.
    h. All construction areas will be stabilized with permanent vegetative species, graded stone and/or paving material.

Special Conditions

Special Condition No. 1: No effluent from any mine related facility area under this permit shall, alone or in combination with other sources, cause a violation of any applicable water quality standard as set out in the Illinois Pollution Control Board Rules and Regulations, Subtitle C: Water Pollution.

Special Condition No. 2: Samples taken in compliance with the effluent monitoring requirements shall be taken at a point representative of the discharge, but prior to entry into the receiving stream.

Special Condition No. 3: All periodic monitoring and reporting forms, including Discharge Monitoring Report (DMR) forms, shall be submitted to the Agency according to the schedule outlined in Special Condition No. 4 or 5 below with one (1) copy forwarded to each of the following addresses:

Illinois Environmental Protection Agency
Division of Water Pollution Control
1021 North Grand Ave., East
P.O. Box 19276
Springfield, IL 62794-9276

Attn: Compliance Assurance Section

Illinois Environmental Protection Agency
Mine Pollution Control Program
2309 West Main Street, Suite 116
Marion, Illinois 62959

The Permittee will be required to submit electronic DMRs (NetDMRs) instead of mailing paper DMRs to the IEPA beginning December 21, 2016. More information, including registration information for the NetDMR program, can be obtained on the IEPA website, http://www.epa.state.il.us/water/net-dmr/index.html.

Special Condition No. 4: Completed Discharge Monitoring Report (DMR) forms and as well as upstream and downstream monitoring results, shall be retained by the Permittee for a period of three (3) months and shall be mailed and received by the IEPA at the addresses indicated in Special Condition No. 3 above in accordance with the following schedule, unless otherwise specified by the permitting authority.

Period	Received by IEPA
January, February, March	April 15
April, May, June	July 15
July, August, September	October 15
October, November, December	January 15

The Permittee shall record discharge monitoring results on Discharge Monitoring Report (DMR) forms using one such form for each Outfall and Discharge Condition each month. In the event that an Outfall does not discharge during a monthly reporting period or under a given Discharge Condition, the DMR form shall be submitted with "No Discharge" indicated.

Any and all monitoring results, other than NPDES outfall discharge results reported through NetDMR, shall be submitted to the Agency at the addresses indicated in Special Condition No. 3 above.

Special Condition No. 5: Completed periodic monitoring and reporting, other than DMR's and stream monitoring (i.e., groundwater monitoring, coal combustion waste analysis reports, etc.), shall be retained by the Permittee for a period of three (3) months and shall be mailed and received by the IEPA at the addresses indicated in Special Condition No. 3 above in accordance with the following schedule, unless otherwise specified by the permitting authority.

Period	Received by IEPA
January, February, March	May 1
April, May, June	August 1
July, August, September	November 1
October, November, December	February 1

Special Condition No. 6: The Agency may revise or modify the permit consistent with applicable laws, regulations or judicial orders.

Special Condition No. 7: If an applicable effluent standard or limitation is promulgated under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act and that effluent standard or limitation is more stringent than any effluent limitation in the permit or controls a pollutant not limited in the NPDES Permit, the Agency shall revise or modify the permit in accordance with the more stringent standard or prohibition and shall so notify the permittee.

Special Conditions

Special Condition No. 8: The permittee shall notify the Agency in writing by certified mail within thirty days of abandonment, cessation, or suspension of active mining for thirty days or more unless caused by a labor dispute. During cessation or suspension of active mining, whether caused by a labor dispute or not, the permittee shall provide whatever interim impoundment, drainage diversion, and wastewater treatment is necessary to avoid violations of the Act or Subtitle D Regulations.

Special Condition No. 9: Plans must be submitted to and approved by this Agency prior to construction of any future sedimentation ponds. At such time as runoff water is collected in the sedimentation pond, a sample shall be collected and analyzed for the parameters designated as 1M-15M under Part 5-C of Form 2C and the effluent parameters designated herein with the results sent to this Agency. Should additional treatment be necessary to meet these standards, a Supplemental Permit must also be obtained. Discharge from a pond is not allowed unless applicable effluent and water quality standards are met.

Special Condition No. 10: The special reclamation area effluent standards of 35 Ill. Adm. Code 406.109 apply only on approval from the Agency. To obtain approval, a request form and supporting documentation shall be submitted to request the discharge be classified as a reclamation area discharge. The Agency will notify the permittee upon approval of the change.

Special Condition No. 11: The special stormwater effluent standards apply only on approval from the Agency. To obtain approval, a request with supporting documentation shall be submitted to request the discharge to be classified as a stormwater discharge. The documentation supporting the request shall include analysis results indicating the discharge will consistently comply with reclamation area discharge effluent standards. The Agency will notify the permittee upon approval of the change.

Special Condition No. 12: Annual stormwater monitoring is required for all discharges not tributary to a sediment basin until Final SMCRA Bond is released and approval to cease such monitoring is obtained from the Agency.

a. Each discharge must be monitored for pH and settleable solids annually.

b. Analysis of samples must be submitted with second quarter Discharge Monitoring Reports. A map with discharge locations must be included in this submittal.

c. If discharges can be shown to be similar, a plan may be submitted by November 1 of each year preceding sampling to propose grouping of similar discharges and/or update previously submitted groupings. If updating of a previously submitted plan is not necessary, a written notification to the Agency indicating such is required. Upon approval from the Agency, one representative sample for each group may be submitted.

Special Condition No. 13: Sediment Pond Operation and Maintenance (Outfalls 001, 002, 003, 004, 005, 006, 007, 008, 010, 014, 015 and 016).

a. At times of stormwater discharge, in addition to the alternate effluent monitoring requirements, discharges from Outfalls 001, 002, 003, 004, 005, 006, 007, 008, 010, 014, 015 and 016 shall be monitored and reported for Discharge Rate, Sulfate, Chloride and Hardness.

b. The following sampling and monitoring requirements are applicable to flow in the Middle Fork Big Muddy River which receives discharges from Outfalls 002 and 014, the unnamed tributaries to Middle Fork Big Muddy River receiving the discharges from Outfalls 001, 006, 007 and 010, Akin Creek which receives discharges from Outfall 005, the unnamed tributaries to Akin Creek receiving the discharge from Outfalls 003, 004 and 008 and unnamed tributaries to Sugar Camp Creek which receives discharges from Outfalls 015 and 016.

   i. All sampling and monitoring required in accordance with 13(b)(ii) and (iii) below shall be performed during a discharge and monitoring event from the associated outfall.

   ii. The Middle Fork Big Muddy River, Akin Creek and Sugar Camp Creek as well as the unnamed tributaries to these receiving streams shall be monitored and reported quarterly for Discharge Rate, Chloride, Sulfate and Hardness downstream of the associated outfalls, if applicable. This downstream monitoring shall be performed a sufficient distance downstream of the associated outfall to ensure that complete mixing has occurred. At such time that sufficient information has been collected regarding receiving stream flow characteristics and in-stream contaminant concentrations, the permittee may request a re-evaluation of the monitoring frequency required herein for possible reduction or elimination. For the purpose of re-evaluating the downstream monitoring frequency of the receiving stream, "sufficient information" is defined as a minimum of ten (10) quarterly sampling events.

   In the event that downstream monitoring of the receiving waters is eliminated during the term of this permit based on an evaluation of the quarterly data, a minimum of three (3) additional samples analyzed for the parameters identified above must be submitted with the permit renewal application a minimum of 180 days prior to expiration of this permit.

iii. The Middle Fork Big Muddy River, Akin Creek and Sugar Camp Creek as well as the unnamed tributaries to these receiving streams shall be monitored and reported annually for Discharge Rate, Chloride, Sulfate and Hardness upstream of the associated outfall.

Special Condition No. 14: Sediment Pond Operation and Maintenance (Outfall 013):

a. No discharge is allowed from Outfall No. 013 during "low flow" or "no flow" conditions in the receiving stream, unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.

Pursuant to 35 Ill. Adm. Code Part 302.102, discharges from the referenced outfalls that otherwise would not meet the water quality standards of 35 Ill. Adm. Code Part 302 may be permitted if sufficient flow exists in the receiving stream to ensure that applicable water quality standards are met. That is, discharges not meeting the water quality standards of 35 Ill. Adm. Code Part 302 may only be discharged in combination with stormwater discharges from the basin, and only at such times that sufficient flow exists in the receiving stream to ensure that water quality standards in the receiving stream beyond the area of allowed mixing will not be exceeded.

The permittee shall determine the effluent limitation for chloride and/or the maximum effluent flow rate allowable to maintain water quality in the receiving stream. The following equations shall be used to make such determinations:

$$C_{DS} = [C_E Q_E + 0.25 C_{US} Q_{US}]/ (0.25 Q_{US} + Q_E)$$

Where:

C_E = Effluent concentration (mg/L)

Q_E = Effluent flow rate (cfs) for Outfall 013

Q_{US} = Upstream flow rate (cfs)

C_{US} = Upstream concentration (mg/L)

C_{DS} = Downstream concentration

The "calculated" downstream concentration shall be less than 500 mg/L for chloride and reported on the discharge monitoring reports (DMRs).

The permittee shall install a gauging station and TDS monitor upstream of the discharge to determine an upstream flow (Q_{US}) and a chloride concentration (C_{US}) correlated to the TDS value. In addition, the permittee shall install a continuous TDS monitor downstream to ensure that the chloride concentration (correlated to the TDS value) stays within the chloride water quality standard.

b. The following sampling and monitoring requirements are applicable to flow in Middle Fork Big Muddy River which receives the discharges from Outfall 013.

i. All sampling and monitoring required under 14(b)(ii) and (iii) below shall be performed during a discharge and monitoring event from the associated outfall.

ii. Middle Fork Big Muddy River shall be monitored and reported quarterly for Discharge Rate, Sulfate, Chloride and Hardness downstream of the associated outfall. This downstream monitoring shall be performed a sufficient distance downstream of the associated outfall to ensure that complete mixing has occurred. At such time that sufficient information has been collected regarding stream flow characteristics and in-stream contaminant concentrations, the permittee may request a re-evaluation of the monitoring frequency required herein for possible reduction or elimination. For the purpose of re-evaluating the downstream monitoring frequency of the receiving stream, "sufficient information" is defined as a minimum of ten (10) quarterly sampling events.

In the event that downstream monitoring of the receiving waters is eliminated during the term of this permit based on an evaluation of the quarterly data, a minimum of three (3) additional samples analyzed for the parameters identified above must be submitted with the permit renewal application a minimum of 180 days prior to expiration of this permit.

iii. Middle Fork Big Muddy River shall be monitored and reported annually for Discharge Rate, Sulfate, Chloride and Hardness upstream of the associated outfall.

Special Condition No. 15: Sediment Pond Operation and Maintenance (Outfall 013 – Reclamation Area Discharge Classification):

a. For discharges resulting from precipitation events, in addition to the alternate effluent (Discharge Condition Nos. II and III) monitoring requirements, as indicated on the applicable effluent pages of this Permit, discharges from Outfall 013 shall be monitored and reported for Discharge Rate, Sulfate, Chloride and Hardness.

b. The following sampling and monitoring requirements are applicable to flow in the Middle Fork Big Muddy River which receive discharges from Outfall 013.

   i. All sampling and monitoring required under 15(b)(ii) and (iii) below shall be performed during a discharge and monitoring event from the associated outfall.

   ii. Middle Fork Big Muddy River shall be monitored and reported quarterly for Discharge Rate, Chloride, Sulfate and Hardness downstream of the associated outfall. This downstream monitoring shall be performed a sufficient distance downstream of the associated outfall to ensure that complete mixing has occurred. At such time that sufficient information has been collected regarding receiving stream flow characteristics and in-stream contaminant concentrations the permittee may request a re-evaluation of the monitoring frequency required herein for possible reduction or elimination. For the purpose of re-evaluating the downstream monitoring frequency of the receiving stream, "sufficient information" is defined as a minimum of ten (10) quarterly sampling events.

   In the event that downstream monitoring of the receiving waters is eliminated during the term of this permit based on an evaluation of the quarterly data, a minimum of three (3) additional samples analyzed for the parameters identified above must be submitted with the permit renewal application a minimum of 180 days prior to expiration of this permit.

   iii. Middle Fork Big Muddy River shall be monitored and reported annually for Discharge Rate, Chloride, Sulfate and Hardness upstream of the associated outfall.

Special Condition No. 16: Sediment Pond Operation and Maintenance (Outfall 017):

a. No discharge is allowed from Outfall No. 017 during "low flow" or "no flow" conditions in the receiving stream, unless such discharge meets the water quality standards of 35 Ill. Adm. Code 302.

   Pursuant to 35 Ill. Adm. Code Part 302.102, discharges from the referenced outfalls that otherwise would not meet the water quality standards of 35 Ill. Adm. Code Part 302 may be permitted if sufficient flow exists in the receiving stream to ensure that applicable water quality standards are met. That is, discharges not meeting the water quality standards of 35 Ill. Adm. Code Part 302 may only be discharged in combination with stormwater discharges from the basin, and only at such times that sufficient flow exists in the receiving stream to ensure that water quality standards in the receiving stream beyond the area of allowed mixing will not be exceeded.

   The permittee shall determine the effluent limitation for chloride and/or the maximum effluent flow rate allowable to maintain water quality in the receiving stream. The following equations shall be used to make such determinations:

$$C_{DS} = [C_E Q_E + 0.25 C_{US} Q_{US}]/ (0.25 Q_{US} + Q_E)$$

   Where:

   C_E = Effluent concentration (mg/L)

   Q_E = Effluent flow rate (cfs) for Outfall 017

   Q_{US} = Upstream flow rate (cfs)

   C_{US} = Upstream concentration (mg/L)

   C_{DS} = Downstream concentration

The "calculated" downstream concentration shall be less than 500 mg/L for chloride and reported on the discharge monitoring reports (DMRs).

Chloride is limited in the NPDES permit at the limits described below. The maximum flow from Outfall 017 is 8,482 gpm and the maximum chloride concentration is 12,000 mg/L.

Special Conditions

The permit only allows a discharge when the Big Muddy River is flowing above 30 cfs. The maximum dispersion required for all water quality parameters is 25.5:1. Model predictions have been made for a maximum effluent total flow rate of 18.9 cfs. At the maximum chloride concentration of 12,000 mg/L, this maximum discharge requires a river flow of 1,893 cfs to meet a dispersion of 25.5 mg/L in less than 25 % of the river volume. The maximum distance to meet the water quality standard for all scenarios is 221.5 feet downstream with a plume width of 13.1 feet.

The upstream flow (Q_{US}) should be based on the US Army Corps of Engineers (USACE) dam at Rend Lake and the chloride concentration can be based on the 90th percentile of the existing data of 30.1 mg/L.

b. The following sampling and monitoring requirements are applicable to flow in Big Muddy River which receives the discharges from Outfall 017.

   i. All sampling and monitoring required under 16(b)(ii) and (iii) below shall be performed during a discharge and monitoring event from the associated outfall.

   ii. The Big Muddy River shall be monitored and reported quarterly for Discharge Rate, Sulfate, Chloride and Hardness downstream of the associated outfall. This downstream monitoring shall be performed a sufficient distance downstream of the associated outfall to ensure that complete mixing has occurred. At such time that sufficient information has been collected regarding stream flow characteristics and in-stream contaminant concentrations, the permittee may request a re-evaluation of the monitoring frequency required herein for possible reduction or elimination. For the purpose of re-evaluating the downstream monitoring frequency of the receiving stream, "sufficient information" is defined as a minimum of ten (10) quarterly sampling events.

   In the event that downstream monitoring of the receiving waters is eliminated during the term of this permit based on an evaluation of the quarterly data, a minimum of three (3) additional samples analyzed for the parameters identified above must be submitted with the permit renewal application a minimum of 180 days prior to expiration of this permit.

   iii. The Big Muddy River shall be monitored and reported annually for Discharge Rate, Sulfate, Chloride and Hardness upstream of the associated outfall.

Special Condition No. 17: Data collected in accordance with Special Condition Nos. 13, 14, 15 and 16 above will be utilized to evaluate the appropriateness of the effluent limits established in this Permit. Should the Agency's evaluation of this data indicate revised effluent limits are warranted; this permit may be reopened and modified to incorporate more appropriate effluent limitations. This data will also be used for determination of effluent limitations at the time of permit renewal.

Special Condition No. 18: Discharges from Outfall Nos. 001, 003, 008, 013 and 017 shall be monitored twice annually with such monitoring spaced at approximately 6-month intervals during the entire 5-year term of this NPDES. Sampling of the discharges shall be performed utilizing the grab sampling method and analyzed for total (unfiltered) concentrations. The results of the sampling required under this Special Condition shall be submitted twice annually to the Agency in January and July of each calendar year to the addresses indicated in the Special Condition No. 3 above. The parameters to be sampled and the detection limits (minimum reporting levels) are as follows:

Parameter	Detection Limit
Arsenic	0.05 mg/L
Barium	0.50 mg/L
Cadmium	0.001 mg/L
Chromium (hexavalent)	0.01 mg/L
Chromium	0.05 mg/L
Copper	0.005 mg/L
Lead	0.05 mg/L
Manganese	0.50 mg/L
Mercury*	1.00 ng/L**
Nickel	0.005 mg/L
Phenols	0.005 mg/L
Selenium	2.000 µg/L***
Silver	0.003 mg/L
Zinc	0.025 mg/L

* Utilize USEPA Method 1631E and the digestion procedure described in Section 11.1.1.2 of 1631E.
** 1.00 ng/L. (nanogram/liter) = 1 part per trillion.
*** µg/L = micrograms/liter

Attachment H

Standard Conditions

Definitions

Act means the Illinois Environmental Protection Act, 415 ILCS 5 as Amended.

Agency means the Illinois Environmental Protection Agency.

Board means the Illinois Pollution Control Board.

Clean Water Act (formerly referred to as the Federal Water Pollution Control Act) means Pub. L 92-500, as amended. 33 U.S.C. 1251 et seq.

NPDES (National Pollutant Discharge Elimination System) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318 and 405 of the Clean Water Act.

USEPA means the United States Environmental Protection Agency.

Daily Discharge means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Maximum Daily Discharge Limitation (daily maximum) means the highest allowable daily discharge.

Average Monthly Discharge Limitation (30 day average) means the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Discharge Limitation (7 day average) means the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Aliquot means a sample of specified volume used to make up a total composite sample.

Grab Sample means an individual sample of at least 100 milliliters collected at a randomly-selected time over a period not exceeding 15 minutes.

24-Hour Composite Sample means a combination of at least 8 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24-hour period.

8-Hour Composite Sample means a combination of at least 3 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over an 8-hour period.

Flow Proportional Composite Sample means a combination of sample aliquots of at least 100 milliliters collected at periodic intervals such that either the time interval between each aliquot or the volume of each aliquot is proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot.

(1) **Duty to comply**. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or for denial of a permit renewal application. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirements.

(2) **Duty to reapply**. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. If the permittee submits a proper application as required by the Agency no later than 180 days prior to the expiration date, this permit shall continue in full force and effect until the final Agency decision on the application has been made.

(3) **Need to halt or reduce activity not a defense**. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

(4) **Duty to mitigate**. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

(5) **Proper operation and maintenance**. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up, or auxiliary facilities, or similar systems only when necessary to achieve compliance with the conditions of the permit.

(6) **Permit actions**. This permit may be modified, revoked and reissued, or terminated for cause by the Agency pursuant to 40 CFR 122.62 and 40 CFR 122.63. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

(7) **Property rights**. This permit does not convey any property rights of any sort, or any exclusive privilege.

(8) **Duty to provide information**. The permittee shall furnish to the Agency within a reasonable time, any information which the Agency may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also furnish to the Agency upon request, copies of records required to be kept by this permit.

(9) **Inspection and entry**. The permittee shall allow an authorized representative of the Agency or USEPA (including an authorized contractor acting as a representative of the Agency or USEPA), upon the presentation of credentials and other documents as may be required by law, to:

(a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records

must be kept under the conditions of this permit;

(b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

(c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

(d) Sample or monitor at reasonable times, for the purpose of assuring permit compliance, or as otherwise authorized by the Act, any substances or parameters at any location.

(10) **Monitoring and records**.

(a) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

(b) The permittee shall retain records of all monitoring information, including all calibration and maintenance records, and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of this permit, measurement, report or application. Records related to the permittee's sewage sludge use and disposal activities shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503). This period may be extended by request of the Agency or USEPA at any time.

(c) Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;

(2) The individual(s) who performed the sampling or measurements;

(3) The date(s) analyses were performed;

(4) The individual(s) who performed the analyses;

(5) The analytical techniques or methods used; and

(6) The results of such analyses.

(d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. Where no test procedure under 40 CFR Part 136 has been approved, the permittee must submit to the Agency a test method for approval. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals to ensure accuracy of measurements.

(11) **Signatory requirement**. All applications, reports or information submitted to the Agency shall be signed and certified.

(a) **Application**. All permit applications shall be signed as follows:

(1) For a corporation: by a principal executive officer of at least the level of vice president or a person or position having overall responsibility for environmental matters for the corporation:

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

(b) **Reports**. All reports required by permits, or other information requested by the Agency shall be signed by a person described in paragraph (a) or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described in paragraph (a); and

(2) The authorization specifies either an individual or a position responsible for the overall operation of the facility, from which the discharge originates, such as a plant manager, superintendent or person of equivalent responsibility; and

(3) The written authorization is submitted to the Agency.

(c) **Changes of Authorization**. If an authorization under (b) is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of (b) must be submitted to the Agency prior to or together with any reports, information, or applications to be signed by an authorized representative.

(d) **Certification**. Any person signing a document under paragraph (a) or (b) of this section shall make the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

(12) **Reporting requirements**.

(a) **Planned changes**. The permittee shall give notice to the Agency as soon as possible of any planned physical alterations or additions to the permitted facility.
Notice is required when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source pursuant to 40 CFR 122.29 (b); or

(2) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements pursuant to 40 CFR 122.42 (a)(1).

(3) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

(b) **Anticipated noncompliance**. The permittee shall give advance notice to the Agency of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

(c) **Transfers**. This permit is not transferable to any person except after notice to the Agency.

(d) **Compliance schedules**. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

(e) **Monitoring reports**. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(1) Monitoring results must be reported on a Discharge Monitoring Report (DMR).

(2) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR 136 or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

(3) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Agency in the permit.

(f) **Twenty-four hour reporting.** The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24-hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and time; and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The following shall be included as information which must be reported within 24-hours:

(1) Any unanticipated bypass which exceeds any effluent limitation in the permit.

(2) Any upset which exceeds any effluent limitation in the permit.

(3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Agency in the permit or any pollutant which may endanger health or the environment.

The Agency may waive the written report on a case-by-case basis if the oral report has been received within 24-hours.

(g) **Other noncompliance.** The permittee shall report all instances of noncompliance not reported under paragraphs (12) (d), (e), or (f), at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph (12) (f).

(h) **Other information.** Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to the Agency, it shall promptly submit such facts or information.

(13) **Bypass.**

(a) Definitions.

(1) Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

(2) Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

(b) Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs (13)(c) and (13)(d).

(c) Notice.

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in paragraph (12)(f) (24-hour notice).

(d) Prohibition of bypass.

(1) Bypass is prohibited, and the Agency may take enforcement action against a permittee for bypass, unless:

(i) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(ii) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(iii) The permittee submitted notices as required under paragraph (13)(c).

(2) The Agency may approve an anticipated bypass, after considering its adverse effects, if the Agency determines that it will meet the three conditions listed above in paragraph (13)(d)(1).

(14) **Upset.**

(a) Definition. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

(b) Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph (14)(c) are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

(c) Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;

(2) The permitted facility was at the time being properly operated; and

(3) The permittee submitted notice of the upset as required in paragraph (12)(f)(2) (24-hour notice).

(4) The permittee complied with any remedial measures required under paragraph (4).

(d) Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

(15) **Transfer of permits.** Permits may be transferred by modification or automatic transfer as described below:

(a) Transfers by modification. Except as provided in paragraph (b), a permit may be transferred by the permittee to a new owner or operator only if the permit has been modified or revoked and reissued pursuant to 40 CFR 122.62 (b) (2), or a minor modification made pursuant to 40 CFR 122.63 (d), to identify the new permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

(b) Automatic transfers. As an alternative to transfers under paragraph (a), any NPDES permit may be automatically transferred to a new permittee if:
(1) The current permittee notifies the Agency at least 30 days in advance of the proposed transfer date;
(2) The notice includes a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage and liability between the existing and new permittees; and
(3) The Agency does not notify the existing permittee and the proposed new permittee of its intent to modify or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement.

(16) All manufacturing, commercial, mining, and silvicultural dischargers must notify the Agency as soon as they know or have reason to believe:
(a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant identified under Section 307 of the Clean Water Act which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:
(1) One hundred micrograms per liter (100 ug/l);
(2) Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6 dinitrophenol; and one milligram per liter (1 mg/l) for antimony.
(3) Five (5) times the maximum concentration value reported for that pollutant in the NPDES permit application; or
(4) The level established by the Agency in this permit.
(b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the NPDES permit application.

(17) All Publicly Owned Treatment Works (POTWs) must provide adequate notice to the Agency of the following:
(a) Any new introduction of pollutants into that POTW from an indirect discharge which would be subject to Sections 301 or 306 of the Clean Water Act if it were directly discharging those pollutants; and
(b) Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
(c) For purposes of this paragraph, adequate notice shall include information on (i) the quality and quantity of effluent introduced into the POTW, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

(18) If the permit is issued to a publicly owned or publicly regulated treatment works, the permittee shall require any industrial user of such treatment works to comply with federal requirements concerning:
(a) User charges pursuant to Section 204 (b) of the Clean Water Act, and applicable regulations appearing in 40 CFR 35;
(b) Toxic pollutant effluent standards and pretreatment standards pursuant to Section 307 of the Clean Water Act; and
(c) Inspection, monitoring and entry pursuant to Section 308 of the Clean Water Act.

(19) If an applicable standard or limitation is promulgated under Section 301(b)(2)(C) and (D), 304(b)(2), or 307(a)(2) and that effluent standard or limitation is more stringent than any effluent limitation in the permit, or controls a pollutant not limited in the permit, the permit shall be promptly modified or revoked, and reissued to conform to that effluent standard or limitation.

(20) Any authorization to construct issued to the permittee pursuant to 35 Ill. Adm. Code 309.154 is hereby incorporated by reference as a condition of this permit.

(21) The permittee shall not make any false statement, representation or certification in any application, record, report, plan or other document submitted to the Agency or the USEPA, or required to be maintained under this permit.

(22) The Clean Water Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Clean Water Act is subject to a civil penalty not to exceed $25,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318 or 405 of the Clean Water Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one year, or both.
Additional penalties for violating these sections of the Clean Water Act are identified in 40 CFR 122.41 (a)(2) and (3).

(23) The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

(24) The Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

(25) Collected screening, slurries, sludges, and other solids shall be disposed of in such a manner as to prevent entry of those wastes (or runoff from the wastes) into waters of the State. The proper authorization for such disposal shall be obtained from the Agency and is incorporated as part hereof by reference.

(26) In case of conflict between these standard conditions and any other condition(s) included in this permit, the other condition(s) shall govern.

(27) The permittee shall comply with, in addition to the requirements of the permit, all applicable provisions of 35 Ill. Adm. Code, Subtitle C, Subtitle D, Subtitle E, and all applicable orders of the Board or any court with jurisdiction.

(28) The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit is held invalid, the remaining provisions of this permit shall continue in full force and effect.

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Appendix C – Biological Resource Reports

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Biological Compliance Report

Sugar Camp Northern Mine Expansion Project

Viking District No. 4 Bleeder Shaft

Hamilton County, Illinois

January 10, 2024

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Contents

Tables

Appendices

Acronyms and Abbreviations

APT	Antecedent Precipitation Tool
BCC	Birds of Conservation Concern
CR	County Road
CWA	Clean Water Act
DBH	Diameter at breast height
EcoCAT	Ecological Compliance Assessment Tool
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
ft	Foot/feet
HD	Hydrologic Determination
HDR	HDR Engineering, Inc.
HUC	Hydrologic Unit Code
LF	Linear foot/feet
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
INHS	Illinois Natural History Survey
MANLAA	May Affect, but Not Likely to Adversely Affect
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NHD	National Hydrology Dataset
NLEB	Northern long-eared bat
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
NWP	Nationwide Permit
OHWM	Ordinary high-water mark
Project	Sugar Camp Northern Mine Expansion
RPW	Relatively Permanent Waterway
Shadow Area	Sugar Camp Mine Number 1
Study Area	Viking District No. 4 Bleeder Shaft (Bleeder Shaft Area)
Sugar Camp	Sugar Camp Energy, LLC
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
TVARAM	Tennessee Valley Authority Rapid Assessment Method
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Survey
USGS	U.S. Geological Survey
WOTUS	Waters of the U.S.
WWC	Wet weather conveyance

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1 Introduction and Scope of Work

Under its Significant Boundary Revision No. 8 application to the Illinois Department of Natural Resources (IDNR), Sugar Camp Energy, LLC (Sugar Camp) proposes to expand its underground longwall mining operations at Sugar Camp Mine Number 1 (Shadow Area) located in Franklin, Hamilton, and Jefferson counties, Illinois. The proposed Sugar Camp Northern Mine expansion project (Project) encompasses an approximately 22,414-acre Shadow Area and includes approximately 21,868 acres owned by the Tennessee Valley Authority (TVA) and leased by Sugar Camp Mine. On behalf of TVA and to support compliance with the National Environmental Policy Act (NEPA), HDR Engineering, Inc. (HDR) identified biological and water resources, fully delineated these resources, and assessed the quality of these resources and their ability to support habitat for the Viking District Number 4 bleeder ventilation shaft (Bleeder Shaft Area), proposed to be located on approximately 91 acres within the Shadow Area and referred to herein as the Study Area. This report provides the results of HDR's investigation of the 91-acre Study Area.

The Project must comply with state, local, and other federal requirements, including Executive Order 11990, *Protection of Wetlands*, Executive Order 13571, and TVA's *Guidelines for Conducting Biological and Cultural Surveys and Impact Analyses* (TVA 2023). The intent of the survey is to identify aquatic, wetland, vegetation, and wildlife resources within the Project Site, assess the quality of these resources and their ability to support habitat, determine impacts, and recommend suitable mitigation measures. The survey also aims to identify aquatic and wetland resources likely to be considered jurisdictional by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA). The goal of the Biological Compliance Report is to present information to help ensure compliance with the Endangered Species Act (ESA), provisions in the CWA around streams and wetlands, the Migratory Bird Treaty Act (MBTA), and various Executive Orders.

An aquatic resources survey and wetlands delineation was performed to identify surface waters likely to be considered jurisdictional by the USACE under Section 404 of the CWA. The CWA defines jurisdictional waters to include navigable waters, the intermittent and ephemeral tributaries of truly navigable waters, and adjacent wetlands. The 1987 USACE Wetland Delineation Manual defines wetlands as areas that have positive indicators for hydrophytic vegetation, wetland hydrology, and hydric soils or as "areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions," with special exceptions.

Vegetation and wildlife assessments were conducted to facilitate compliance with NEPA, the ESA, and Executive Order 13571. Wildlife, vegetation, and threatened and endangered (T&E) species surveys were conducted to identify the existing environment, to determine potential impacts, and to recommend suitable mitigation measures.

Results of these assessments are presented herein and supporting documents included as appendices are as follows:

- Appendix A – Figures and Maps
- Appendix B - U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Report
- Appendix C - U.S. Fish and Wildlife Service (USFWS) Official Species List, USFWS northern long-eared bat (NLEB) Determination Key, and Illinois Department of Natural Resources (IDNR) Ecological Compliance Assessment Tool (EcoCAT) Consultation
- Appendix D - USACE Antecedent Precipitation Tool (APT) report
- Appendix E - USACE Wetland Determination Forms, Hydrologic Determination (HD) Forms, TVA Rapid Assessment Method (TVARAM) Forms, and USFWS Phase I Habitat Forms
- Appendix F - Site Photographs

2 Study Area

2.1 Location and Description

The Study Area is located in Hamilton County, Illinois approximately 5.8 miles northwest of the City of McLeansboro. It is intersected by County Road (CR) 1400 North to the south and CR 350 East to the east. CR 300 East is located approximately 0.3 miles to the west and CR 1500 North is located approximately 0.9 miles to the north (**Appendix A, Figure 1**).

The Study Area is approximately 91 acres in size and is situated within a rural setting. It predominantly consists of agricultural fields with a small, forested area along the eastern boundary and a railroad track bisecting the Study Area from north to south. The Study Area is located within the Mt. Vernon Hill County physiographic region, which is characterized by rolling hills and post oak flatwood forests (Leighton et al. 1948). The Study Area is situated within three U.S. Geological Survey (USGS) Hydrologic Unit Code (HUC) 12-digit watersheds: the Sullivan Branch-Middle Fork Big Muddy River (071401060401) encompasses 67 acres of the Study Area, Opossum Creek (051201150404) encompasses 22 acres, and Middle Creek-Big Creek (051201150405) encompasses two acres (USGS 1987).

Current land cover includes corn fields, linear water conveyances along roadsides and railroad tracks, and streams and wetlands interspersed within the low-lying areas (**Appendix A, Figure 2 and Figure 3**). Historic land use within the Study Area was predominantly crop cultivation with a small patch of untouched forest to the east which has remained consistent since 1985. The railroad that extends through the site was constructed around 2011. Site topography is generally flat and gently slopes southwest towards an unnamed tributary of Campbell Branch. Elevation within the Study Area ranges from approximately 532 feet (ft) to 570 ft above mean sea level with the highest elevations located generally along the northern portion of the Study Area (**Appendix A, Figure 4**).

2.2 Soils

According to the USDA NRCS Soil Survey for Hamilton County, Illinois, there are eight soil types within the Study Area (**Appendix B**). Soils underlying the Study Area were identified as farmland of statewide importance (17.8%), prime farmland (59.5%), and prime farmland if

drained (22.7%; **Appendix A, Figure 5**). Approximately 10.7% of the Study Area is identified as predominantly hydric (66-99% hydric components), approximately 68.1% is identified as predominantly non-hydric (1-32% hydric components), and the remainder is considered non-hydric (**Appendix A, Figure 6 and Appendix E**). Soils that are formed under consistently wet conditions during the growing season long enough to develop anaerobic conditions in the upper part are considered hydric. Approximately 0.5 acres of the Study Area is classified as water. A summary of soils within the Study Area is provided in Table 1.

Table 1. Summary of USDA NRCS Soils within the Study Area

Map Unit Symbol	Map Unit Name	Farmland Classification	Hydric	Acres of Study Area	Percent of Study Area
12A	Wynoose silt loam, 0 to 2 percent slopes	Farmland of statewide importance	Yes	10.7	11.8
13A	Bluford silt loam, 0 to 2 percent slopes	Prime farmland if drained	Yes	20.6	22.7
13B	Bluford silt loam, 2 to 5 percent slopes	Prime farmland	Yes	25.5	28.1
13B2	Bluford silt loam, 2 to 5 percent slopes, eroded	Prime farmland	Yes	22.0	24.3
14B	Ava silt loam, 2 to 5 percent slopes	Prime farmland	No	4.6	5.1
14B2	Ava silt loam, 2 to 5 percent slopes, eroded	Prime farmland	No	1.4	1.5
14C2	Ava silt loam, 5 to 10 percent slopes, eroded	Farmland of statewide importance	No	3.2	3.5
14C3	Ava silt loam, 5 to 10 percent slopes, severely eroded	Farmland of statewide importance	No	2.3	2.5

Note: Acreage does not include areas classified as water.

2.3 Floodplains

According to the Federal Emergency Management Agency (FEMA) 2021 data, there are no floodplains within the Study Area.

3 Preliminary Review

3.1 Desktop Review

Prior to conducting field investigations, available background information was reviewed including:

- Aerial imagery via ESRI and Google Earth software (**Appendix A, Figure 2**)
- USGS 7.5-minute quadrangle map (**Appendix A, Figure 3**)
- USGS Digital Elevation Model (**Appendix A, Figure 4**),
- U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (**Appendix A, Figure 5 and Figure 6**),
- USGS National Hydrography Dataset (NHD) mapped streams (**Appendix A, Figure 7**)
- U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory (NWI) mapped wetlands (**Appendix A, Figure 7**)

- USFWS Information for Planning and Consultation (IPaC) for federally listed threatened and endangered species (**Appendix C**)
- Illinois Natural Heritage Database for state-listed threatened and endangered species (**Appendix C**)

According to the desktop review of the USFWS NWI (USFWS 2023), there are three freshwater diked/impounded ponds and one riverine intermittent stream within the Study Area (**Appendix A, Figure 7).** The freshwater ponds total 0.5 acres. USGS NHD (USGS 2023) data indicate there are 231 linear feet (LF) of stream located within the Study Area (**Appendix A, Figure 7**).

According to USFWS IPaC, there are five federally threatened and endangered species and, according to EcoCAT, there are no state-listed threatened and endangered species that are likely to occur within with the Study Area (**Appendix C**). In addition, the USFWS IPaC identified three Birds of Conservation Concern (BCC) as likely to occur within the Study Area. A summary of the federally-listed species is provided in Table 2**.**

Table 2. Summary of Federally-Listed Species with Likelihood of Occurrence within the Study Area

Scientific Name	Common Name	Type	Listing Status[1]
Myotis sodalis	Indiana bat	Mammal	Endangered
Myotis septenrionalis	Northern long-eared bat	Mammal	Endangered
Perimyotis subflavus	Tricolored bat	Mammal	Proposed Endangered
Grus americana	Whooping crane	Bird	Experimental Population, Non-Essential
Chaetura pelagica	Chimney swift	Bird	BCC
Spizella pusilla	Field sparrow	Bird	BCC
Melanerpes erythrocephalus	Red-headed woodpecker	Bird	BCC
Danaus plexippus	Monarch butterfly	Insect	Candidate for listing

1. BCC: Birds of Conservation Concern.
Candidate species: Not protected under ESA Section 7. This determination of effect is for planning and discussion purposes only. This determination may not be used for USFWS consultation.
Experimental Population, Non-Essential: populations that are not necessary for continued existence of the species. USFWS treats these populations as proposed species on private land. Though, federal agencies must not jeopardize their existence.

3.2 Qualifications

Trained and qualified biologists conducted all biological resource surveys. Surveys were carried out by HDR environmental scientists Brittany Schweiger and Levi Reed. Scientists have advanced degrees, training, and experience in accurate identification and assessment of threatened and endangered species habitat, wetland and upland vegetation species, soil profile and morphology, and hydrologic indicators influencing wetland occurrence. HDR staff also have experience in federal, state, and local regulatory compliance obligations and NEPA process, as well as mitigation measures.

4 Aquatic Resources Survey and Wetlands Delineation

An aquatic resources field survey and wetlands delineation was carried out within the Study Area by HDR environmental staff on October 17 and 18, 2023. Pedestrian field survey methods were implemented to facilitate assessing the 91-acre survey area for potential jurisdictional features and jurisdictional waters of the U.S. (WOTUS) in the Study Area. As there are no federal- or state-listed aquatic threatened and endangered species that are likely to occur within with the Study Area, HDR assessed the quality of these resources and their ability to support habitat generally.

4.1 Waters and Wetlands Delineation

Potential WOTUS were delineated according to the methodology and guidance described in USACE 1987 *Wetland Delineation Manual*, USACE Rapanos Guidance, USACE Sackett Guidance (Sackett 2023), and the USACE *Midwest Region (Version 2.0)* (Regional Supplement) (USACE 2010). Wetland features were classified according to the Cowardian naming convention (Cowardin et al. 1979). Streams were classified according to the guidance outlined in USACE Regulatory Guidance Letter 05-05 – Ordinary High-Water Mark (OHWM) Identification (USACE 2005) and the Tennessee Department of Environment & Conservation (TDEC) Division of Water Resources *Guidance for Making Hydrologic Determinations (Version 1.5)*.

Per TDEC HD methods, watercourses are scored based on primary and secondary field indicators. Primary indicators are individual or combinations of field characteristics that under normal circumstances and in the absence of any directly contradictory evidence are considered to be definitive for jurisdictional purposes. Secondary indicators are evaluated if none of the primary indicators are present at the time of survey. Potential WOTUS were flagged in the field and Esri Field Maps was employed to map WOTUS boundaries via a mobile device. The mobile device's integrated GPS antenna was used to collect appropriate feature data in the field with sub-meter accuracy. Geographic Information System (GIS) software was used to analyze collected features, calculate areas, and generate figures. All point, line, and polygon data collected using the GPS receiver and displayed on subsequent figures are for review purposes only and do not represent a professional civil survey. The USACE APT was used to determine weather conditions at the time of field survey. During the field surveys, weather conditions were considered to be drier than normal (**Appendix D**).

The USACE has the regulatory authority to issue preliminary and/or approved jurisdictional determinations based on the regulations in place at the time of their assessment. Therefore, the potential jurisdictional status of features identified in this delineation and proposed jurisdictional determination reflect that of the Sackett Guidance (Sackett 2023).

The wetlands and waters determination within this report is subject to review and approval by the USACE Louisville Regulatory District, and the final jurisdictional determination is within the regulatory authority of the USACE and U.S. Environmental Protection Agency (USEPA).

4.2 Aquatic Survey

Two intermittent streams, nine ephemeral features, four wet weather conveyances features (WWC), and one pond were delineated within the Study Area during the field survey (**Appendix A, Figure 8**). A summary of delineated features is provided below and in Table 3, Table 4, Table 5, and Table 6 including survey coordinates within the Study Area. TVA HD forms are included in **Appendix E**, and a photographic log with representative photos of delineated aquatic features is included in **Appendix F.**

4.2.1 Relatively Permanent Waters with Seasonal Flow

Streams S001 and S002 were identified as Relatively Permanent Waterways (RPWs) that exhibit continuous seasonal surface flow to other RPWs off-site. According to the Cowardin Classification hierarchical structure (Cowardin et al. 1979), these streams are classified as riverine, intermittent features with mud bottom streambeds (R4SB5). According to the HD methodology, a watercourse is a stream if a primary indicator is present or if the secondary field indicator score is greater than or equal to 19, under normal conditions. S001 and S002 each scored 19.5. OHWM was reported as stream width (see Table 3) and indicators observed during the field assessment include a well-defined natural line impressed on the bank, disturbed or washed away leaf litter, absence of vegetation, sediment deposition, and scour. No flowing water was observed at the time of the site visit, though a small pool of water was present in S002 near the railroad culvert. A summary of RPWs with seasonal flow is provided in Table 3.

S001 is located in the northeast portion of the Study Area and is separated from E013 due to the railroad; it continues offsite to the north. S001 is an unnamed primary surface water feature that flows north to south. The dominant substrate is mud. Though the railroad created a barrier between S001 and other jurisdictional features, due to the presence of an OHWM and presentation as a RPW, S001 is likely a Section 404 water under the CWA and therefore regulated under the jurisdiction of the USACE.

S002 is located south of the railroad in the eastern forested portion of the Study Area and continues off-site to the south. S002 is a primary surface water feature and is the NHD-named stream Opossum Creek. The dominant substrate is mud. S002 is a likely jurisdictional stream regulated by the USACE due to the presence of an OHWM and presentation as seasonal RPW.

4.2.2 Non-permanent Waters with Ephemeral Flow

Nine ephemeral features were identified which are not considered to be RPWs and are primarily linear drainage features adjacent to roadsides and the railroad. All ephemeral features were dry and exhibited a defined bed and bank and an absence of vegetation within the streambed at the time of survey. The dominant substrate of these features is mud. These features only flow during wet weather events but can provide a hydrological connection between features and downstream waters. A summary of non-permanent waters with ephemeral flow is provided in Table 4.

Multiple ephemeral features drain into S002. Ephemeral streams E001, E003, E010, and E013 all exhibit a hydrologic connection to S002 via culverts. E001 is located north of the railroad. E003 flows into the Study Area north of CR 1400 North and continues north along the edge of

the crop field, where a culvert connects it to E001. E010 begins at the culvert connecting E001 and E003 and continues linearly along the railroad and CR 350 East to a culvert beneath the road, where it then flows into the forested area and is connected via culvert underneath the railroad to S002. E013 is located near the eastern boundary of the Study Area, at the base of the railroad. It flows south into S002 off-site. These ephemeral streams exhibit a hydrologic connection to a presumed jurisdictional feature and are likely Section 404 waters under the CWA and therefore regulated under the jurisdiction of the USACE.

E002 and E004 through E007 are hydrologically isolated linear drainage features. E002 is located south of CR 1400 North and continues offsite to the west. E004 is located to the east of the railroad and continues offsite to the south. A large man-made berm separates E004 from E007, which is located along the southern side of the railroad and ceases just west of CR 350 East. E005 and E006 are located east of the railroad track on either side of CR 1400 N. These ephemeral streams did not exhibit a hydrologic connection to a jurisdictional feature and are likely non-Section 404 waters under the CWA and therefore not regulated under the jurisdiction of the USACE.

4.2.3 Wet Weather Conveyances

Five WWC features were identified which are not considered to be RPWs and are not expected to carry federal jurisdiction. The features include WWC features E008, E009, E011, E012, and E014. At the time of survey, these features were dry, did not exhibit an OHWM or a defined bed and bank, and may have had upland rooted plants growing in the bottom of the channel. These features only flow during wet weather events but can provide a hydrological connection between features and downstream waters. A summary of WWC features is provided in Table 5**.**

E008 and E009 are located near the southwestern intersection of CR 350 East Rd and the railroad. These WWC features are erosional rills that flow downslope from the agricultural field to the base of the railroad. E011 is an erosional rill located in the crop field and connects to W002. E011 is hydrologically isolated from any other aquatic features. E012 is hydrologically connected to S001 near the northeastern corner of the Study Area. It continues offsite to the north. E014 is a drainage feature on the north side of the railroad track near the eastern boundary of the Study Area.

All WWC features, except for E012, did not exhibit a hydrologic connection to a jurisdictional feature and are likely non-Section 404 waters under the CWA and therefore not regulated under the jurisdiction of the USACE. Due to the connection of E012 to S001, this WWC is likely a jurisdictional feature.

4.2.4 Open Waters

P001 was a 0.329-acre freshwater pond located south of the railroad, north of CR 1400 North Rd, and west of CR 350 East Rd (Table 6). It was identified as palustrine, unconsolidated mud bottom, permanently flooded, diked/impounded (PUB3Hh) (Cowardin et al. 1979) and characterized as open water within a man-made impoundment. This freshwater pond did not exhibit a continuous surface hydrologic connection to a jurisdictional feature and is likely non-Section 404 waters under the CWA and therefore not regulated under the jurisdiction of the USACE.

Table 3. Summary of Delineated Relatively Permanent Waters with Seasonal Flow

Feature Name	Stream Type	Streamside Management Zone Category	Coordinates		Cowardian Classification[1]	Average OHWM[2] (ft)	Average Bank Height (ft)	LF within Study Area	HD Score	Presumed Jurisdictional Status
			Latitude	Longitude						
S001	Intermittent	A	38.11427	-88.63798	R4SB5	5	3	711	19.5	Yes
S002	Intermittent	A	38.11286	-88.63839	R4SB5	3	5	466	19.5	Yes
							Presumed Jurisdictional (Section 404) Linear Feet Total:	*1,177*		
							Presumed Non-Jurisdictional (Non-Section 404) Linear Feet Total:	*0*		
							Linear Feet Total:	**1,177**		

1. R4SB5: Mud, Streambed, Intermittent, Riverine
2. OHWM: Width of stream at ordinary high-water mark

Table 4. Summary of Delineated Non-permanent Waters with Ephemeral Flow

Feature Name	Stream Type	Streamside Management Zone Category	Coordinates		Cowardian Classification[1]	Average OHWM[2] (ft)	LF within Study Area	HD Score	Presumed Jurisdictional Status
			Latitude	Longitude					
E001	Ephemeral	A	38.10893	-88.64642	R6	2	2,134	9.5	Yes
E002	Ephemeral	A	38.11004	-88.64740	R6	2	589	9.5	No
E003	Ephemeral	A	38.11011	-88.64738	R6	2	2,179	10	Yes
E004	Ephemeral	A	38.10888	-88.64629	R6	2	815	9.5	No
E005	Ephemeral	A	38.11013	-88.64305	R6	2	496	9.5	No
E006	Ephemeral	A	38.11022	-88.64294	R6	2	270	9.5	No
E007	Ephemeral	A	38.11053	-88.64432	R6	2	1,656	9.5	No
E010	Ephemeral	A	38.11301	-88.64129	R6	2	1,043	12	Yes
E013	Ephemeral	A	38.11302	-88.63817	R6	3	341	17.5	Yes
						Presumed Jurisdictional (Section 404) Linear Feet Total:	*5,697*		
						Presumed Non-Jurisdictional (Non-Section 404) Linear Feet Total:	*3,826*		
						Linear Feet Total:	**9,523**		

1. R6: A wetland, spring, stream, river, pond, or lake that exists for a short period
2. OHWM: Width of stream at ordinary high-water mark

Table 5. Summary of Delineated Wet Weather Conveyances

Feature Name	Coordinates		LF within Study Area	HD Score	Presumed Jurisdictional Status
	Latitude	Longitude			
E008	38.11340	-88.63994	20	1	No
E009	38.11352	-88.63958	27	1	No
E011	38.11574	-88.63957	26	10	No
E012	38.11587	-88.63828	50	11.5	Yes
E014	38.11414	-88.63776	55	5.5	No
Presumed Jurisdictional (Section 404) Acreage Total:			*50*		
Presumed Non-Jurisdictional (Non-Section 404) Acreage Total:			*128*		
Linear Feet Total:			**178**		

Table 6. Summary of Delineated Open Waters

Feature Name	Open Water Type	Streamside Management Zone Category	Coordinates		Cowardian Classification[1]	Acreage within Study Area	Presumed Jurisdictional Status
			Latitude	Longitude			
P001	Pond	A	38.11170	-88.64198	PUB3Hh	0.329	No
					Acreage Total:	**0.329**	

1. PUB3Hh: Diked/Impounded, Permanently Flooded, Mud, Unconsolidated Bottom, Palustrine

4.3 Wetland Delineation

Three wetlands were delineated within the Study Area during the field survey (**Appendix A, Figure 9**). A summary of wetland features is provided below and in Table 7. USACE Wetland Determination Forms and TVARAM forms are included in **Appendix E**, and a photographic log with representative photos of wetland features is included in **Appendix F.**

4.3.1 Forested Wetlands

W001 was a 0.05-acre wetland located north of the railroad and near the eastern boundary of the Study Area. It was identified as palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E) (Cowardin et al. 1979) and exhibits a vegetated concave surface. Dominant vegetation consists of black willow (*Salix nigra*) and common reed (*Phragmites australis*). No primary wetland hydrology indicators were observed during the field assessment. Secondary wetland hydrology indicators include drainage patterns and geomorphic position. Soils were sandy, with dark brown and gray and mottled coloration indicative of hydric conditions.

According to TVARAM, W001 scored as moderate quality due to its hydrologic influence and lack of recent disturbance, coupled with its small size.

This forested wetland exhibited a continuous surface hydrologic connection to a jurisdictional feature (S001) and is likely Section 404 waters under the CWA and therefore regulated under the jurisdiction of the USACE.

4.3.2 Farmed Wetlands

W002 was a 0.006-acre wetland located within the crop field west of CR 350 East Rd and north of the railroad. It was identified as palustrine, emergent, persistent, farmed (PEM1f) (Cowardin et al. 1979) and characterized by vegetated concave surface within a row crop field. Non-cultivated vegetation included barnyard grass (*Echinochloa crus-galli*), Indian goosegrass (*Eleusine indica*), annual ragweed (*Ambrosia artemisiifolia*), roughfruit amaranth (*Amaranthus tuberculatus*), and wand panic grass (*Panicum virgatum*). Primary and secondary wetland hydrology indicators observed during the field assessment include iron deposits, drainage patterns, and geomorphic position. Soils were clayey, with dark brown and gray and mottled coloration indicative of hydric conditions.

According to TVARAM, W002 scored as low quality due to the ongoing disturbance from row crop farming.

This farmed wetland did not exhibit a continuous surface hydrologic connection to a jurisdictional feature and is likely non-Section 404 waters under the CWA and therefore not regulated under the jurisdiction of the USACE.

4.3.3 Emergent Wetlands

W003 was a 0.146-acre wetland located south of the railroad, north of CR 1400 North Rd, west of CR 350 East Rd. It was identified as palustrine, emergent, persistent, seasonally flooded/saturated, diked/impounded (PEM1Eh) (Cowardin et al. 1979) and forms a fringe around the impounded freshwater pond (P001) (described below). Dominant vegetation consists

of pussy willow (*Salix discolor*), blunt spikerush (*Eleocharis obtusa*), and rice cutgrass (*Leersia oryzoides*). Primary and secondary wetland hydrology indicators observed during the field assessment include iron deposits, crayfish burrows, and geomorphic position. Soils were clayey with dark brown and gray and mottled coloration indicative of hydric conditions.

According to TVARAM, W003 scored as moderate quality due to its hydrologic influence and lack of recent disturbance, coupled with its small size.

This emergent wetland did not exhibit a continuous surface hydrologic connection to a jurisdictional feature and is likely non-Section 404 waters under the CWA and therefore not regulated under the jurisdiction of the USACE.

Table 7. Summary of Delineated Wetlands

Feature Name	Coordinates		Associated Data Points		Cowardian Classification[1]	Acreage within Study Area	TVARAM Score	Presumed Jurisdictional Status
	Latitude	Longitude	Wetland	Upland				
W001	38.11425	-88.63794	W001_W	W001_U	PFO1E	0.146	48	Yes
W002	38.11562	-88.63963	W002_W	W002_U	PEM1f	0.006	9	No
W003	38.11190	-88.64213	W003_W	W003_U	PEM1Eh	0.050	42	No
					Presumed Jurisdictional (Section 404) Acreage Total:	*0.146*		
					Presumed Non-Jurisdictional (Non-Section 404) Acreage Total:	*0.056*		
					Acreage Total:	**0.202**		

1. PFO1E: Seasonally flooded/saturated, Broad-leaved Deciduous, Forested, Palustrine
PEM1f: Farmed, Persistent, Emergent, Palustrine
PEM1Eh: Diked/Impounded, Seasonally flooded/saturated, Persistent, Emergent, Palustrine

4.4 Waters of the U.S. Regulatory Assessment

A total of eight potential WOTUS, including two intermittent stream features, four ephemeral features, one wetland, and one WWC were identified within the Study Area, totaling approximately 1,177 LF of stream channel, 5,697 LF of ephemeral channel, 0.146 -acre of wetlands, and 50 LF of WWC.

The Project is within the USACE Louisville Regulatory District. Due to wetlands and streams identified in the Study Area, it is possible the proposed Project may result in impacts to jurisdictional waters requiring CWA Section 404/401 permitting. A jurisdictional determination from the USACE would confirm the jurisdictional status of features within the Study Area.

For a Section 404 permit, impacts of less than 0.5 acres of jurisdictional waters can typically be permitted using a Nationwide Permit (NWP). Authorization to use an NWP is usually issued within 45 days of submittal. Bleeder shafts can be permitted under NWP 21 for Surface Coal Mining Activities if activities are authorized, or currently being processed by states with approved programs under Title V of the Surface Mining Control and Reclamation Act of 1977. All activities require a Pre-Construction Notification. Impacts to greater than 0.5 acres of jurisdictional WOTUS would require an Individual Permit. The timeframe for issuance of an Individual Permit is typically nine to 12 months.

Section 401 of the CWA requires state water quality certification for any permit or license issued by a federal agency for an activity that could discharge fill into WOTUS. This requirement allows each state to have input into federally approved projects that could affect its waters (rivers, streams, lakes, and wetlands) and to ensure that the projects will comply with state water quality standards and any other water quality requirements of state law. Each Section 401 water quality certification for a project in Illinois, administered by the Illinois Environmental Protection Agency (IEPA), also ensures that the project will comply with applicable state water quality standards. The State of Illinois has conditionally certified most nationwide permits, so individual certification is typically not required for authorizations granted under nationwide permits.

Additionally, the Illinois Interagency Wetland Policy Act of 1989 establishes a wetland regulatory program to regulate state-funded projects and activities that impact state wetlands. State wetlands are defined by the Act as “land that has a predominance of hydric soils and that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.” Governed by the IDNR, this Act allows for the State to have input into state-funded projects.

Further details on Project design and scope would be necessary prior to determination of applicable Section 404/401 permits.

4.5 Aquatic Resources Conclusion

HDR delineated three wetlands, one open water, two stream channels, nine ephemeral channels, and five WWC features within the Study Area. Based on the TVARAM score, one wetland (W002) was categorized as low quality and two wetlands (W001, W003) were categorized as moderate quality. Low quality wetlands support minimal wildlife habitat and hydrological function. Moderate quality wetlands may support moderate wildlife habitat or hydrological functions, are generally dominated by native plant species, and have potential for reestablishment of lost wetland functions. The freshwater pond supported amphibians. The stream channels were dry at the time of survey and no fish nor invertebrates were observed. Some amphibians were observed within the streambeds. The ephemeral channels and WWC features were linear drainage ditches to the roadways and railroads and no amphibians were observed within the banks.

It is the professional judgment of HDR that the 1,177 LF of streams, 5,697 LF of ephemeral channels, 0.146 acre of wetland features, and 50 LF of WWC features within the Study Area are potentially WOTUS features under Section 404 of the CWA. These features would likely be jurisdictional because they exhibit a hydrologic connection to a relatively permanent water. Approximately 3,826 LF of ephemeral features, 0.056 acre of wetland features, 0.329 acre of open water features, and 128 LF of WWC features are not anticipated to be jurisdictional. The USACE Regulatory Division can officially render a final jurisdictional determination for Section 404 requirements through the formal review process. Submittal of a Jurisdictional Determination and coordination with the USACE Louisville District is recommended to verify that delineated drainage features are not jurisdictional WOTUS and to determine if Project activities would require a Section 404 permit.

Additionally, the waters and wetlands identified within the Study Area are potentially regulated by the State of Illinois and, may be regulated by the IEPA and/or IDNR and subject to Section 401 of the CWA. IEPA can render an official determination for Section 401 requirements, or the features can be assumed to be jurisdictional based on the findings of this report and permitted accordingly. As a mitigation measure, 50-foot vegetated buffers will be maintained for intermittent streams and all wetlands; best management practices will be maintained for ephemeral streams and WWC features.

5 Terrestrial Ecology

Terrestrial vegetation and wildlife field surveys were conducted within the Study Area by HDR environmental staff on October 17 and 18, 2023. Pedestrian field survey methods were implemented to facilitate assessing the 91-acre survey area to document plant communities and invasive plants and conduct habitat assessments for rare and listed plant and animal species.

5.1 Vegetation

Plant communities in the Study Area were classified using the National Vegetation Classification System (Grossman et al. 1998) and were delineated using ESRI Field Maps and Field Notes. The area of each plant community type was calculated as a percentage of the total Study Area and the general location and abundance of invasive plants identified within the Study Area were noted.

5.1.1 Vegetation Communities

The Study Area consists of cropland, herbaceous vegetation, and deciduous forest vegetation community types, following Grossman et al. (1998) (**Appendix A, Figure 10**). Most of the Study Area is comprised of cultivated corn fields and developed areas, with a small, forested area along the eastern border. Table 8 summarizes the vegetation community types and **Appendix F** show representative vegetation community types within the Study Area at the time of the survey. Not included in Table 8 are an approximately 0.329-acre area of open water and an approximately 3.16-acre of development (roadway and railroad).

Table 8. Summary of Vegetation Communities

Plant Community	Acreage in Study Area	Percentage of Study Area
Cropland	65.15	71.9
Herbaceous Vegetation	12.09	13.3
Deciduous Forest	10.23	11.3
Acreage Total:	**87.47**	

Cropland, which consist of planted corn (*Zea mays*), comprise 71.9 percent of the Study Area. Other weedy species found in bare patches and along roadway and railroad edges included typical pioneering species such as butterweed (*Packera glabella*), Indian goosegrass (*Eleusine indica*), and annual bluegrass (*Poa annua*). A representative photo of cropland within the Study Area is provided in **Appendix F, Photo 24.**

Herbaceous vegetation comprises 13.30 percent of the Study Area and is located in disturbed areas along the roadways and railroad edges and in lawn areas of residential properties. Common herbaceous plants include Indian goosegrass, annual bluegrass, switchgrass (*Panicum virgatum*), and bristlegrass (*Setaria* spp.). A representative photo of herbaceous vegetation within the Study Area is provided in **Appendix F, Photo 25.**

Deciduous forests comprise 11.30 percent of the Study Area and are located in the easternmost portion of the Study Area. This forested area is part of a broader tract of woodlands that extends beyond the Study Area. These forested areas have the potential to support forest dwelling species such as box turtles, woodpeckers, and other small mammals. Common overstory trees include pignut hickory (*Carya glabra),* shagbark hickory (*C. ovata*), white oak (*Quercus alba*), black willow, and black walnut (*Juglans nigra*). The shrub layer is relatively open and contains green ash (*Fraxinus pennsylvanica*) and raspberry species (*Rubus* spp.). The herbaceous layer in this forest type includes poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), trumpet creeper (*Campsis radicans*), Asteraceae species, and grass species. A representative photo of deciduous forest within the Study Area is provided in **Appendix F, Photo 26.**

5.1.2 Notable Plant Communities

No notable plant communities were observed. No federal-noxious weeds, as defined by the USDA NRCS were observed, but other invasive plant species were observed throughout the Study Area. These species were most often phragmites, Indian goosegrass, Japanese honeysuckle, and bristlegrasses and are most often found in ruderal forested areas, along field edges, and in areas prone to disturbance.

5.1.3 Listed and Protected Plant Habitat

Based on IPaC results, no federally listed plant species were noted as potentially occurring within the Study Area. Based on EcoCAT results, no species of state-listed plants were noted as potentially occurring within the Study Area (**Appendix C**).

5.2 Terrestrial Zoology

Listed species are those that are recognized by federal, state, or other agencies in an effort to protect them and their habitat under the federal ESA (1973), as well as under state laws and per local policies. In Illinois, these species are protected under the Illinois Endangered Species Protection Act (1972). These species are vulnerable to habitat loss and population decline because of their rarity. HDR's assessment also considered wildlife protected under the MBTA of 1918 (16 U.S.C. §§ 703-712) and Executive Order for Migratory Birds (E.O. 13186 of January 10, 2001.

Executive Order 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) directs federal agencies to take certain actions to further implement the MBTA. The MBTA prohibits the "take" of migratory birds. The regulatory definition of "take" as defined by 50 CFR § 10.12, "means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue hunt, shoot, wound, kill, trap, capture, or collect." The following prohibitions apply to migratory bird

nests: “possession, sale, purchase, barter, transport, import and export, take, and collect.” The MBTA is executed and enforced by USFWS.

During the wildlife survey, HDR noted, mapped, and photographed suitable protected species habitats identified within and adjacent to the Study Area. A bat habitat survey was conducted in compliance with the USFWS Phase I Summer Habitat Assessment requirements following the *2023 Range-Wide Indiana Bat & Northern Long-eared Bat Summer Survey Guidelines* (USFWS 2023). The Study Area was traversed as prescribed by the approved survey protocol to document all live and dead trees with greater than or equal to three inches diameter at breast height (DBH) and with suitable summer roosting characteristics such as exfoliating bark, cracks, crevices, and/or hollows. Additionally, the Study Area was surveyed for manmade structures suitable for roosting as well as for the presence of any caves or karst features. HDR recorded bat habitat data on Phase I Habitat Assessment forms and these are available in **Appendix E**.

5.2.1 Observed Wildlife

Ten bird species, five mammal species, two amphibian, species, one group of insects, and one group of crustaceans were either directly observed or whose evidence (e.g., tracks, scat) was noted during the field survey. A summary of observed wildlife is provided in Table 9.

Table 9. Summary of Wildlife Species Observed in the Study Area

Species observed (Common name)	Notes/Habitat Observed in the Study Area
BIRDS	
Downy woodpecker	Observed flying within forested area.
Northern cardinal	Observed flying within forested area.
Northern flicker	Heard calling in forested area.
Pileated woodpecker	Heard calling within forested area.
Red-tailed hawk	Heard calling.
Red-bellied woodpecker	Observed flying within forested area.
Turkey	Feather observed within forested area.
Turkey vulture	Observed flying above agricultural area.
Tufted titmouse	Observed flying within forested area.
White-throated sparrow	Heard in several locations across site.
MAMMALS	
Coyote	Observed scat in several locations across the site.
Deer	Observed tracks and scat in several locations across the site.
Gray squirrel	Observed within forested area.
Raccoon	Observed tracks in intermittent stream creek beds throughout site
AMPHIBIANS	
Frog spp.	Observed within forested area near PFO, and in freshwater pond.
Garter snake	Observed within forested area near PFO.
INSECTS	
Grasshopper spp.	Observed throughout site

Species observed (Common name)	Notes/Habitat Observed in the Study Area
CRUSTACEANS	
Crayfish spp.	Burrows observed in several ephemeral streams and wetlands across site.

5.2.2 Listed and Protected Wildlife Species Habitat

Suitable habitat was identified for the federally endangered Indiana bat and NLEB, proposed endangered tricolored bat, federally-listed whooping crane, and the monarch butterfly, which is a candidate for listing. Suitable habitat was also identified for the little brown bat (*Myotis lucifugus*), for which the listing status is under review at the time of the report and may be elevated in the future. Three BCC were listed for the Study Area, including chimney swift, field sparrow, and red-headed woodpecker. No designated critical habitat for federally listed species occurs on or in the vicinity of the Study Area. A summary of the likelihood of occurrence within the Study Area for these animal species is provided in Table 10.

Table 10. Likelihood of Occurrence Summary of Federally-Listed Animal Species within the Project Site

Scientific Name	Common Name	Habitat	Likelihood of Occurrence within the Study Area	Proposed Effects Determination[1]
Myotis sodalis	Indiana bat	In summer, wooded areas that contain trees with loose tree bark, crevices, or cavities and edge of forested areas. In winter, hibernates in caves or abandoned mines.	**Possible**	MANLAA
Myotis septentrionalis	Northern long-eared bat	In summer, wooded areas that contain trees with loose tree bark, crevices, or cavities and edge of forested areas. Less commonly, may roost in structures, such as barns and sheds. In winter, hibernates in caves or abandoned mines.	**Possible**	MANLAA
Perimyotis subflavus	Tricolored bat	In summer, have been known to roost among live and dead leaf clusters of live or recently dead deciduous hardwood trees, pine needles, eastern red cedar (Juniperus virginiana), within artificial roosts like barns, beneath porch roofs, bridges, concrete bunkers, and rarely within caves. In winter, hibernates in caves or abandoned mines.	**Possible**	MANLAA
Danaus plexippus	Monarch butterfly	Open areas with milkweed plants.	**Possible**	MANLAA
Grus americana	Whooping crane	Coastal marshes and estuaries, inland marshes, lakes, open ponds, shallow bays, salt marsh and sand or tidal flats, upland swales, wet meadows and rivers, pastures, agricultural fields, and areas that are covered often intermittently with shallow water or have soil saturated with moisture.	**Possible**	No effect

1. MANLAA: May Affect, Not Likely to Adversely Affect

5.2.2.1 MAMMALS

Three federally listed mammals potentially occur in the Study Area: the Indiana bat, NLEB, and tricolored bat. The little brown bat may also occur in the Study Area. These bat species prefer winter habitats that include caves, rock crevices, and mines (USFWS n.d.-a, 2015).

The Indiana bat roosts within a wide variety of forested habitats ranging from old-growth bottomland, floodplain, to upland forests comprised of hardwood trees with a DBH of greater than or equal to five inches with loose or exfoliating bark. Preferred roost sites include forest openings, at the forest edge, or where the overstory canopy allows some sunlight exposure to the roost which is usually within 0.6 miles of water (U.S. Forest Service 2015, USDA 2003). The USFWS defines suitable roosting habitat for the Indiana bat as any tree greater than or equal to five inches DBH with cracks, crevices, and/or exfoliating bark that is within 1,000 ft of forested/wooded habitat. This species uses both dead and live trees for roosting and rearing young and requires one or more primary trees plus multiple alternate trees to meet their roosting needs during an annual cycle. While live trees may be used, snags in stages of early- to mid-decay are preferred (USDA 2003).

Although Indiana bats primarily roost under loose bark, some have been known to occasionally roost in tree cavities (Luensmann 2005). Because Indiana bats typically roost in snags, many roost trees are no longer usable after a few years, although some may last as long as 20 years (Luensmann 2005). Roost trees utilized by Indiana bats in Illinois are primarily of the oak-hickory cover type and include a variety of species such as maple (*Acer*), oak (*Quercus*), cottonwood (*Populus*), hickory (*Carya*), elm (*Ulmus*), and ash (*Fraxinus*) (Luensmann 2005, Henning, Hinz, and Kath 2017).

While the Indiana bat prefers roosting in trees with a DBH of nine inches or greater, the NLEB has a wider suitable tree DBH range starting at three inches DBH with cracks, crevices, cavities, or exfoliating bark. Typically, these trees will be situated within 1,000 ft of forested or woodland areas that are adjacent to field edges, riparian forests, or other wooded corridors (USDA 2003). However, unlike the Indiana bat, the NLEB may also inhabit man-made structures (Tennessee Wildlife Resources Agency n.d.). Forested and woodland areas are particularly important for this species, not only for roosting habitat, but also for foraging, as NLEB prefer to forage in upland forests rather than riparian areas (NatureServe 2022). These bats have also been observed utilizing forest edges and clearings for foraging habitat (NatureServe 2022).

In spring, summer, and fall, tricolored bats primarily roost in the leaves of live or dead trees within forested areas. Tricolored bats are also known to roost in human-made structures. Female tricolored bats form maternity roosting colonies in the summer and exhibit high site fidelity, returning to the same summer roost for multiple years (USFWS n.d.-d).

Similar to tricolored bats, little brown bats use a wide variety of habitat for summer roosting, including human-made structures, trees, rocks, and wood piles. Maternity colonies are most common in warm sites of human structures and infrequently in hollow trees. Little brown bats are known to forage over bodies of water or in woodlands near water (USFWS n.d.-c).

Foraging habitat for these species is present in the Study Area within the forested area. Water resources for these species include intermittent stream channels located on the site. A more detailed description of potential habitat for these species in the Study Area is presented below.

5.2.2.1.1 Potential Summer Bat Roost Habitat Assessment

Forested habitat determined to be suitable for all four bat species was observed in five of the six sample locations (**Appendix A, Figure 11**). The forested portion of the Study Area considered not suitable for Indiana bat and NLEB was a row of mature oak trees within the agricultural field and was greater than 1,000 ft from contiguous forest. However, this portion may be suitable for the tricolored bat and little brown bat. Three sample locations were within 30 ft of a stream channel. No caves, karst features, or structures were observed within the Study Area. A summary of bat habitat for all three species is provided in Table 11**,** bat habitat assessment data sheets for all sample locations is provided in **Appendix E**, and representative photos of all sample locations is provided in **Appendix F**.

Table 11. Summary of Bat Habitat Sample Locations

Forest Stand ID	Latitude	Longitude	Snags Present (Y/N)?	% Suitable Roosting Trees[1]	Water Feature[2] (Y/N)	Habitat Suitability
1	38.11418	-88.63837	Y	35	N	Moderate quality
2	38.11539	-88.63829	Y	25	Y	Low quality
3	38.11560	-88.63816	Y	50	Y	High quality
4	38.11496	-88.64339	Y	35	N	Moderate quality
5	38.11350	-88.64402	N	0	N	Not suitable for Indiana bat and NLEB; Low quality for tricolored and little brown bat
6	38.11328	-88.63853	N	20	Y	Low quality

1. Percent of trees within 30 ft of the sample location that are suitable roosting trees. Suitable roosting trees are defined as trees >= 3 inches DBH with cracks, crevices, and/or exfoliating bark.
2. Water feature within 30 ft of sample location.

Forest Stand ID 1 consists of a mixed deciduous forest stand 30.0 ft in diameter within the Study Area and is located north of the railroad and east of CR 350 east. Dominant canopy and understory trees include pignut hickory, white oak, and black willow. Trees ranged in size from less than three inches DBH to approximately 40 inches DBH. Three mid- to late-stage snags were present; all three had cavities along the trunk and one snag had a basal cavity. Sample ID 1 was determined to have moderate quality habitat as it had some trees with exfoliating bark, three snags. There is no proximal water source within the forest stand.

Forest Stand ID 2 consists of a mixed deciduous forest stand 30.0 ft in diameter within the Study Area and is located north of the railroad and east of CR 350 east. Dominant canopy and understory trees include hickory species and American elm (*Ulmus americana*). Trees ranged in size from 10 inches DBH to approximately 40 inches DBH. Sample ID 2 was determined to have low quality habitat as it had few trees with exfoliating bark, no snags, and lack of diversity in trees throughout the stand. An intermittent stream channel provides a good water source within the forest stand.

Forest Stand ID 3 consists of a mixed deciduous forest stand 30.0 ft in diameter within the Study Area and is located north of the railroad and east of CR 350 east. Dominant canopy and understory trees include shagbark hickory and white oak. Trees ranged in size from less than three inches DBH to approximately 40 inches DBH. Five mid- to late-stage snags were present. Snags and approximately 20 percent of live trees had exfoliating bark and cavities or crevices present. Sample ID 3 was determined to have high quality habitat as it had many suitable trees with exfoliating bark, five snags, and a proximal water source. An intermittent stream channel provides a good water source within the forest stand.

Forest Stand ID 4 consists of forest edge located north of the railroad and east of CR 350. Dominant canopy and understory trees include eastern red cedar (*Juniperus virginiana*), white oak, and shagbark hickory. Trees ranged in size from less than three inches DBH to approximately 40 inches DBH. Sample ID 4 was determined to have moderate quality habitat as it was located along the forest edge, had few suitable roosting trees, and consisted of open area suitable for foraging. There is no proximal water source within the forest stand.

Forest Stand ID 5 consists of a single row of mature white and pin oak and shagbark hickory trees within the agricultural field located north of CR 1400 North Rd and west of CR 350 East Rd. Sample ID 5 was determined not to be suitable for the Indiana bat and NLEB due to a distance of greater than 1,000 ft to contiguous forest, no water sources, and dense understory. However, tricolored and little brown bats may roost in leaf clusters at the tops of these trees.

Forest Stand ID 6 consists of a mixed deciduous forest stand 30.0 ft in diameter within the Study Area and is located south of the railroad and east of CR 350 east. Dominant canopy and understory trees include black walnut, shagbark and pignut hickory, and common hackberry (*Celtis occidentalis*). Trees ranged in size from less than three inches DBH to approximately 40 inches DBH. Sample ID 6 was determined to have low quality habitat as it had marginal roosting habitat with an open understory and proximal water feature for foraging. An intermittent stream channel provides a good water source within the forest stand.

5.2.2.2 INSECTS

One candidate species for federal listing that is listed to potentially occur within the Study Area is the monarch butterfly. The monarch butterfly inhabits areas with nectar producing plants and milkweeds. Several milkweeds were present along roadways of the Study Area. A representative photo of milkweed plants within the Study Area is provided in **Appendix F, Photo 33**.

5.2.2.3 BIRDS

The whooping crane, with a federal listing status of Experimental, Non-Essential Population, and three BCC – the chimney swift, field sparrow, and the red-headed woodpecker -- potentially occur in the Study Area.

The whooping crane uses a wide variety of habitats for breeding, migrating, and foraging. During migration, whooping cranes may forage in pasture and agricultural fields. Suitable foraging habitat for the whooping crane was identified within the Study Area. Thus, presence is possible within the Study Area.

The chimney swift commonly uses urban and suburban habitats and nests in chimneys. Chimney swifts will use rural areas, where the species will nest in hollow trees, tree cavities, or caves. Foraging habitat for the species includes open terrain. Chimney swifts migrate in flocks and forage over forests and open areas and roost in chimneys. Due to the rural nature of the Study Area and lack of suitable nesting locations, it is unlikely that chimney swifts breed within the Study Area. However, due to the presence of a few farmhouses in the vicinity of the Study Area, chimney swifts may occasionally forage over the Study Area.

The field sparrow uses open habitat with low perches, often in rural areas with little human habitation. Open habitat includes abandoned agricultural fields, brushlands, recently clearcut areas, fencerows, and forest edges. Though the Study Area contains cropland and forest edge, no fencerows or suitable perches were observed. The agricultural fields are cultivated with rows of corn and do not provide suitable habitat for field sparrows. Thus, it is unlikely that field sparrows would occur within the Study Area.

The red-headed woodpecker is a common migrant and resident in Illinois. It is known to breed in open woodlands with deciduous species. It may use forest edges, roadsides, and other disturbed areas. Dead or dying trees with cavities are important for nesting. The Study Area contained suitable habitat for the red-headed woodpecker, including snags with cavities and oak species. Additionally, other woodland woodpecker species such as the downy, red-bellied, and pileated woodpeckers were observed during the field surveys. Based on the observation of these similar species and presence of suitable nesting trees, it is possible that the red-headed woodpecker occurs within the Study Area.

A summary of the likelihood of occurrence with the Study Area for Migratory BCC is provided in Table 12.

Table 12. Likelihood of Occurrence Summary of Migratory Birds of Conservation Concern within the Study Area

Scientific Name	Common name	Habitat	Season of Occurrence	Likelihood of Occurrence within the Study Area
Chaetura pelagica	Chimney swift	Nests in chimneys and less frequently large, open-topped hollow trees. Mostly forage over open terrain.	Spring through fall	**Unlikely**
Spizella pusilla	Field sparrow	Open habitat with low perches, such as fencerows, forest edges, and abandoned agricultural fields and pastures.	Spring through fall	**Unlikely**
Melanerpes erythrocephalus	Red-headed woodpecker	Breeds in deciduous woodlands with oak or beech and use dead or dying trees for nest cavities. Move from forest interiors to edges at the start of the breeding season.	Summer	**Possible**

Numerous additional migratory birds could occur within the Study Area. According to the eBird checklist for Hamilton County, Illinois, 217 species of birds have been observed (eBird 2023). However, given that cropland comprising most of the land cover within the Study Area, it is likely that suitable habitat is present for a small subset of the species reported in the county.

5.3 Terrestrial Ecology Conclusion

Approximately 72 percent of the Study Area is comprised of cropland. Approximately 13 percent of the Study Area is comprised of herbaceous vegetation, primarily along roadsides and the railroad track. Approximately 11.3 percent of the Study Area is comprised of deciduous forest, primarily along the eastern boundary. No protected plant species were observed nor was habitat identified within the Study Area.

The approximately 10-acre forested area within the eastern portion of the Study Area provides potential roosting and foraging bat habitat for the federally listed bat species. The migratory BCC red-headed woodpecker, as well as many other bird species, likely occur in the Study Area. Due to likely temporary and permanent impacts to presumed jurisdictional WOTUS, a USACE Section 404 permit will be required. Therefore, understanding potential Project effects to threatened and endangered bat species is necessary for further project permit planning.

HDR evaluated the loss of potential bat habitat within the context of the USFWS's Rangewide Programmatic agreement for the Indiana bat and NLEB (U.S. Fish and Wildlife Service) and the USFWS IPaC system's NLEB determination key. Per HDR's evaluation of the Project activities and intended use of conservation measures (tree clearing during the hibernation period of November 1 to March 31), a *May Affect, but Not Likely to Adversely Affect (MANLAA)* determination was made for the Indiana bat. Completion of the USFWS' northern long-eared bat determination key has also resulted in a *MANLAA* determination for the species. It is anticipated that informal consultation will be completed for these two species as a part of any Section 404 permitting that is required for this Project. To mitigate potential affects to listed bat species, HDR recommends clearing trees during the winter tree clearing window, November 1 to March 15.

The tricolored bat is currently proposed for listing by the USFWS with no date of a final determination. However, based on historical decisions, it is likely that the USFWS will announce a final determination for listing by the end of the year. The little brown bat is currently under review by the USFWS for listing on the ESA. Based on this understanding, HDR has evaluated these species' suitable habitat within the Study Area. Based on presence of suitable habitat and current understanding of Project activities and timeline, HDR has made a preliminary *MANLAA* determination for both species. Should the tricolored or little brown bat species be listed prior to Project construction occurring, additional informal consultation may be required.

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Appendix A – Figures

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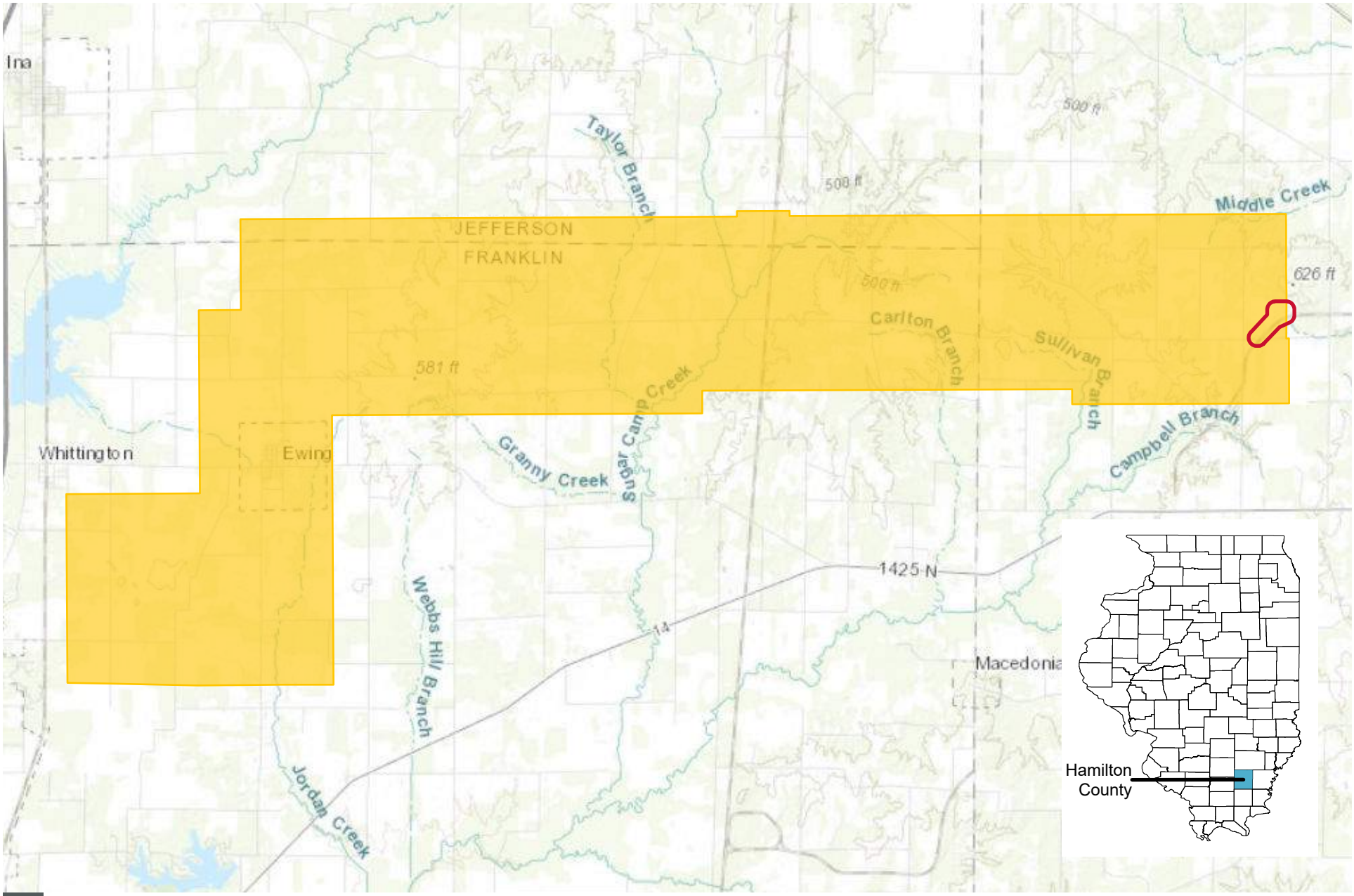

PROJECT VICINITY
Figure 1

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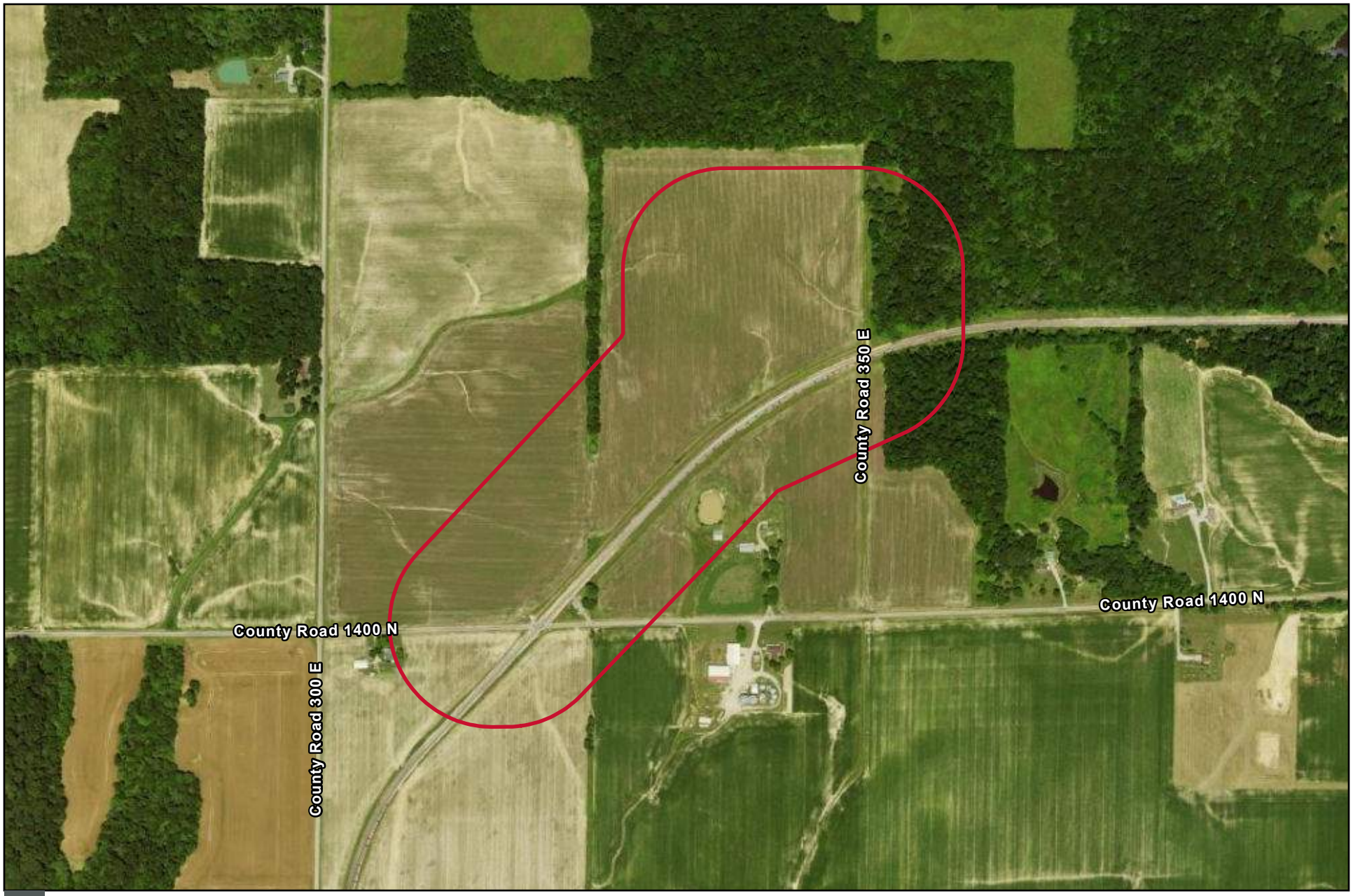

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Study Area (91 acres)

AERIAL IMAGERY
Figure 2

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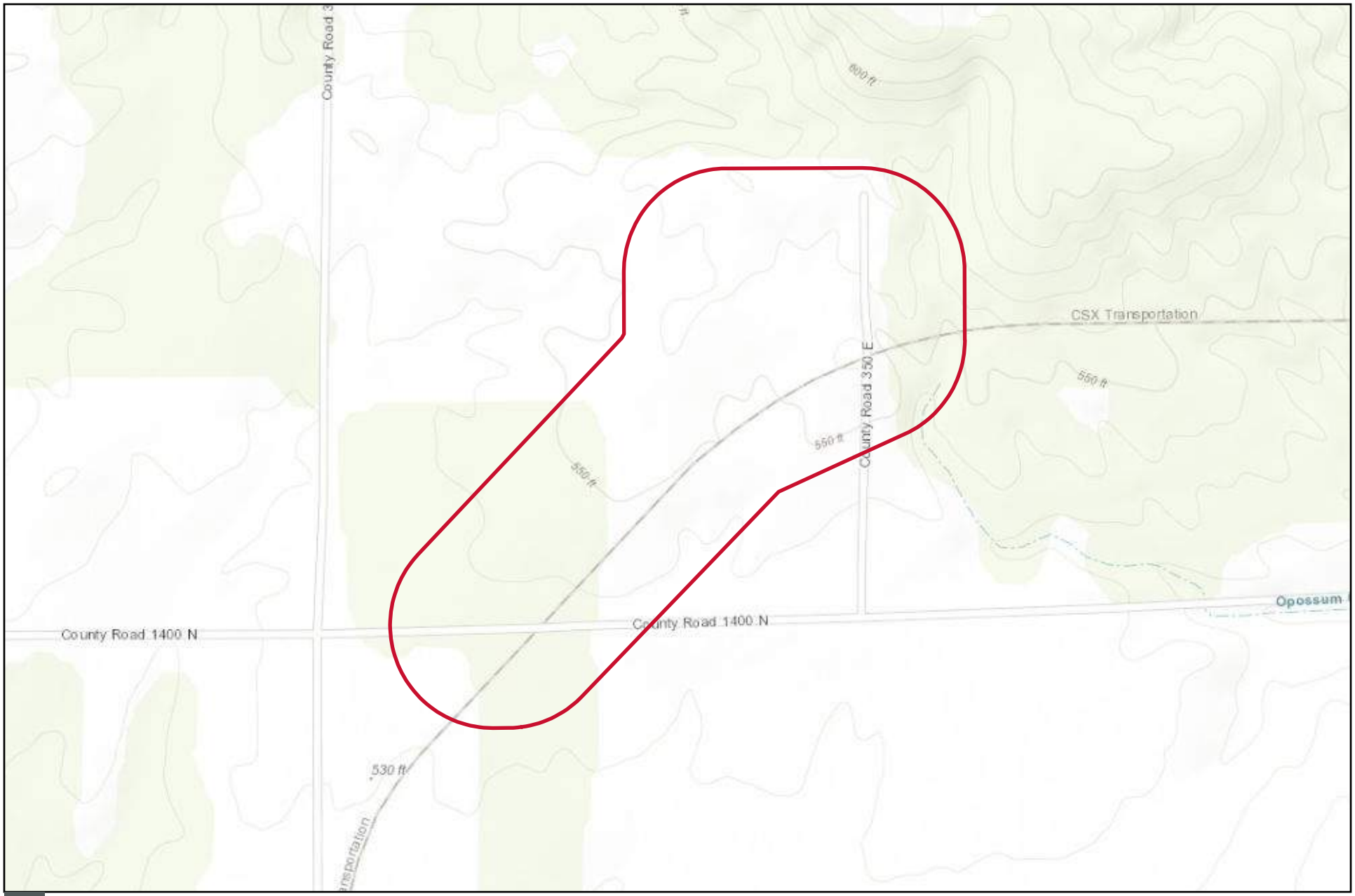
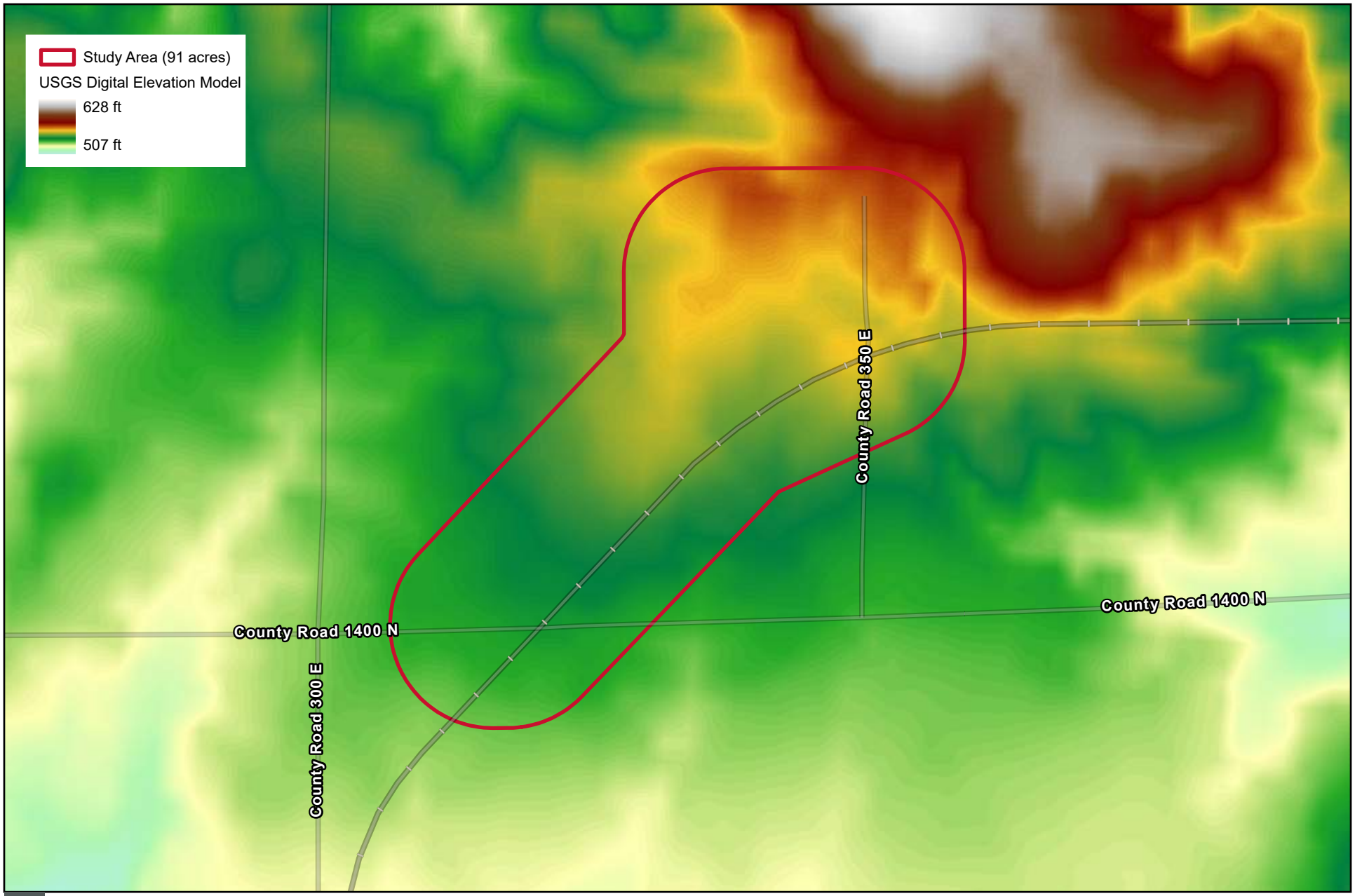


TOPOGRAPHIC MAP, MACEDONIA QUADRANGLE

Figure 3



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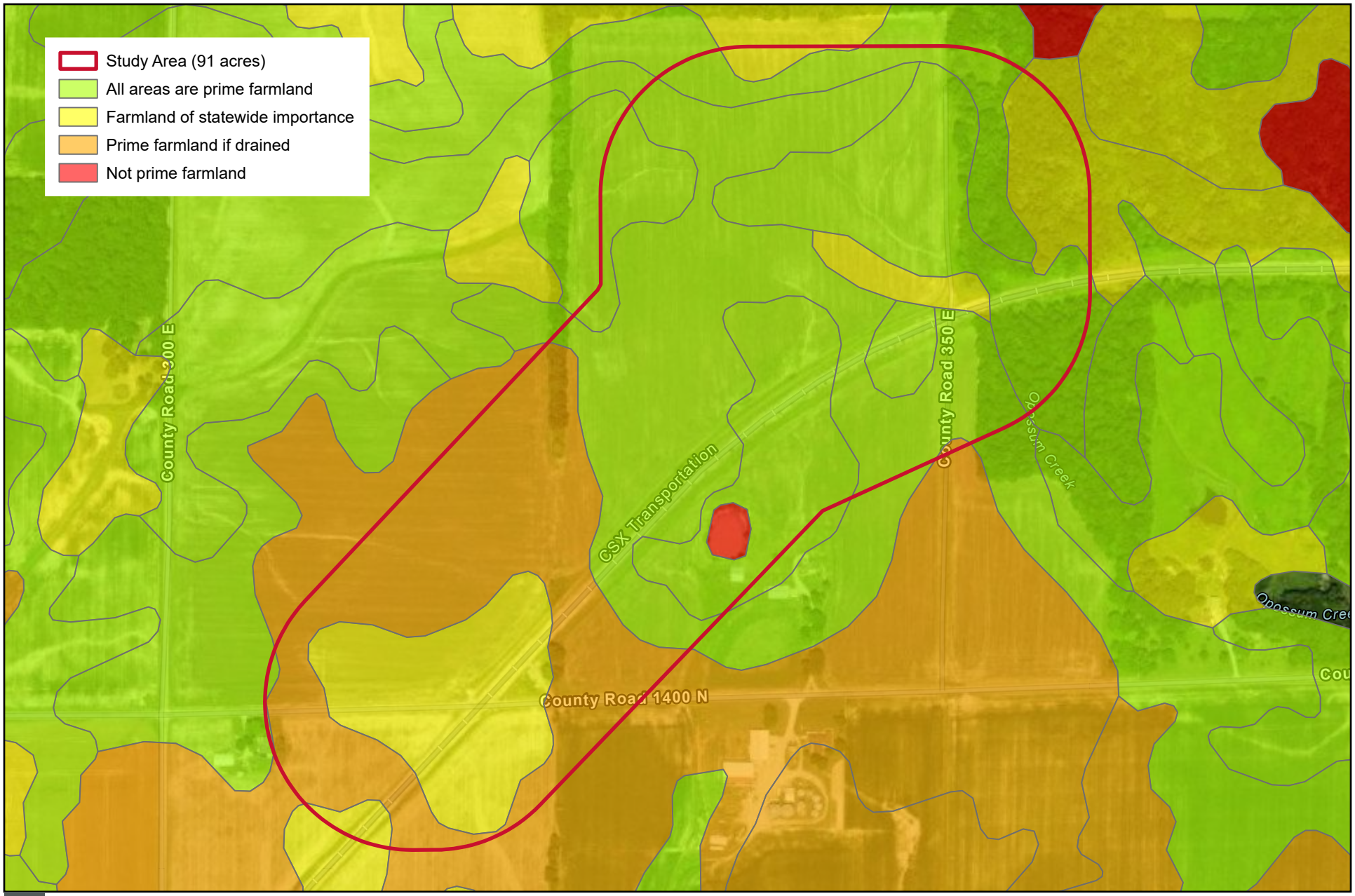
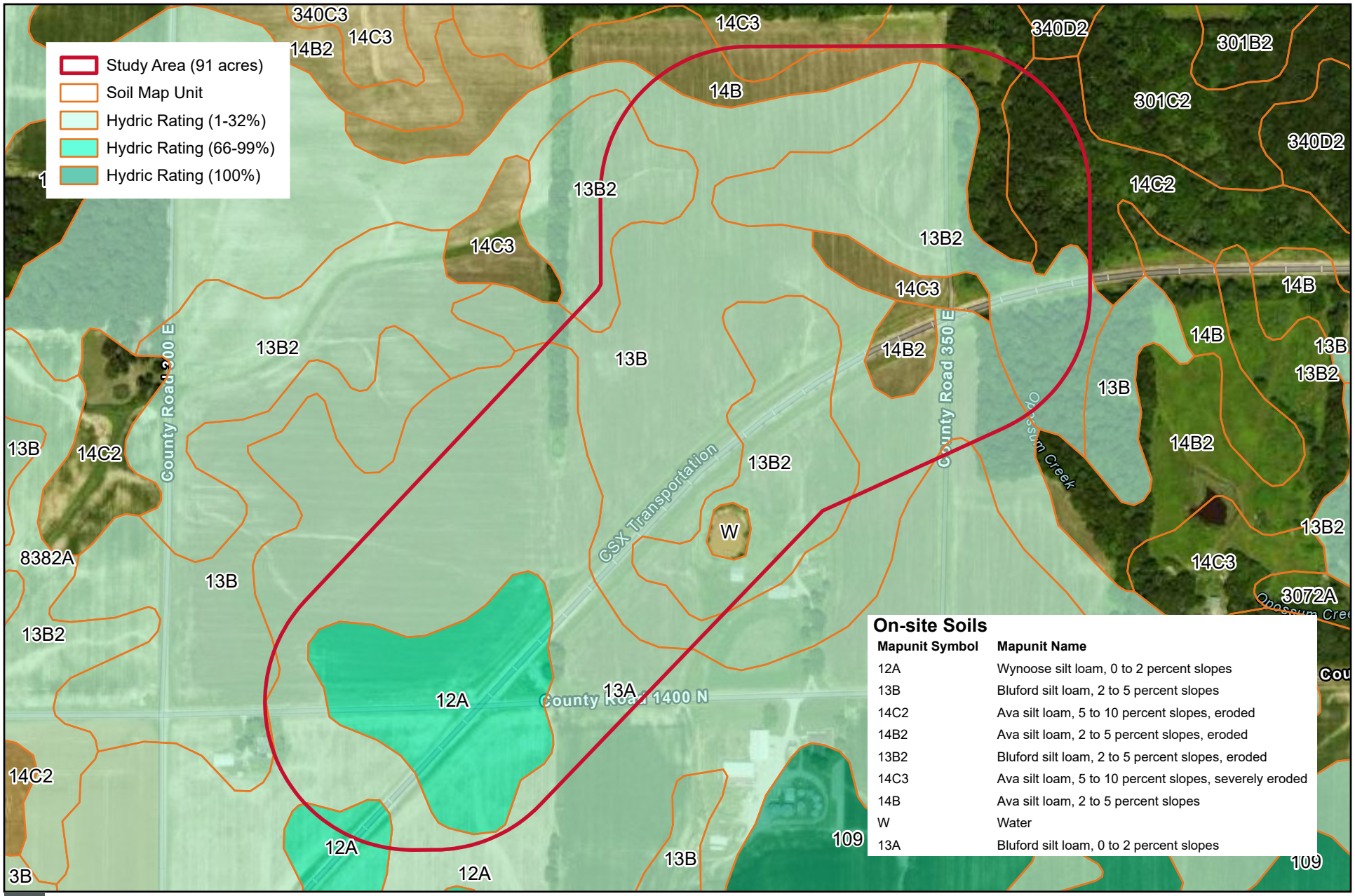
USGS DIGITAL ELEVATION MODEL

Figure 4



FARMLAND SUITABILITY

Figure 5



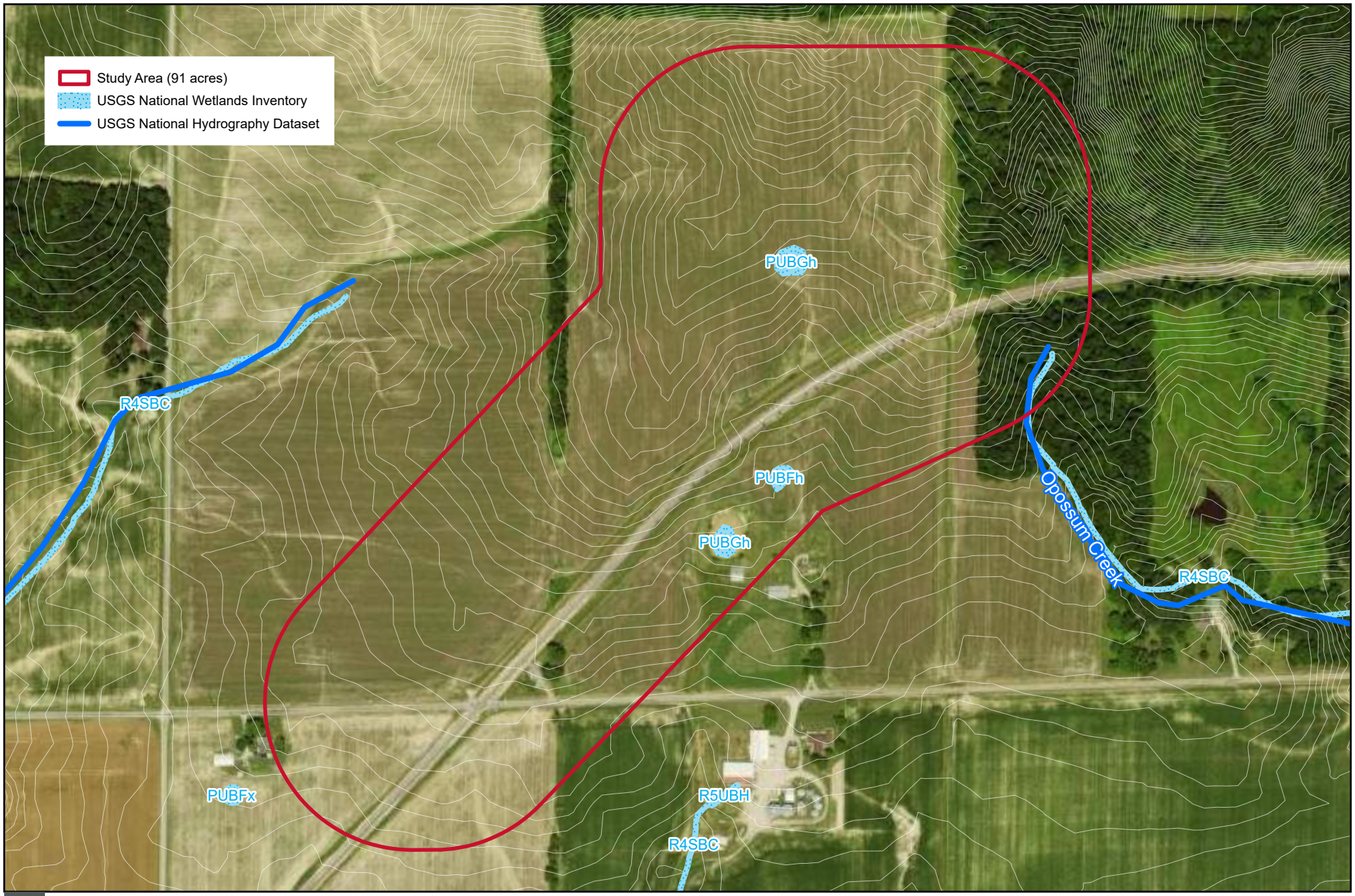
On-site Soils

Mapunit Symbol	Mapunit Name
12A	Wynoose silt loam, 0 to 2 percent slopes
13B	Bluford silt loam, 2 to 5 percent slopes
14C2	Ava silt loam, 5 to 10 percent slopes, eroded
14B2	Ava silt loam, 2 to 5 percent slopes, eroded
13B2	Bluford silt loam, 2 to 5 percent slopes, eroded
14C3	Ava silt loam, 5 to 10 percent slopes, severely eroded
14B	Ava silt loam, 2 to 5 percent slopes
W	Water
13A	Bluford silt loam, 0 to 2 percent slopes

0 0.1 mi

NRCS SOIL SURVEY OF HAMILTON COUNTY, IL

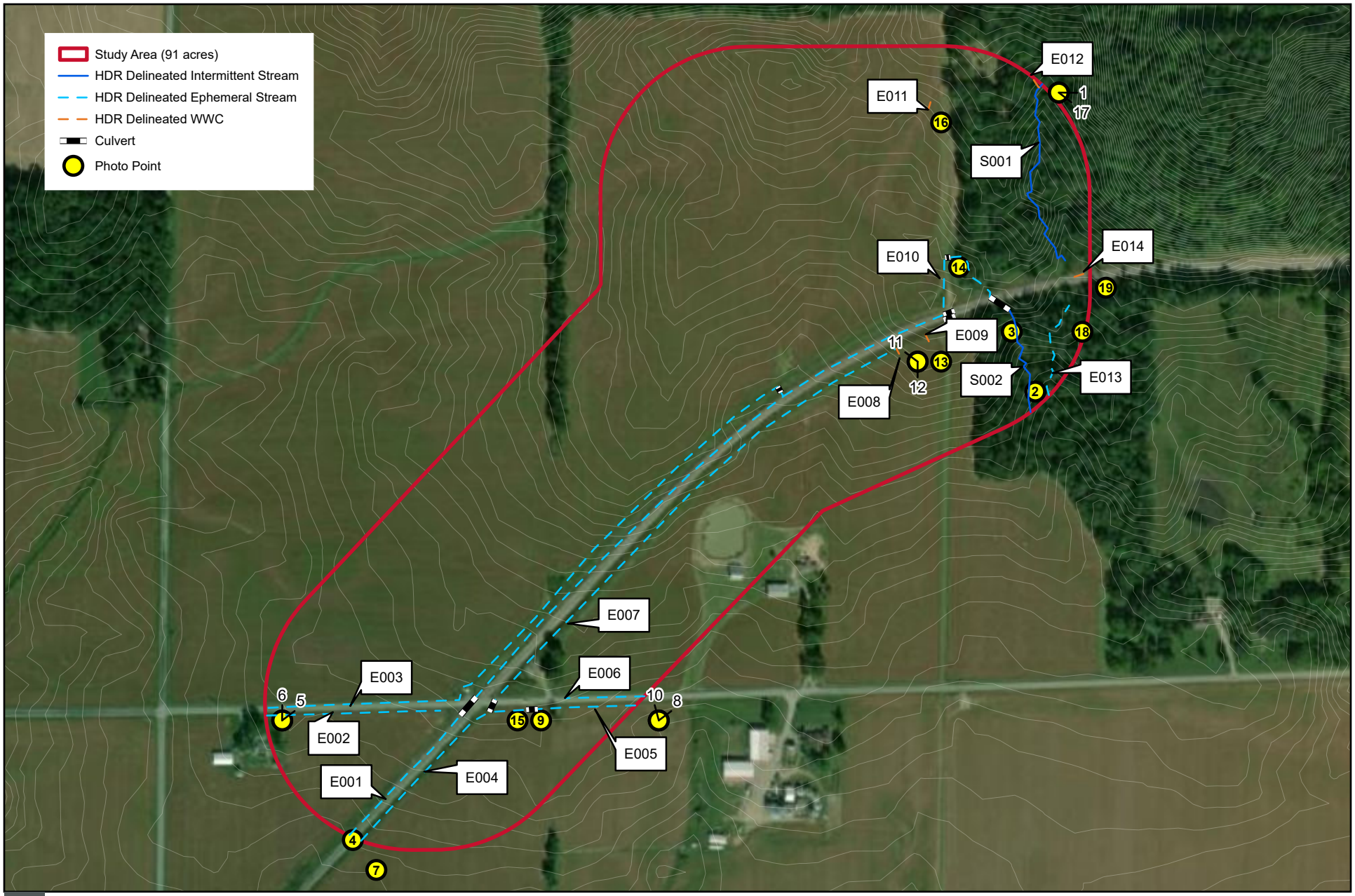
Figure 6



0 0.1 mi

NWI AND NHD
Figure 7

\\CLTSMAIN\GIS_DATA\GIS\PROJECTS\7014_TVA\10353955_SUGARCAMPNMINEEXPEIS\7.2_WIP\MAP_DOCS\TVA_SUGARCAMP.APRX DATE: 11/13/2023



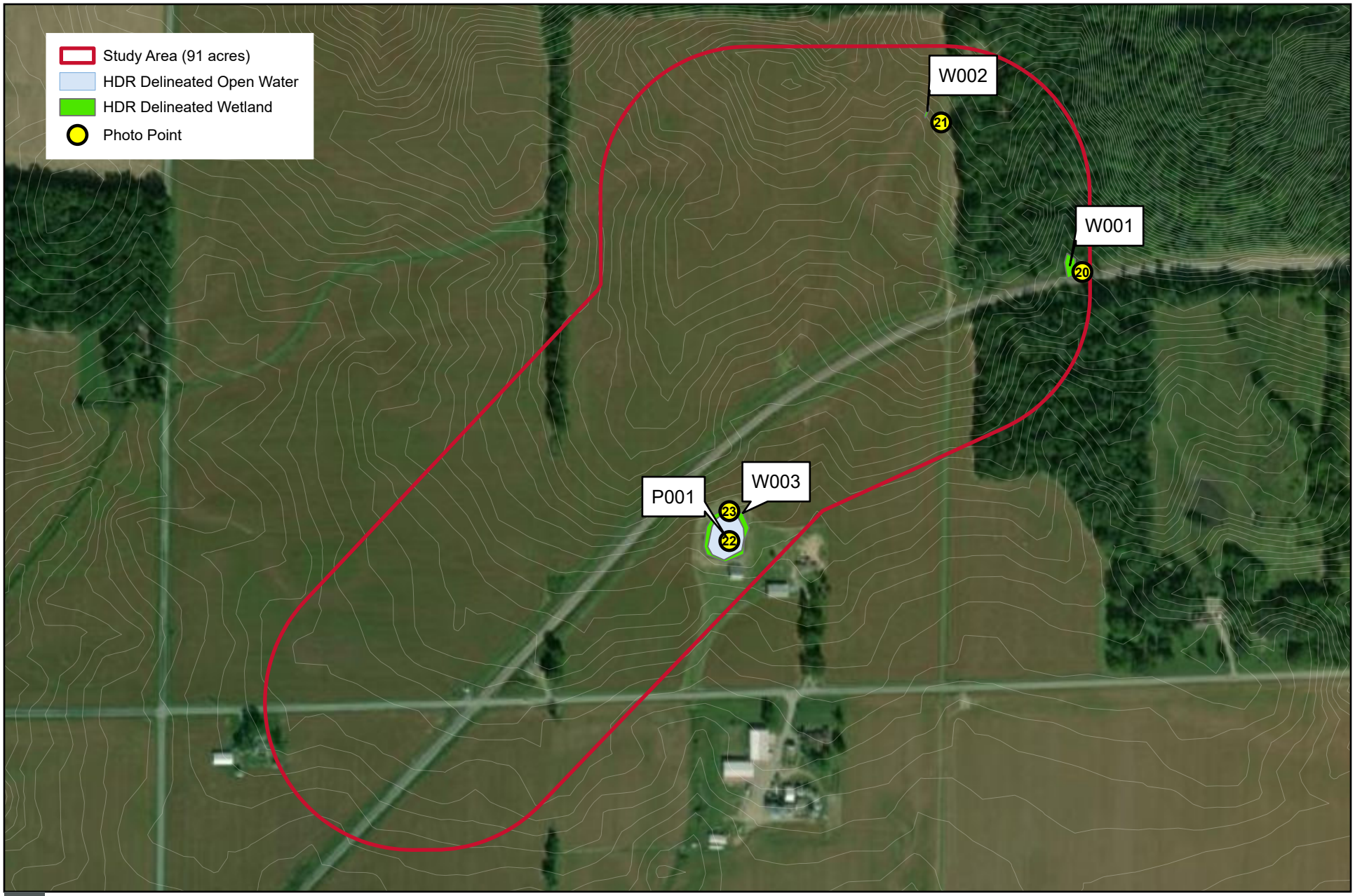
HDR TVA

DELINEATED STREAMS

Figure 8

\\CLTSMAIN\GIS_DATA\GIS\PROJECTS\7014_TVA\10353955_SUGARCAMPNMINEEXPEIS\7.2_WIP\MAP_DOCS\TVA_SUGARCAMP.APRX DATE: 12/4/2023

SUGAR CAMP NORTHERN MINE EXPANSION



HDR TVA

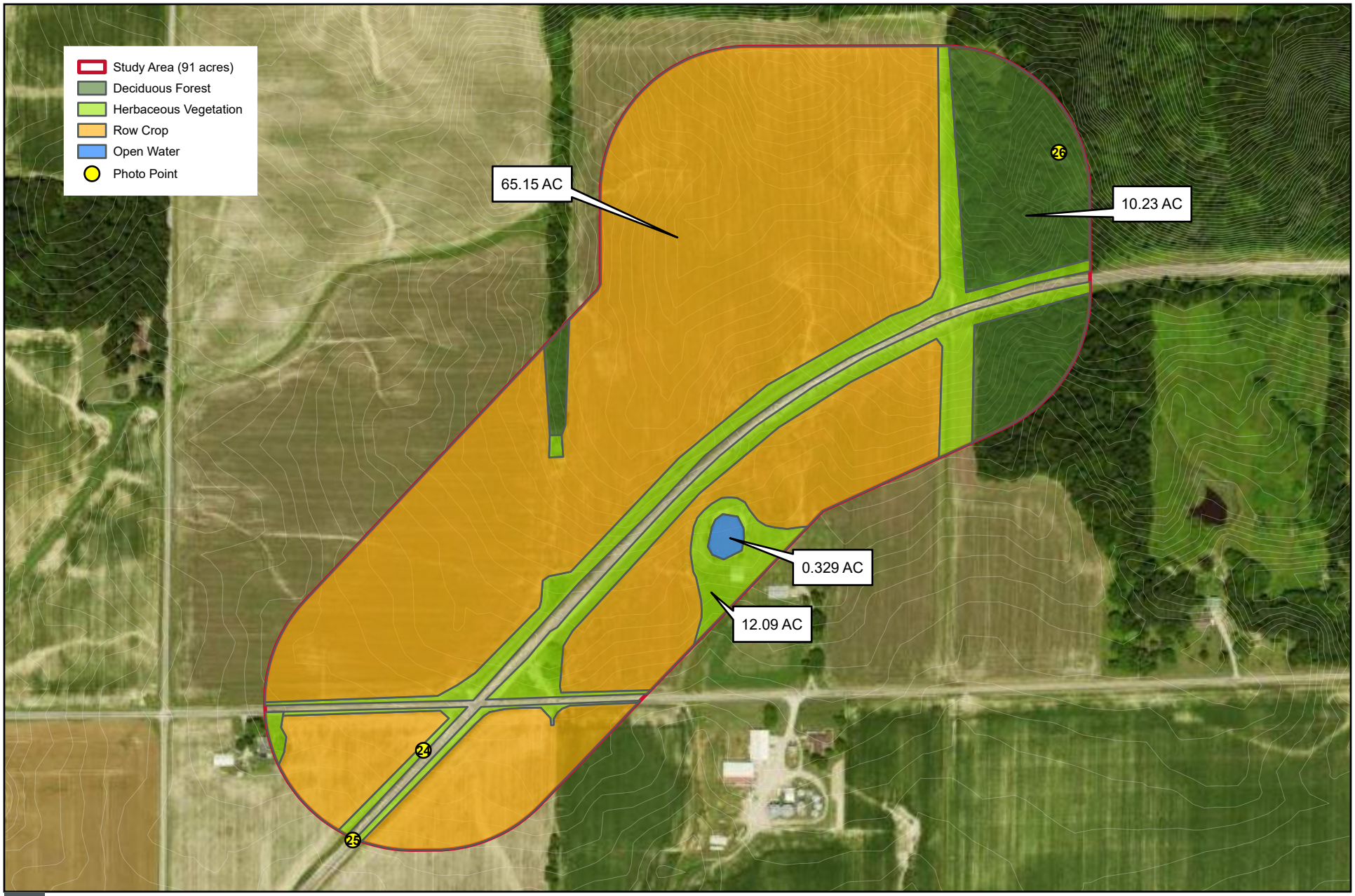
0 0.1 mi

DELINEATED WETLANDS

Figure 9

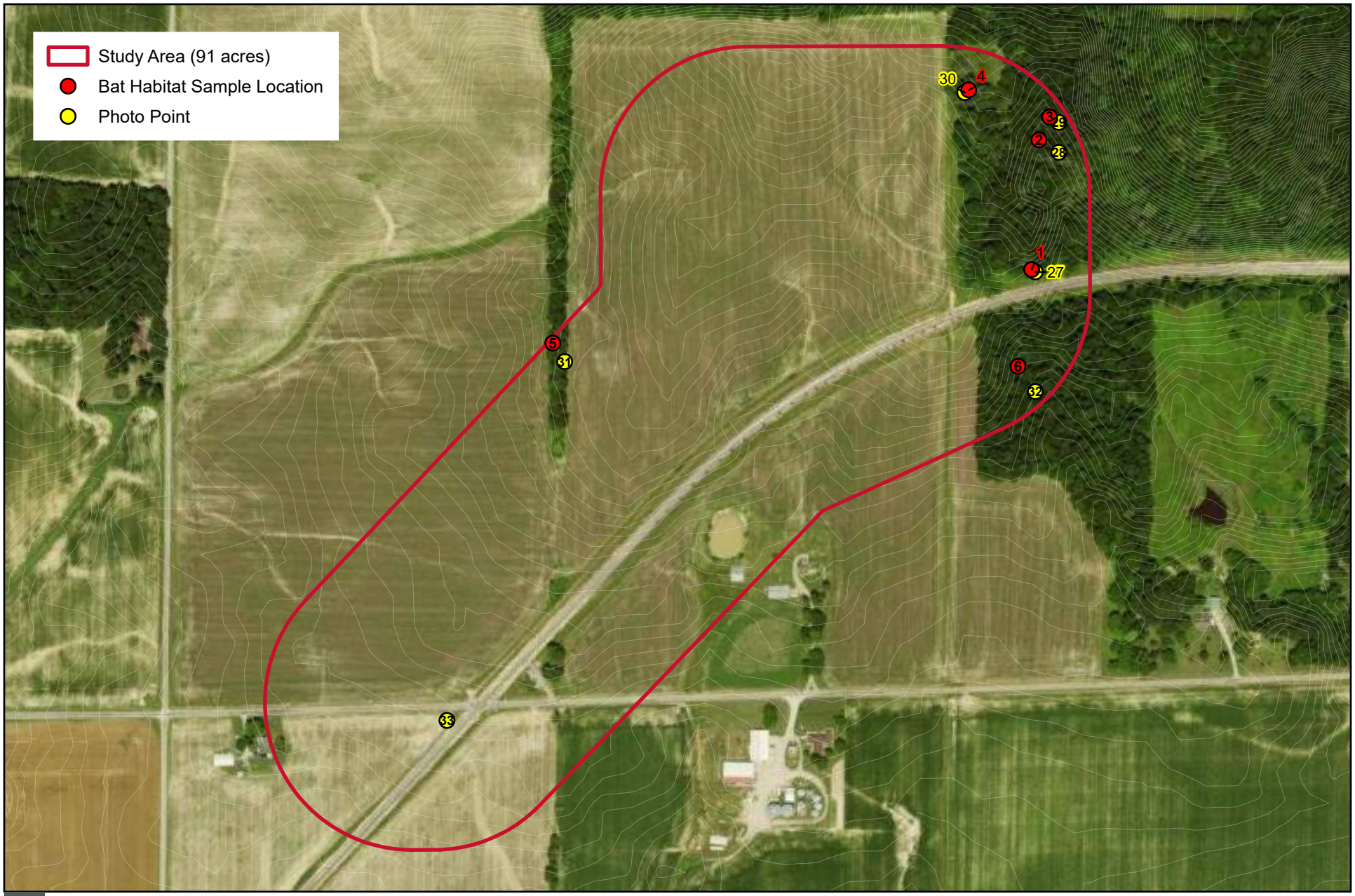
\\CLTSMAIN\GIS_DATA\GIS\PROJECTS\7014_TVA\10353955_SUGARCAMPNMINEEXPEIS\7.2_WIP\MAP_DOCS\TVA_SUGARCAMP.APRX DATE: 12/4/2023

SUGAR CAMP NORTHERN MINE EXPANSION



0 0.1 mi

VEGETATION COMMUNITIES
Figure 10



SUITABLE SUMMER ROOSTING BAT HABITAT

Figure 11

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B

Appendix B – USDA NRCS Soil Report

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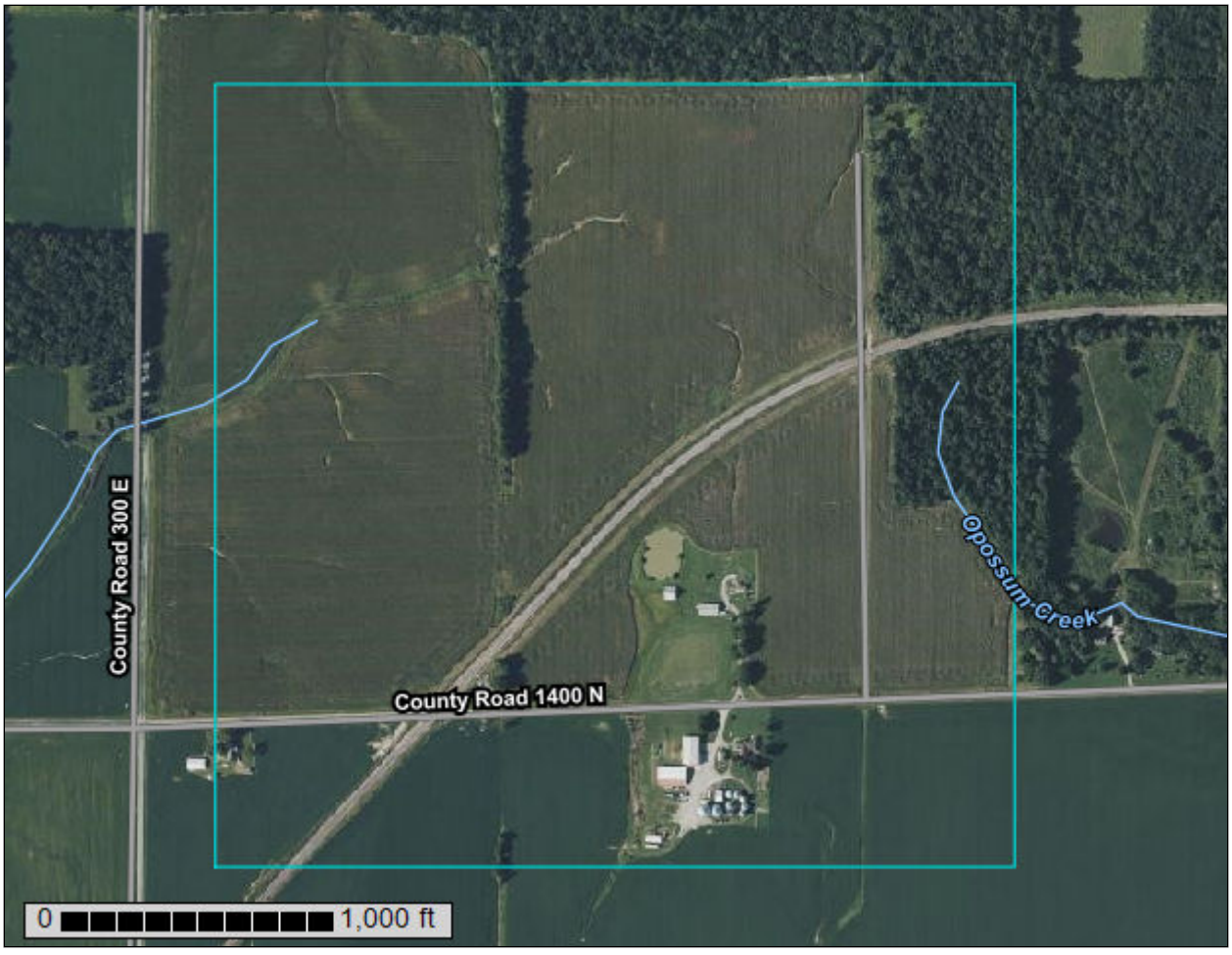
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Hamilton County, Illinois



November 1, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

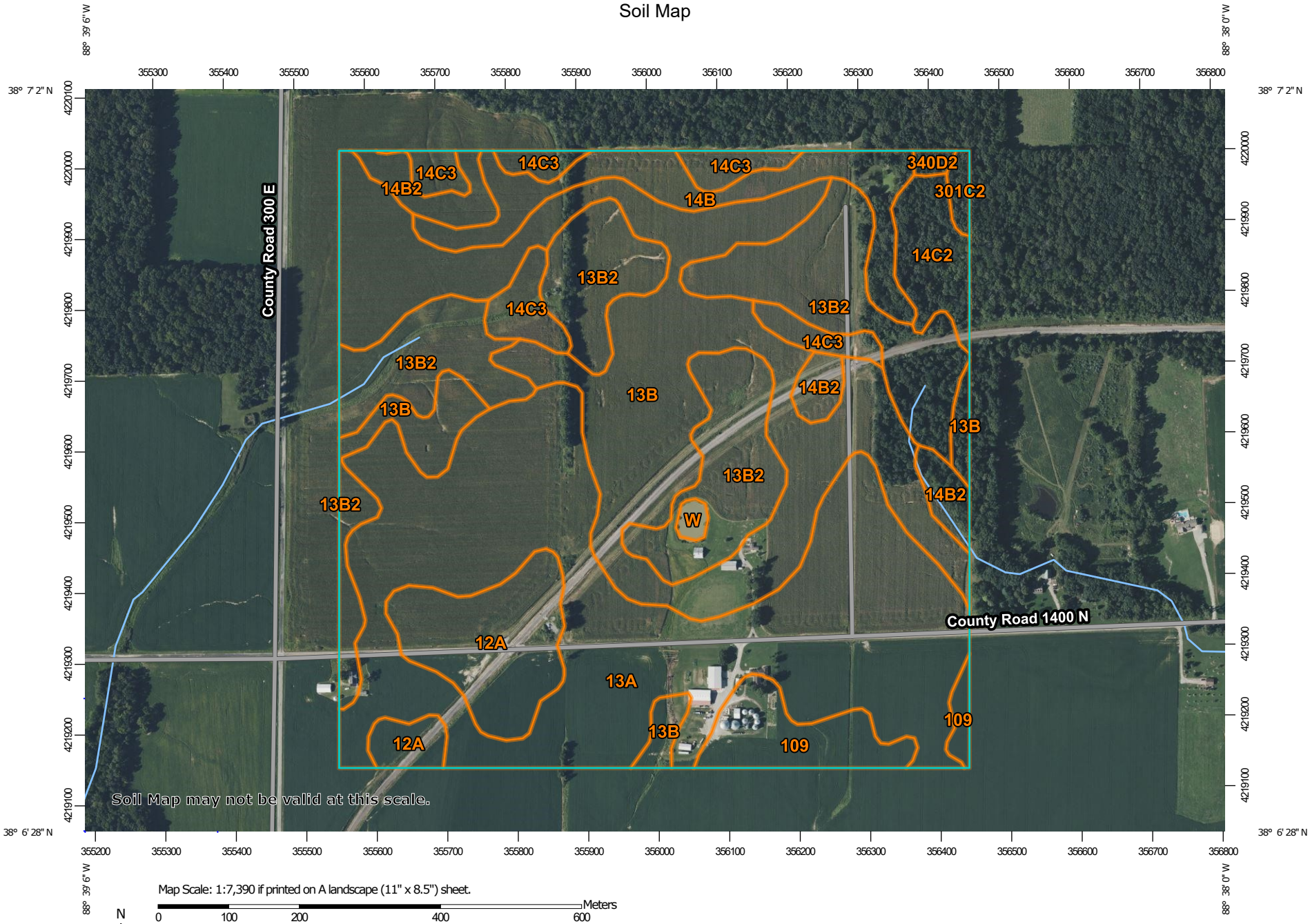
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:7,390 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hamilton County, Illinois
Survey Area Data: Version 18, Aug 28, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 28, 2020—Sep 5, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
12A	Wynoose silt loam, 0 to 2 percent slopes	11.9	6.1%
13A	Bluford silt loam, 0 to 2 percent slopes	59.3	30.7%
13B	Bluford silt loam, 2 to 5 percent slopes	51.6	26.7%
13B2	Bluford silt loam, 2 to 5 percent slopes, eroded	34.5	17.8%
14B	Ava silt loam, 2 to 5 percent slopes	9.9	5.1%
14B2	Ava silt loam, 2 to 5 percent slopes, eroded	5.6	2.9%
14C2	Ava silt loam, 5 to 10 percent slopes, eroded	4.7	2.4%
14C3	Ava silt loam, 5 to 10 percent slopes, severely eroded	7.6	3.9%
109	Racoon silt loam	6.7	3.5%
301C2	Grantsburg silt loam, 5 to 12 percent slopes, eroded	0.8	0.4%
340D2	Zanesville silt loam, till plain, 10 to 18 percent slopes, eroded	0.4	0.2%
W	Water	0.5	0.3%
Totals for Area of Interest		**193.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called

noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can

be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Hamilton County, Illinois

12A—Wynoose silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2t959
Elevation: 360 to 840 feet
Mean annual precipitation: 35 to 46 inches
Mean annual air temperature: 53 to 58 degrees F
Frost-free period: 175 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wynoose and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wynoose

Setting

Landform: Ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over mixed loess and drift over sangamon age paleosol till

Typical profile

Ap - 0 to 7 inches: silt loam
Eg - 7 to 19 inches: silt loam
Btg - 19 to 36 inches: silty clay
2Btg - 36 to 66 inches: silty clay loam
3Btgb - 66 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 13 to 24 inches to abrupt textural change
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.02 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F113XY905IL - Wet Upland Woodland
Hydric soil rating: Yes

Minor Components

Bluford

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F113XY905IL - Wet Upland Woodland
Hydric soil rating: No

13A—Bluford silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2t95c
Elevation: 360 to 840 feet
Mean annual precipitation: 35 to 46 inches
Mean annual air temperature: 53 to 58 degrees F
Frost-free period: 175 to 195 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Bluford and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bluford

Setting

Landform: Ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over mixed loess and drift

Typical profile

Ap - 0 to 7 inches: silt loam
E - 7 to 19 inches: silt loam
Btg - 19 to 35 inches: silty clay
2Btgx - 35 to 42 inches: silty clay loam
2Btg - 42 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 10 to 24 inches to abrupt textural change; 24 to 48 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F113XY905IL - Wet Upland Woodland
Hydric soil rating: No

Minor Components

Wynoose

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F113XY905IL - Wet Upland Woodland
Hydric soil rating: Yes

13B—Bluford silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t95d
Elevation: 360 to 840 feet
Mean annual precipitation: 35 to 46 inches
Mean annual air temperature: 53 to 58 degrees F
Frost-free period: 175 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bluford and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bluford

Setting

Landform: Ground moraines
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Loess over mixed loess and drift

Typical profile

Ap - 0 to 7 inches: silt loam
E - 7 to 19 inches: silt loam
Btg - 19 to 35 inches: silty clay
2Btgx - 35 to 42 inches: silty clay loam
2Btg - 42 to 60 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 10 to 24 inches to abrupt textural change; 24 to 48 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F113XY905IL - Wet Upland Woodland
Hydric soil rating: No

Minor Components

Wynoose

Percent of map unit: 5 percent
Landform: Ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F113XY905IL - Wet Upland Woodland
Hydric soil rating: Yes

Ava

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F113XY910IL - Fragic Backslope Woodland
Hydric soil rating: No

13B2—Bluford silt loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2t95f
Elevation: 360 to 840 feet
Mean annual precipitation: 35 to 46 inches
Mean annual air temperature: 53 to 58 degrees F
Frost-free period: 175 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bluford and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bluford

Setting

Landform: Ground moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over mixed loess and drift

Typical profile

Ap - 0 to 6 inches: silt loam
E - 6 to 9 inches: silt loam
Btg - 9 to 32 inches: silty clay
2Btgx - 32 to 47 inches: silty clay loam
2Btg - 47 to 60 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 5 to 20 inches to abrupt textural change; 19 to 45 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C/D
Ecological site: F113XY905IL - Wet Upland Woodland
Hydric soil rating: No

Minor Components

Ava

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F113XY910IL - Fragic Backslope Woodland
Hydric soil rating: No

Wynoose

Percent of map unit: 5 percent
Landform: Ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F113XY905IL - Wet Upland Woodland
Hydric soil rating: Yes

14B—Ava silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t95h
Elevation: 360 to 840 feet
Mean annual precipitation: 38 to 46 inches
Mean annual air temperature: 54 to 58 degrees F
Frost-free period: 180 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Ava and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ava

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over mixed loess and drift over till

Typical profile

Ap - 0 to 6 inches: silt loam
E - 6 to 14 inches: silt loam
Bt - 14 to 34 inches: silty clay loam
2Btx - 34 to 50 inches: silty clay loam
3Btb - 50 to 79 inches: loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 25 to 40 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.02 to 0.06 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F113XY910IL - Fragic Backslope Woodland
Hydric soil rating: No

Minor Components

Bluford

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F113XY905IL - Wet Upland Woodland
Hydric soil rating: No

14B2—Ava silt loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2t95j
Elevation: 360 to 840 feet
Mean annual precipitation: 38 to 46 inches
Mean annual air temperature: 54 to 58 degrees F
Frost-free period: 180 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Ava and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ava

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over mixed loess and drift

Typical profile

Ap - 0 to 4 inches: silt loam
Bt and E - 4 to 30 inches: silty clay loam
2Btx - 30 to 60 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 25 to 40 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.02 to 0.06 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: F113XY910IL - Fragic Backslope Woodland
Hydric soil rating: No

Minor Components

Bluford

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F113XY905IL - Wet Upland Woodland
Hydric soil rating: No

14C2—Ava silt loam, 5 to 10 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2t95l
Elevation: 360 to 840 feet
Mean annual precipitation: 38 to 46 inches
Mean annual air temperature: 54 to 58 degrees F
Frost-free period: 180 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ava, eroded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ava, Eroded

Setting

Landform: Hillslopes, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Loess over mixed loess and drift over till

Typical profile

Ap - 0 to 9 inches: silt loam
Bt and E - 9 to 28 inches: silty clay loam
Btx - 28 to 36 inches: silty clay loam
2Btx - 36 to 64 inches: silt loam
3Btb - 64 to 78 inches: silt loam

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: 25 to 40 inches to fragipan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.01 to 0.06 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Ecological site: F113XY910IL - Fragic Backslope Woodland
Hydric soil rating: No

Minor Components

Bluford, eroded
Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F113XY905IL - Wet Upland Woodland
Hydric soil rating: No

14C3—Ava silt loam, 5 to 10 percent slopes, severely eroded

Map Unit Setting
National map unit symbol: 5w74
Elevation: 350 to 1,000 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 160 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Ava and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ava

Setting
Landform: Till plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over pedisediment

Typical profile
H1 - 0 to 5 inches: silt loam
H2 - 5 to 21 inches: silty clay loam
H3 - 21 to 40 inches: silty clay loam
H4 - 40 to 60 inches: loam

Properties and qualities
Slope: 5 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F113XY910IL - Fragic Backslope Woodland
Hydric soil rating: No

109—Racoon silt loam

Map Unit Setting

National map unit symbol: 5w6w
Elevation: 350 to 700 feet
Mean annual precipitation: 34 to 48 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Racoon and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Racoon

Setting

Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess and/or local silty alluvium

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 27 inches: silt loam
H3 - 27 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: Occasional
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F114XB203IN - Wet Floodplain Forest
Hydric soil rating: Yes

301C2—Grantsburg silt loam, 5 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: 5w7b
Elevation: 340 to 1,020 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 180 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Grantsburg and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grantsburg

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over residuum weathered from limestone, sandstone, and shale

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 22 inches: silt loam
H3 - 22 to 38 inches: silty clay loam
H4 - 38 to 68 inches: silt loam

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: 24 to 40 inches to fragipan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F113XY910IL - Fragic Backslope Woodland
Hydric soil rating: No

340D2—Zanesville silt loam, till plain, 10 to 18 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2wcyt
Elevation: 340 to 1,010 feet
Mean annual precipitation: 38 to 49 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 190 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Zanesville, eroded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zanesville, Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over residuum weathered from sandstone and siltstone and/or shale

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 24 inches: silt loam
Btx - 24 to 40 inches: silty clay loam
2C - 40 to 60 inches: clay loam
2R - 60 to 70 inches: bedrock

Properties and qualities

Slope: 10 to 18 percent
Depth to restrictive feature: 22 to 30 inches to fragipan; 40 to 79 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F113XY910IL - Fragic Backslope Woodland
Hydric soil rating: No

Minor Components

Wellston, eroded

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F114XB302IN - Residuum Upland Forest
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydric soil rating: Unranked

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C

Appendix C – USFWS IPaC Official Species List, USFWS NLEB Determination Key, and IDNR EcoCAT

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Southern Illinois Sub-Office
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8588 Route 148
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https://www.fws.gov/office/illinois-iowa-ecological-services

In Reply Refer To: December 01, 2023
Project Code: 2024-0021824
Project Name: Sugar Camp Northern Mine Expansion - Viking District No. 4 Bleeder Shaft Area

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

To Whom It May Concern:

The attached species list identifies federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat, if present, within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Under 50 CFR 402.12(e) (the regulations that implement Section 7 of the Endangered Species Act) **the accuracy of this species list should be verified after 90 days**. This verification can be completed formally or informally. You may verify the list by visiting the Information for Planning and Consultation (IPaC) website https://ipac.ecosphere.fws.gov at regular intervals during project planning and implementation and completing the same process you used to receive the attached list.

Section 7 Consultation

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the U.S. Fish and Wildlife Service (Service) if they determine their project “may affect” listed species or designated critical habitat. Under the ESA, it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action may affect endangered, threatened, or

proposed species, or designated critical habitat, and if so, to consult with the Service further. Similarly, it is the responsibility of the Federal action agency or project proponent, not the Service to make "no effect" determinations. If you determine that your proposed action will have no effect on threatened or endangered species or their respective designated critical habitat, you do not need to seek concurrence with the Service.

Note: For some species or projects, IPaC will present you with *Determination Keys*. You may be able to use one or more Determination Keys to conclude consultation on your action for species covered by those keys.

Technical Assistance for Listed Species

1. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain information on the species life history, species status, current range, and other documents by selecting the species from the thumbnails or list view and visiting the species profile page.???????

No Effect Determinations for Listed Species

1. If there are *no* species or designated critical habitats on the Endangered Species portion of the species list: conclude "no species and no critical habitat present" and document your finding in your project records. No consultation under ESA section 7(a)(2) is required if the action would result in no effects to listed species or critical habitat. Maintain a copy of this letter and IPaC official species list for your records.
2. If any species or designated critical habitat are listed as potentially present in the **action area** of the proposed project the project proponents are responsible for determining if the proposed action will have “no effect” on any federally listed species or critical habitat. No effect, with respect to species, means that no individuals of a species will be exposed to any consequence of a federal action or that they will not respond to such exposure.
3. If the species habitat is not present within the action area or current data (surveys) for the species in the action area are negative: conclude “no species habitat or species present” and document your finding in your project records. For example, if the project area is located entirely within a “developed area” (an area that is already graveled/paved or supports structures and the only vegetation is limited to frequently mowed grass or conventional landscaping, is located within an existing maintained facility yard, or is in cultivated cropland conclude no species habitat present. Be careful when assessing actions that affect: 1) rights-of-ways that contains natural or semi-natural vegetation despite periodic mowing or other management; structures that have been known to support listed species (example: bridges), and 2) surface water or groundwater. Several species inhabit rights-of-ways, and you should carefully consider effects to surface water or groundwater, which often extend outside of a project’s immediate footprint.
4. Adequacy of Information & Surveys - Agencies may base their determinations on the best evidence that is available or can be developed during consultation. Agencies must give the benefit of any doubt to the species when there are any inadequacies in the

information. Inadequacies may include uncertainty in any step of the analysis. To provide adequate information on which to base a determination, it may be appropriate to conduct surveys to determine whether listed species or their habitats are present in the action area. Please contact our office for more information or see the survey guidelines that the Service has made available in IPaC.

May Effect Determinations for Listed Species

1. If the species habitat is present within the action area and survey data is unavailable or inconclusive: assume the species is present or plan and implement surveys and interpret results in coordination with our office. If assuming species present or surveys for the species are positive continue with the may affect determination process. May affect, with respect to a species, is the appropriate conclusion when a species might be exposed to a consequence of a federal action and could respond to that exposure. For critical habitat, ‘may affect’ is the appropriate conclusion if the action area overlaps with mapped areas of critical habitat and an essential physical or biological feature may be exposed to a consequence of a federal action and could change in response to that exposure.
2. Identify stressors or effects to the species and to the essential physical and biological features of critical habitat that overlaps with the action area. Consider all consequences of the action and assess the potential for each life stage of the species that occurs in the action area to be exposed to the stressors. Deconstruct the action into its component parts to be sure that you do not miss any part of the action that could cause effects to the species or physical and biological features of critical habitat. Stressors that affect species’ resources may have consequences even if the species is not present when the project is implemented.
3. If no listed or proposed species will be exposed to stressors caused by the action, a ‘no effect’ determination may be appropriate – be sure to separately assess effects to critical habitat, if any overlaps with the action area. If you determined that the proposed action or other activities that are caused by the proposed action may affect a species or critical habitat, the next step is to describe the manner in which they will respond or be altered. Specifically, to assess whether the species/critical habitat is "not likely to be adversely affected" or "likely to be adversely affected."
4. Determine how the habitat or the resource will respond to the proposed action (for example, changes in habitat quality, quantity, availability, or distribution), and assess how the species is expected to respond to the effects to its habitat or other resources. Critical habitat analyses focus on how the proposed action will affect the physical and biological features of the critical habitat in the action area. If there will be only beneficial effects or the effects of the action are expected to be insignificant or discountable, conclude "may affect, not likely to adversely affect" and submit your finding and supporting rationale to our office and request concurrence.
5. If you cannot conclude that the effects of the action will be wholly beneficial, insignificant, or discountable, check IPaC for species-specific Section 7 guidance and conservation measures to determine whether there are any measures that may be implemented to avoid or minimize the negative effects. If you modify your proposed action to include conservation measures, assess how inclusion of those measures will likely change the

effects of the action. If you cannot conclude that the effects of the action will be wholly beneficial, insignificant, or discountable, contact our office for assistance.

6. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

For additional information on completing Section 7 Consultation including a Glossary of Terms used in the Section 7 Process, information requirements for completing Section 7, and example letters visit the Midwest Region Section 7 Consultations website at: https://www.fws.gov/library/collections/midwest-region-section-7-consultations.
You may find more specific information on completing Section 7 on communication towers and transmission lines on the following websites:

- Incidental Take Beneficial Practices: Power Lines - https://www.fws.gov/story/incidental-take-beneficial-practices-power-lines
- Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning. - https://www.fws.gov/media/recommended-best-practices-communication-tower-design-siting-construction-operation

Tricolored Bat Update

On September 14, 2022, the Service published a proposal in the Federal Register to list the tricolored bat (Perimyotis subflavus) as endangered under the Endangered Species Act (ESA). The Service has up to 12-months from the date the proposal published to make a final determination, either to list the tricolored bat under the Act or to withdraw the proposal. The Service determined the bat faces extinction primarily due to the rangewide impacts of white-nose syndrome (WNS), a deadly fungal disease affecting cave-dwelling bats across North America. Because tricolored bat populations have been greatly reduced due to WNS, surviving bat populations are now more vulnerable to other stressors such as human disturbance and habitat loss. Species proposed for listing are not afforded protection under the ESA; however, as soon as a listing becomes effective (typically 30 days after publication of the final rule in the Federal Register), the prohibitions against jeopardizing its continued existence and “take” will apply. Therefore, if your future or existing project has the potential to adversely affect tricolored bats after the potential new listing goes into effect, we recommend that the effects of the project on tricolored bat and their habitat be analyzed to determine whether authorization under ESA section 7 or 10 is necessary. Projects with an existing section 7 biological opinion may require reinitiation of consultation, and projects with an existing section 10 incidental take permit may require an amendment to provide uninterrupted authorization for covered activities. Contact our office for assistance.

Bald and Golden Eagles

Although no longer protected under the Endangered Species Act, be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act, as are golden eagles. Projects affecting these species may require measures to avoid harming eagles

or may require a permit. If your project is near an eagle nest or winter roost area, please contact our office for further coordination. For more information on permits and other eagle information visit our website https://www.fws.gov/library/collections/bald-and-golden-eagle-management.

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries

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:

Southern Illinois Sub-Office
Southern Illinois Sub-office
8588 Route 148
Marion, IL 62959-5822
(618) 998-5945

PROJECT SUMMARY

Project Code: 2024-0021824

Project Name: Sugar Camp Northern Mine Expansion - Viking District No. 4 Bleeder Shaft Area

Project Type: Subsurface Extraction - Coal

Project Description: On behalf of Tennessee Valley Authority (TVA), HDR Engineering, Inc (HDR) is conducting a biological resources survey which included a wetlands and waters delineation, vegetation assessment, and wildlife assessment for a portion of the Sugar Camp North Mine Expansion Project (Project), a proposed bleeder shaft (Viking District No. 4) located on approximately 91 acres in Hamilton County, Illinois (Study Area).

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.1123324,-88.64263317034363,14z

Counties: Hamilton County, Illinois

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 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.

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
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Whooping Crane *Grus americana* Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non-Essential

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9743

CRITICAL HABITATS

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

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Brittany Schweiger
Address: 401 S 18th St.
City: St. Louis
State: MO
Zip: 63103
Email brittany.schweiger@hdrinc.com
Phone: 3144258353

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Tennessee Valley Authority

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Southern Illinois Sub-Office
Southern Illinois Sub-office
8588 Route 148
Marion, IL 62959-5822
Phone: (618) 998-5945
Email Address: Marion@fws.gov
https://www.fws.gov/office/illinois-iowa-ecological-services

In Reply Refer To: December 01, 2023
Project code: 2024-0021824
Project Name: Sugar Camp Northern Mine Expansion - Viking District No. 4 Bleeder Shaft Area

Federal Nexus: yes
Federal Action Agency (if applicable): Tennessee Valley Authority

Subject: Technical assistance for 'Sugar Camp Northern Mine Expansion - Viking District No. 4 Bleeder Shaft Area'

Dear Brittany Schweiger:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on December 01, 2023, for 'Sugar Camp Northern Mine Expansion - Viking District No. 4 Bleeder Shaft Area' (here forward, Project). This project has been assigned Project Code 2024-0021824 and all future correspondence should clearly reference this number. **Please carefully review this letter. Your Endangered Species Act (Act) requirements are not complete.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis, your project is not reasonably certain to cause incidental take of the northern long-eared bat. Unless the Service advises you within 15 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat.

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Indiana Bat *Myotis sodalis* Endangered
- Monarch Butterfly *Danaus plexippus* Candidate
- Tricolored Bat *Perimyotis subflavus* Proposed Endangered
- Whooping Crane *Grus americana* Experimental Population, Non-Essential

You may coordinate with our Office to determine whether the Action may cause prohibited take of the animal species listed above. Note that if a new species is listed that may be affected by the identified action before it is complete, additional review is recommended to ensure compliance with the Endangered Species Act.

Next Step

Consultation with the Service is necessary. The project has a federal nexus (e.g., Federal funds, permit, etc.), but you are not the federal action agency or its designated (in writing) non-federal representative. Therefore, the ESA consultation status is incomplete and no project activities should occur until consultation between the Service and the Federal action agency (or designated non-federal representative), is completed.

As the federal agency or designated non-federal representative deems appropriate, they should submit their determination of effects to the Service by doing the following.

1. Log into IPaC using an agency email account and click on My Projects, click "Search by record locator" to find this Project using **380-135327322**. (Alternatively, the originator of the project in IPaC can add the agency representative to the project by using the Add Member button on the project home page.)
2. Review the answers to the Northern Long-eared Bat Range-wide Determination Key to ensure that they are accurate.
3. Click on Review/Finalize to convert the ‘not likely to adversely affect’ consistency letter to a concurrence letter. Download the concurrence letter for your files if needed.

If no changes occur with the Project or there are no updates on listed species, no further consultation/coordination for this project is required for the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical

habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place before project implements any changes which are final or commits additional resources.

If you have any questions regarding this letter or need further assistance, please contact the Southern Illinois Sub-Office and reference Project Code 2024-0021824 associated with this Project.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Sugar Camp Northern Mine Expansion - Viking District No. 4 Bleeder Shaft Area

2. Description

The following description was provided for the project 'Sugar Camp Northern Mine Expansion - Viking District No. 4 Bleeder Shaft Area':

> On behalf of Tennessee Valley Authority (TVA), HDR Engineering, Inc (HDR) is conducting a biological resources survey which included a wetlands and waters delineation, vegetation assessment, and wildlife assessment for a portion of the Sugar Camp North Mine Expansion Project (Project), a proposed bleeder shaft (Viking District No. 4) located on approximately 91 acres in Hamilton County, Illinois (Study Area).

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.1123324,-88.64263317034363,14z

DETERMINATION KEY RESULT

Based on the answers provided, the proposed Action is consistent with a determination of "may affect, but not likely to adversely affect" for the Endangered northern long-eared bat (*Myotis septentrionalis*).

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

   Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

   No

2. The action area does not overlap with an area for which U.S. Fish and Wildlife Service currently has data to support the presumption that the northern long-eared bat is present. Are you aware of other data that indicates that northern long-eared bats (NLEB) are likely to be present in the action area?

   Bat occurrence data may include identification of NLEBs in hibernacula, capture of NLEBs, tracking of NLEBs to roost trees, or confirmed NLEB acoustic detections. Data on captures, roost tree use, and acoustic detections should post-date the year when white-nose syndrome was detected in the relevant state. With this question, we are looking for data that, for some reason, may have not yet been made available to U.S. Fish and Wildlife Service.

   No

3. Does any component of the action involve construction or operation of wind turbines?

   Note: For federal actions, answer 'yes' if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.).

   No

4. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

   Yes

5. Is the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), or Federal Transit Administration (FTA) funding or authorizing the proposed action, in whole or in part?

   No

6. Are you an employee of the federal action agency or have you been officially designated in writing by the agency as its designated non-federal representative for the purposes of Endangered Species Act Section 7 informal consultation per 50 CFR § 402.08?

   Note: This key may be used for federal actions and for non-federal actions to facilitate section 7 consultation and to help determine whether an incidental take permit may be needed, respectively. This question is for information purposes only.

   No

7. Is the lead federal action agency the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC)? Is the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC) funding or authorizing the proposed action, in whole or in part?

   No

8. Is the lead federal action agency the Federal Energy Regulatory Commission (FERC)?

   No

9. Have you determined that your proposed action will have no effect on the northern long-eared bat? Remember to consider the effects of any activities that would not occur but for the proposed action.

   If you think that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, answer “No” below and continue through the key. If you have determined that the northern long-eared bat does not occur in your project’s action area and/or that your project will have no effects whatsoever on the species despite the potential for it to occur in the action area, you may make a “no effect” determination for the northern long-eared bat.

   Note: Federal agencies (or their designated non-federal representatives) must consult with USFWS on federal agency actions that may affect listed species [50 CFR 402.14(a)]. Consultation is not required for actions that will not affect listed species or critical habitat. Therefore, this determination key will not provide a consistency or verification letter for actions that will not affect listed species. If you believe that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, please answer “No” and continue through the key. Remember that this key addresses only effects to the northern long-eared bat. Consultation with USFWS would be required if your action may affect another listed species or critical habitat. The definition of Effects of the Action can be found here: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

   No

10. [Semantic] Is the action area located within 0.5 miles of a known northern long-eared bat hibernaculum?

    Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

    Automatically answered
    No

11. Does the action area contain any caves (or associated sinkholes, fissures, or other karst features), mines, rocky outcroppings, or tunnels that could provide habitat for hibernating northern long-eared bats?

    No

12. Does the action area contain or occur within 0.5 miles of (1) talus or (2) anthropogenic or naturally formed rock crevices in rocky outcrops, rock faces or cliffs?

    No

13. Is suitable summer habitat for the northern long-eared bat present within 1000 feet of project activities?
    (If unsure, answer "Yes.")

    Note: If there are trees within the action area that are of a sufficient size to be potential roosts for bats (i.e., live trees and/or snags ≥3 inches (12.7 centimeter) dbh), answer "Yes". If unsure, additional information defining suitable summer habitat for the northern long-eared bat can be found at: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

    Yes

14. Will the action cause effects to a bridge?

    No

15. Will the action result in effects to a culvert or tunnel?

    No

16. Does the action include the intentional exclusion of northern long-eared bats from a building or structure?

    Note: Exclusion is conducted to deny bats' entry or reentry into a building. To be effective and to avoid harming bats, it should be done according to established standards. If your action includes bat exclusion and you are unsure whether northern long-eared bats are present, answer "Yes." Answer "No" if there are no signs of bat use in the building/structure. If unsure, contact your local U.S. Fish and Wildlife Services Ecological Services Field Office to help assess whether northern long-eared bats may be present. Contact a Nuisance Wildlife Control Operator (NWCO) for help in how to exclude bats from a structure safely without causing harm to the bats (to find a NWCO certified in bat standards, search the Internet using the search term "National Wildlife Control Operators Association bats"). Also see the White-Nose Syndrome Response Team's guide for bat control in structures

    No

17. Does the action involve removal, modification, or maintenance of a human-made structure (barn, house, or other building) **known or suspected to contain roosting bats?**

    No

18. Will the action directly or indirectly cause construction of one or more new roads that are open to the public?

    Note: The answer may be yes when a publicly accessible road either (1) is constructed as part of the proposed action or (2) would not occur but for the proposed action (i.e., the road construction is facilitated by the proposed action but is not an explicit component of the project).

    No

19. Will the action include or cause any construction or other activity that is reasonably certain to increase average daily traffic on one or more existing roads?

    Note: For federal actions, answer ‘yes’ when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.). .

    No

20. Will the action include or cause any construction or other activity that is reasonably certain to increase the number of travel lanes on an existing thoroughfare?

    For federal actions, answer ‘yes’ when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

    No

21. Will the proposed action involve the creation of a new water-borne contaminant source (e.g., leachate pond pits containing chemicals that are not NSF/ANSI 60 compliant)?

    No

22. Will the proposed action involve the creation of a new point source discharge from a facility other than a water treatment plant or storm water system?

    No

23. Will the action include drilling or blasting?

    No

24. Will the action involve military training (e.g., smoke operations, obscurant operations, exploding munitions, artillery fire, range use, helicopter or fixed wing aircraft use)?

    No

25. Will the proposed action involve the use of herbicides or pesticides other than herbicides (e.g., fungicides, insecticides, or rodenticides)?

    No

26. Will the action include or cause activities that are reasonably certain to cause chronic nighttime noise in suitable summer habitat for the northern long-eared bat? Chronic noise is noise that is continuous or occurs repeatedly again and again for a long time.

    Note: Additional information defining suitable summer habitat for the northern long-eared bat can be found at: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

    No

27. Does the action include, or is it reasonably certain to cause, the use of artificial lighting within 1000 feet of suitable northern long-eared bat roosting habitat?

    Note: Additional information defining suitable roosting habitat for the northern long-eared bat can be found at: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

    No

28. Will the action include tree cutting or other means of knocking down or bringing down trees, tree topping, or tree trimming?

    Yes

29. Has a presence/probable absence summer bat survey targeting the northern long-eared bat following the Service's Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines been conducted within the project area? If unsure, answer "No."

    No

30. Does the action include emergency cutting or trimming of hazard trees in order to remove an imminent threat to human safety or property? See hazard tree note at the bottom of the key for text that will be added to response letters

    Note: A "hazard tree" is a tree that is an immediate threat to lives, public health and safety, or improved property and has a diameter breast height of six inches or greater.

    No

31. Are any of the trees proposed for cutting or other means of knocking down, bringing down, topping, or trimming suitable for northern long-eared bat roosting (i.e., live trees and/or snags ≥3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities)?

    Yes

32. [Semantic] Does your project intersect a known sensitive area for the northern long-eared bat?

    Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your state agency or USFWS field office

    Automatically answered
    No

33. Will all tree cutting/trimming or other knocking or bringing down of trees be restricted to the inactive season for the northern long-eared bat?

    Note: Inactive Season dates for summer habitat outside of staging and swarming areas can be found here: https://www.fws.gov/media/inactive-season-dates-swarming-and-staging-areas.

    Yes

34. Will the action cause trees to be cut, knocked down, or otherwise brought down across an area greater than 10 acres?

    No

35. Will the action cause trees to be cut, knocked down, or otherwise brought down in a way that would fragment a forested connection (e.g., tree line) between two or more forest patches of at least 5 acres?

    The forest patches may consist of entirely contiguous forest or multiple forested areas that are separated by less than 1000’ of non-forested area. A project will fragment a forested connection if it creates an unforested gap of greater than 1000’.

    No

36. Will the action result in the use of prescribed fire?

    No

37. Will the action cause noises that are louder than ambient baseline noises within the action area?

    No

PROJECT QUESTIONNAIRE

Enter the extent of the action area (in acres) from which trees will be removed - round up to the nearest tenth of an acre. For this question, include the entire area where tree removal will take place, even if some live or dead trees will be left standing.

10

In what extent of the area (in acres) will trees be cut, knocked down, or trimmed during the inactive (hibernation) season for northern long-eared bat? **Note:** Inactive Season dates for spring staging/fall swarming areas can be found here: https://www.fws.gov/media/inactive-season-dates-swarming-and-staging-areas

10

In what extent of the area (in acres) will trees be cut, knocked down, or trimmed during the active (non-hibernation) season for northern long-eared bat? **Note:** Inactive Season dates for spring staging/fall swarming areas can be found here: https://www.fws.gov/media/inactive-season-dates-swarming-and-staging-areas

0

Will all potential northern long-eared bat (NLEB) roost trees (trees ≥3 inches diameter at breast height, dbh) be cut, knocked, or brought down from any portion of the action area greater than or equal to 0.1 acre? If all NLEB roost trees will be removed from multiple areas, select 'Yes' if the cumulative extent of those areas meets or exceeds 0.1 acre.

Yes

Enter the extent of the action area (in acres) from which all potential NLEB roost trees will be removed. If all NLEB roost trees will be removed from multiple areas, entire the total extent of those areas. Round up to the nearest tenth of an acre.

10

For the area from which all potential northern long-eared bat (NLEB) roost trees will be removed, on how many acres (round to the nearest tenth of an acre) will trees be allowed to regrow? Enter '0' if the entire area from which all potential NLEB roost trees are removed will be developed or otherwise converted to non-forest for the foreseeable future.

0

Will any snags (standing dead trees) ≥3 inches dbh be left standing in the area(s) in which all northern long-eared bat roost trees will be cut, knocked down, or otherwise brought down?

Yes

Will all project activities by completed by April 1, 2024?

No

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Brittany Schweiger
Address: 401 S 18th St.
City: St. Louis
State: MO
Zip: 63103
Email brittany.schweiger@hdrinc.com
Phone: 3144258353

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Tennessee Valley Authority

EcoCAT
Ecological Compliance Assessment Tool

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Applicant: Tennessee Valley Authority
Contact: Brittany Schweiger
Address: 400 WEST SUMMIT HILL DRIVE
KNOXVILLE, TN 37902

IDNR Project Number: 2406660
Date: 11/08/2023

Project: Sugar Camp North Mine Expansion Project
Address: 3409 County Road 1400 North, McLeansboro

Description: On behalf of Tennessee Valley Authority (TVA), HDR Engineering, Inc is conducting a biological resources survey which included a wetlands and waters delineation, vegetation assessment, and wildlife assessment for a portion of the Sugar Camp North Mine Expansion Project (Project), a proposed bleeder shaft (Viking District No. 4) located on approximately 91 acres in Hamilton County, Illinois (Study Area). Sugar Camp proposes to expand its underground longwall mining operations at Sugar Camp Mine No. 1 in Franklin, Hamilton, and Jefferson counties, Illinois, by approximately 22,414 acres (the project area). TVA-owned coal reserves underlie approximately 21,868 acres of the project area. The purpose of the proposed action is to implement the terms of the existing coal lease agreement between TVA and Sugar Camp. As part of that agreement, TVA reserved the right of review and approval of Sugar Camp's mining activities of TVA-owned coal. Sugar Camp would also construct approximately six bleeder ventilation shafts and install associated utilities needed to operate the bleeder shafts within the project area.

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

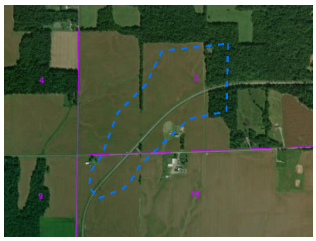
The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Hamilton

Township, Range, Section:
5S, 5E, 3
5S, 5E, 10



IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Government Jurisdiction
Other

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

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1. The IDNR EcoCAT website was developed so that units of local government, state agencies and the public could request information or begin natural resource consultations on-line for the Illinois Endangered Species Protection Act, Illinois Natural Areas Preservation Act, and Illinois Interagency Wetland Policy Act. EcoCAT uses databases, Geographic Information System mapping, and a set of programmed decision rules to determine if proposed actions are in the vicinity of protected natural resources. By indicating your agreement to the Terms of Use for this application, you warrant that you will not use this web site for any other purpose.

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Privacy

EcoCAT generates a public record subject to disclosure under the Freedom of Information Act. Otherwise, IDNR uses the information submitted to EcoCAT solely for internal tracking purposes.

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Appendix D – USACE APT

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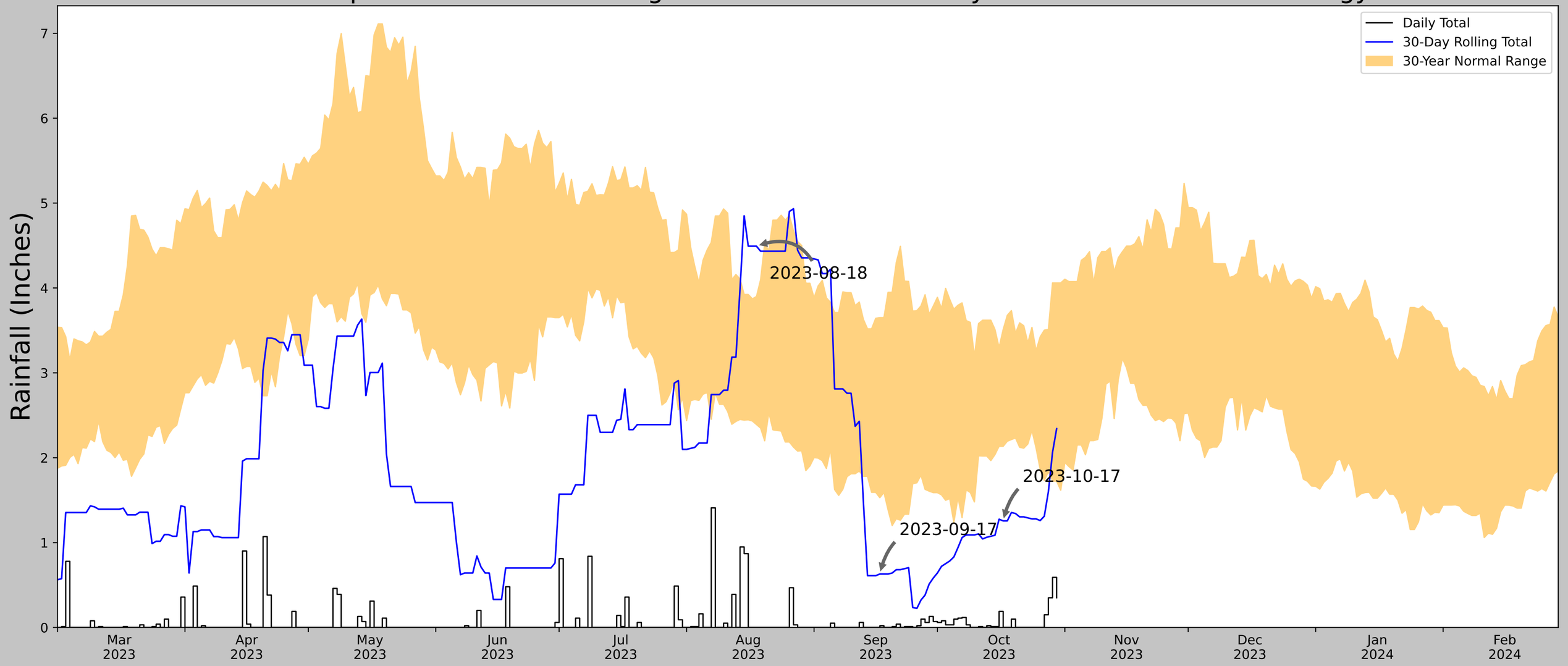
Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	38.112815, -88.642385
Observation Date	2023-10-17
Elevation (ft)	552.205
Drought Index (PDSI)	Mild drought (2023-09)
WebWIMP H_2O Balance	Wet Season

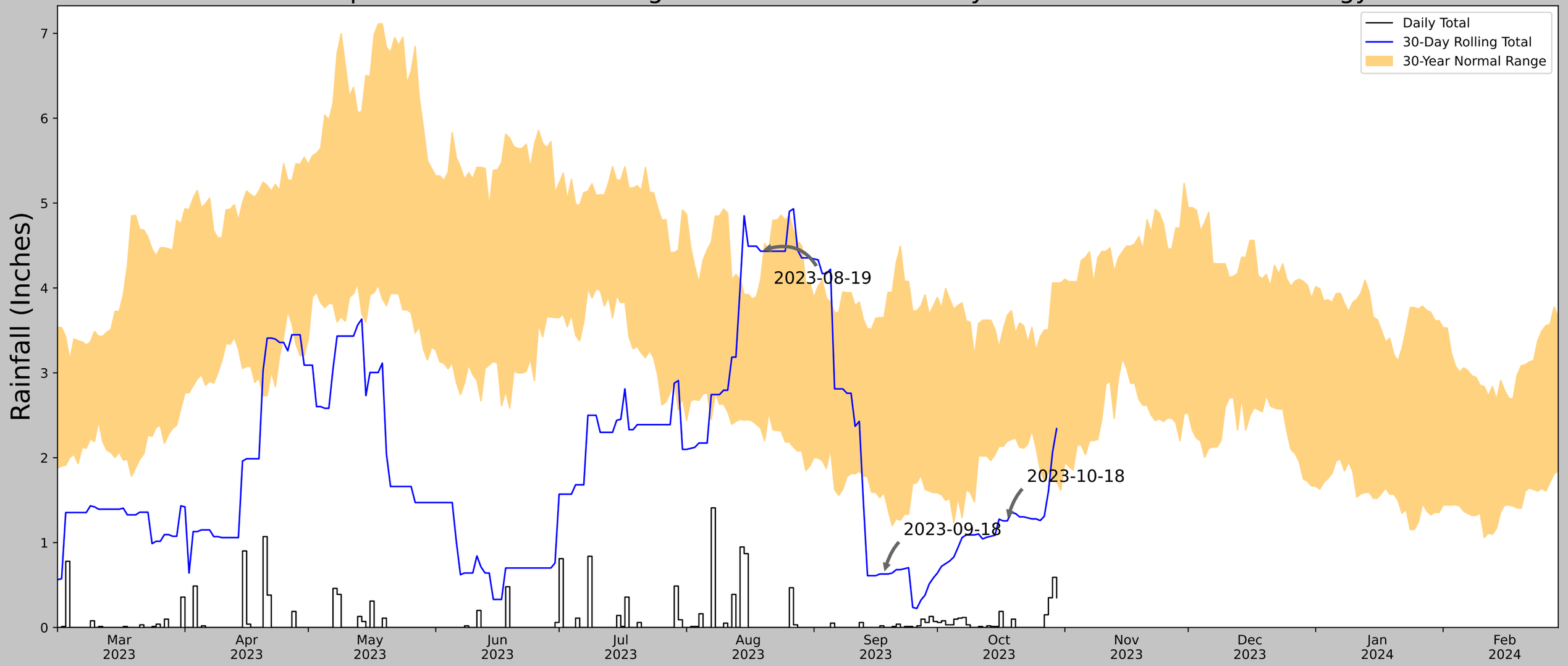
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-10-17	2.134646	3.511417	1.255906	Dry	1	3	3
2023-09-17	1.529134	3.651181	0.629921	Dry	1	2	2
2023-08-18	2.390945	3.899606	4.492126	Wet	3	1	3
Result							Drier than Normal - 8

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MT VERNON 3 NE	38.3619, -88.8597	490.157	20.863	62.048	10.683	11066	80
MOUNT VERNON 4.2 NE	38.363, -88.8597	513.123	0.076	22.966	0.036	16	0
MOUNT VERNON 1.3 SW	38.3052, -88.9289	521.982	5.423	31.825	2.613	163	0
DIX 2.0 ENE	38.4528, -88.908	573.163	6.803	83.006	3.626	47	9
MOUNT VERNON 5.2 SSW	38.2503, -88.9527	488.845	9.213	1.312	4.158	32	0
DIX	38.4628, -88.9433	602.034	8.312	111.877	4.67	9	0
BELLE RIVE 1.7 NNE	38.2558, -88.7299	458.005	10.162	32.152	4.9	16	1
WALTONVILLE 3.4 WSW	38.1865, -89.0913	515.092	17.455	24.935	8.29	2	0
REND LAKE DAM	38.0406, -88.9883	455.053	23.272	35.104	11.289	1	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	38.112815, -88.642385
Observation Date	2023-10-18
Elevation (ft)	552.205
Drought Index (PDSI)	Mild drought (2023-09)
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-10-18	2.194095	3.677953	1.255906	Dry	1	3	3
2023-09-18	1.592126	3.651181	0.629921	Dry	1	2	2
2023-08-19	2.349606	4.096457	4.433071	Wet	3	1	3
Result							Drier than Normal - 8

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MT VERNON 3 NE	38.3619, -88.8597	490.157	20.863	62.048	10.683	11066	80
MOUNT VERNON 4.2 NE	38.363, -88.8597	513.123	0.076	22.966	0.036	16	0
MOUNT VERNON 1.3 SW	38.3052, -88.9289	521.982	5.423	31.825	2.613	163	0
DIX 2.0 ENE	38.4528, -88.908	573.163	6.803	83.006	3.626	47	9
MOUNT VERNON 5.2 SSW	38.2503, -88.9527	488.845	9.213	1.312	4.158	32	0
DIX	38.4628, -88.9433	602.034	8.312	111.877	4.67	9	0
BELLE RIVE 1.7 NNE	38.2558, -88.7299	458.005	10.162	32.152	4.9	16	1
WALTONVILLE 3.4 WSW	38.1865, -89.0913	515.092	17.455	24.935	8.29	2	0
REND LAKE DAM	38.0406, -88.9883	455.053	23.272	35.104	11.289	1	0

E

Appendix E – USACE Wetland Determination, HD, TVARAM, and USFWS Phase I Habitat Forms

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USACE Wetland Determination Data Forms

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Sugar Camp Viking District 4 City/County: McLeansboro, Hamilton Sampling Date: 2023-10-17

Applicant/Owner: Tennessee Valley Authority State: IL Sampling Point: W001_W

Investigator(s): Brittany Schweiger and Levi Reed Section, Township, Range: 5S, 5E, 03

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 3 Lat: 38.11425743 Long: -88.6379448 Datum: WGS84

Soil Map Unit Name: Bluford silt loam, 2 to 5 percent slopes, eroded NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation____ , Soil____ , or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation____ , Soil____ , or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:
Wetland data point for W001, a forested wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 50)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	15	Yes	OBL
2. *Juglans nigra*	1	No	FACU
3. *Fraxinus americana*	3	No	FACU
4.			
5.			
	19	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Phragmites australis*	70	Yes	FACW
2. *Campsis radicans*	5	No	FACU
3. *Eupatorium perfoliatum*	8	No	OBL
4. *Symphyotrichum lateriflorum*	5	No	FACW
5. *Persicaria longiseta*	3	No	FAC
6.			
7.			
8.			
9.			
10.			
	91	=Total Cover	
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	23	x 1 =	23
FACW species	75	x 2 =	150
FAC species	3	x 3 =	9
FACU species	9	x 4 =	36
UPL species	0	x 5 =	0
Column Totals	110 (A)		218 (B)

Prevalence Index = B/A = 1.98

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W001_W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5Y 5/2	95	10YR 5/6	5	C	PL	Sandy	Prominent redox concentrations
12-18	10YR 6/1	70	10YR 5/4	30	C	M	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Sugar Camp Viking District 4 City/County: McLeansboro, Hamilton Sampling Date: 2023-10-17

Applicant/Owner: Tennessee Valley Authority State: IL Sampling Point: W001_U

Investigator(s): Brittany Schweiger and Levi Reed Section, Township, Range: 5S, 5E, 03

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): None

Slope (%): 3 Lat: 38.11431941 Long: -88.6378119 Datum: WGS84

Soil Map Unit Name: Bluford silt loam, 2 to 5 percent slopes, eroded NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation____ , Soil____ , or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation____ , Soil____ , or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
Upland data point associated with W001

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 50)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juglans nigra*	5	Yes	FACU
2. *Carya glabra*	2	Yes	FACU
3.			
4.			
5.			
	7	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Morus rubra*	30	Yes	FACU
2.			
3.			
4.			
5.			
	30	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Ageratina altissima*	7	No	FACU
2. *Campsis radicans*	5	No	FACU
3. *Phytolacca americana*	3	No	FACU
4. *Symphyotrichum lateriflorum*	25	Yes	FACW
5. *Rubus argutus*	10	No	FAC
6. *Panicum dichotomiflorum*	35	Yes	FACW
7. *Lonicera japonica*	5	No	FACU
8.			
9.			
10.			
	90	=Total Cover	
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	60	x 2 =	120
FAC species	10	x 3 =	30
FACU species	57	x 4 =	228
UPL species	0	x 5 =	0
Column Totals	127 (A)		378 (B)

Prevalence Index = B/A = 2.98

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W001_U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 5/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Sugar Camp Viking District 4 City/County: McLeansboro, Hamilton Sampling Date: 2023-10-17

Applicant/Owner: Tennessee Valley Authority State: IL Sampling Point: W002_W

Investigator(s): Brittany Schweiger and Levi Reed Section, Township, Range: 5S, 5E, 03

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 3 Lat: 38.11562734 Long: -88.6396306 Datum: WGS84

Soil Map Unit Name: Bluford silt loam, 2 to 5 percent slopes, eroded NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation X , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:
Farmed wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 50)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Zea mays*	50	Yes	UPL
2. *Echinochloa crus-galli*	20	Yes	FACW
3. *Eleusine indica*	10	No	FACU
4. *Ambrosia artemisiifolia*	5	No	FACU
5. *Amaranthus tuberculatus*	5	No	OBL
6. *Panicum virgatum*	10	No	FAC
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	20	x 2 =	40
FAC species	10	x 3 =	30
FACU species	15	x 4 =	60
UPL species	50	x 5 =	250
Column Totals	100 (A)		385 (B)

Prevalence Index = B/A = 3.85

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (Include photo numbers here or on a separate sheet.)
Within corn field.

SOIL

Sampling Point: W002_W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 5/3	100					Loamy/Clayey	
3-18	10YR 6/2	85	7.5YR 5/6	15	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Sugar Camp Viking District 4 City/County: McLeansboro, Hamilton Sampling Date: 2023-10-17

Applicant/Owner: Tennessee Valley Authority State: IL Sampling Point: W002_U

Investigator(s): Brittany Schweiger and Levi Reed Section, Township, Range: 5S, 5E, 03

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): None

Slope (%): 3 Lat: 38.1157622 Long: -88.639562 Datum: WGS84

Soil Map Unit Name: Bluford silt loam, 2 to 5 percent slopes, eroded NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation X , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
Upland data point associated with W002.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 50)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Packera glabella*	10	No	FACW
2. *Poa annua*	60	Yes	FACU
3. *Zea mays*	40	Yes	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	110 =Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	60	x 4 =	240
UPL species	40	x 5 =	200
Column Totals	110 (A)		460 (B)

Prevalence Index = B/A = 4.18

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Within corn field.

SOIL

Sampling Point: W002_U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 5/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Sugar Camp Viking District 4 City/County: McLeansboro, Hamilton Sampling Date: 2023-10-18

Applicant/Owner: Tennessee Valley Authority State: IL Sampling Point: W003_W

Investigator(s): Brittany Schweiger and Levi Reed Section, Township, Range: 5S, 5E, 03

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 2 Lat: 38.11190484 Long: -88.6421365 Datum: WGS84

Soil Map Unit Name: Water NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation____ , Soil____ , or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation____ , Soil____ , or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:
Wetland data point for W003, a fringing wetland around a manmade pond.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 50)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Salix discolor*	35	Yes	FACW
2.			
3.			
4.			
5.			
	35 =Total Cover		
Herb Stratum (Plot size: 5)			
1. *Eleocharis obtusa*	30	Yes	OBL
2. *Leersia oryzoides*	30	Yes	OBL
3. *Symphyotrichum lanceolatum*	2	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	62 =Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 60	x 1 = 60
FACW species 35	x 2 = 70
FAC species 2	x 3 = 6
FACU species 0	x 4 = 0
UPL species 0	x 5 = 0
Column Totals 97 (A)	136 (B)

Prevalence Index = B/A = 1.40

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W003_W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 5/4	100					Sandy	
3-10	10YR 6/1	70	10YR 4/6	25	C	M	Loamy/Clayey	Prominent redox concentrations
10-18	10YR 6/1	60	10YR 4/6	40	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
In matrix, 10YR 5/3 5% loamy/clayey

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Sugar Camp Viking District 4 City/County: McLeansboro, Hamilton Sampling Date: 2023-10-18

Applicant/Owner: Tennessee Valley Authority State: IL Sampling Point: W003_U

Investigator(s): Brittany Schweiger and Levi Reed Section, Township, Range: 5S, 5E, 03

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): None

Slope (%): 2 Lat: 38.11196426 Long: -88.6421723 Datum: WGS84

Soil Map Unit Name: Bluford silt loam, 2 to 5 percent slopes, eroded NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation____ , Soil____ , or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation____ , Soil____ , or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
Upland data point associated with W003.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 50)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Taxodium distichum*	3	No	OBL
2.			
3.			
4.			
5.			
	3 =Total Cover		
Herb Stratum (Plot size: 5)			
1. *Zea mays*	50	Yes	UPL
2. *Eleusine indica*	20	Yes	FACU
3. *Setaria pumila*	5	No	FAC
4. *Andropogon virginicus*	20	Yes	FACU
5. *Taraxacum officinale*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	3	x 1 =	3
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	45	x 4 =	180
UPL species	50	x 5 =	250
Column Totals	103 (A)		448 (B)

Prevalence Index = B/A = 4.35

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
On edge of cornfield and mowed lawn.

SOIL

Sampling Point: W003_U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 5/3	95	10YR 4/6	5	C	M	Loamy/Clayey	Distinct redox concentrations
10-18	10YR 6/2	90	10YR 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Sugar Camp Viking District 4 City/County: McLeansboro, Hamilton Sampling Date: 2023-10-17

Applicant/Owner: Tennessee Valley Authority State: IL Sampling Point: UP001

Investigator(s): Brittany Schweiger and Levi Reed Section, Township, Range: 5S, 5E, 10

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): None

Slope (%): 1 Lat: 38.10981428 Long: -88.6456203 Datum: WGS84

Soil Map Unit Name: Wynoose silt loam, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation X, Soil X, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes No X
Hydric Soil Present? Yes No X
Wetland Hydrology Present? Yes No X

Is the Sampled Area within a Wetland? **Yes** **No** X

Remarks:
Upland data point in corn field next to railroad tracks. Some gravel fill present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 50)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Zea mays*	95	Yes	UPL
2. *Packera glabella*	2	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	97 =Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	2	x 2 =	4
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	95	x 5 =	475
Column Totals	97 (A)		479 (B)

Prevalence Index = B/A = 4.94

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: UP001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 5/3	90					Loamy/Clayey	10% grave lfill
6-10	2.5Y 6/3	98	10YR 5/8	2	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? Yes ____ No X Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Sugar Camp Viking District 4 City/County: McLeansboro, Hamilton Sampling Date: None

Applicant/Owner: Tennessee Valley Authority State: IL Sampling Point: UP002

Investigator(s): Brittany Schweiger and Levi Reed Section, Township, Range: 5S, 5E, 10

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): None

Slope (%): 1 Lat: 38.1099317 Long: -88.6444651 Datum: WGS84

Soil Map Unit Name: Wynoose silt loam, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation X , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No ____
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
Upland area within crop field.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 50)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Zea mays*	95	Yes	UPL
2. *Packera glabella*	5	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	95	x 5 =	475
Column Totals	100 (A)		485 (B)

Prevalence Index = B/A = 4.85

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: UP002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-24	10YR 5/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Sugar Camp Viking District 4 City/County: McLeansboro, Hamilton Sampling Date: 2023-10-17

Applicant/Owner: Tennessee Valley Authority State: IL Sampling Point: UP003

Investigator(s): Brittany Schweiger and Levi Reed Section, Township, Range: 5S, 5E, 03

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): None

Slope (%): 3 Lat: 38.11430736 Long: -88.6412076 Datum: WGS84

Soil Map Unit Name: Bluford silt loam, 2 to 5 percent slopes NWI classification: PUBGh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation X , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
Upland area within crop field.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 50)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Zea mays*	95	Yes	UPL
2. *Packera glabella*	5	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	95	x 5 =	475
Column Totals	100 (A)		485 (B)

Prevalence Index = B/A = 4.85

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: UP003

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 5/2	98	10YR 5/6	2	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Midwest Region
See ERDC/EL TR-10-16; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Sugar Camp Viking District 4 City/County: McLeansboro, Hamilton Sampling Date: 2023-10-18

Applicant/Owner: Tennessee Valley Authority State: IL Sampling Point: UP004

Investigator(s): Brittany Schweiger and Levi Reed Section, Township, Range: 5S, 5E, 03

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): None

Slope (%): 0 Lat: 38.11224935 Long: -88.6413559 Datum: WGS84

Soil Map Unit Name: Bluford silt loam, 2 to 5 percent slopes, eroded NWI classification: PUBFh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation X , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland area within crop field.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 50)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5)			
1. *Zea mays*	95	Yes	UPL
2. *Packera glabella*	5	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	95	x 5 =	475
Column Totals	100 (A)		485 (B)

Prevalence Index = B/A = 4.85

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: UP004

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 5/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

TVA HD
Data Forms

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : S001
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: In forested area north of the railroad at the eastern project boundary.	
HUC (12 digit): 051201150404	Lat/Long:
Previous Rainfall (7-days) : 0.00 in	38.11427 -88.63798
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 7472.91 acres	County: Hamilton
Soil Type(s) / Geology : Ava silt loam, 5 to 10 percent slopes, eroded	Source: USDA NRCS
Surrounding Land Use : Forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) = 19.5

Justification / Notes :

Intermittent stream through deciduous forest. 5' OHWM, 3' top of bank, sand/gravel substrate. No water present.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 9)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 7)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 19.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : S002
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: In forested area south of the railroad at the eastern project boundary.	
HUC (12 digit): 051201150404	Lat/Long:
Previous Rainfall (7-days) : 0.00 in	38.11286 -88.63839
Precipitation this Season vs. Normal : abnormally wet elevated average **[low]** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 7472.91 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam, 2 to 5 percent slopes, eroded	Source: USDA NRCS
Surrounding Land Use : Forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) = 19.5

Justification / Notes :

Intermittent stream through deciduous forest. 5' OHWM, 3' top of bank, sand/gravel substrate. No water present.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 9)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 7)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 19.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E001
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: North of CR 1400 North Rd and west of CR 350 East Rd	
HUC (12 digit): 071401060401	Lat/Long: 38.108936 -88.64642
Previous Rainfall (7-days) : 0.00 in	
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 16863.32 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam and Wynoose silt loam	Source: USDA NRCS
Surrounding Land Use : Agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 9.5

Justification / Notes :

Ephemeral with defined bed and bank. Sandy substrate, top of bank height 2', OHWM 2', no water present.

Linear roadside drainage ditch.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E002
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: South of CR 1400 North Rd and west of the railroad track	
HUC (12 digit): 071401060401	Lat/Long: 38.110045 -88.64740
Previous Rainfall (7-days) : 0.00 in	
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 16863.32 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam and Wynoose silt loam	Source: USDA NRCS
Surrounding Land Use : Agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 9.5

Justification / Notes :

Ephemeral with defined bed and bank. Sandy substrate, top of bank height 1', OHWM 2', no water present.

Linear roadside drainage ditch.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E003
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: North of CR 1400 North Rd, west of the railroad track and CR 350 E	
HUC (12 digit): 071401060401	Lat/Long: 38.110117 -88.64738
Previous Rainfall (7-days) : 0.00 in	
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 16863.32 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam and Wynoose silt loam	Source: USDA NRCS
Surrounding Land Use : Agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 10

Justification / Notes :

Ephemeral with defined bed and bank. Sandy substrate, top of bank height 2', OHWM 2', no water present.

Linear roadside drainage ditch.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E004
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: East of railroad track and south of CR 1400 North Rd	
HUC (12 digit): 071401060401	Lat/Long:
Previous Rainfall (7-days) : 0.00 in	38.108881 -88.64629
Precipitation this Season vs. Normal : abnormally wet elevated average **[ow]** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 16863.32 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam and Wynoose silt loam	Source: USDA NRCS
Surrounding Land Use : Agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 9.5

Justification / Notes :

Ephemeral with defined bed and bank. Sandy substrate, top of bank height 2', OHWM 2', no water present.

Linear roadside drainage ditch.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E005
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: South of CR 1400 North Rd and east of the railroad track	
HUC (12 digit): 071401060401	Lat/Long: 38.110139 -88.64305
Previous Rainfall (7-days) : 0.00 in	
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 16863.32 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam and Wynoose silt loam	Source: USDA NRCS
Surrounding Land Use : Agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 9.5

Justification / Notes :

Ephemeral with defined bed and bank. Sandy substrate, top of bank height 1', OHWM 2', no water present.

Linear roadside drainage ditch.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E006
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: South of CR 1400 North Rd and east of the railroad track	
HUC (12 digit): 071401060401	Lat/Long: 38.110225 -88.64294
Previous Rainfall (7-days) : 0.00 in	
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 16863.32 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam and Wynoose silt loam	Source: USDA NRCS
Surrounding Land Use : Agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 9.5

Justification / Notes :

Ephemeral with defined bed and bank. Sandy substrate, top of bank height 1', OHWM 2', no water present.

Linear roadside drainage ditch.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E007
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: East of railroad track, north of CR 1400 North Rd, and west of CR 350 East Rd	
HUC (12 digit): 071401060401	Lat/Long:
Previous Rainfall (7-days) : 0.00 in	38.110537 -88.64432
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 16863.32 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam and Wynoose silt loam	Source: USDA NRCS
Surrounding Land Use : Agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 9.5

Justification / Notes :

Ephemeral with defined bed and bank. Sandy substrate, top of bank height 2', OHWM 2', no water present.

Linear roadside drainage ditch.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E008
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: south of railroad track and west of CR 350 East Rd.	
HUC (12 digit): 071401060401	Lat/Long:
Previous Rainfall (7-days) : 0.00 in	38.11340 -88.63994
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 16863.32 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam, 2 to 5 percent slopes	Source: USDA NRCS
Surrounding Land Use : Agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight **Absent**	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

Erosional rills from cultivated field downslope to railroad edge.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E009
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: south of railroad track and east of CR 350 East Rd.	
HUC (12 digit): 051201150404	Lat/Long:
Previous Rainfall (7-days) : 0.00 in	38.11352 -88.63958
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 7472.91 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam, 2 to 5 percent slopes	Source: USDA NRCS
Surrounding Land Use : Agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight **Absent**	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) =

Justification / Notes :

Erosional rills from cultivated field downslope to railroad edge.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E010
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: north of CR 1400 North Rd and railroad track; crosses CR 350 East Rd.	
HUC (12 digit): 051201150404 and 071401060401	Lat/Long: 38.113015 -88.64129
Previous Rainfall (7-days) : 0.00 in	
Precipitation this Season vs. Normal : abnormally wet elevated average [low] abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 7472.91 acres and 16863.32 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam and Ava silt loam	Source: USDA NRCS
Surrounding Land Use : Forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe [Moderate] Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 12

Justification / Notes :

Ephemeral with defined bed and bank. 2' OHWM, 2' top of bank, sandy substrate. No water present.

Linear roadside drainage ditch. Flows under CR 350 East Rd via culvert.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E011
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: In agricultural field north of CR 1400 North Rd and west of CR 350 East Rd.	
HUC (12 digit): 051201150404	Lat/Long:
Previous Rainfall (7-days) : 0.00 in	38.11574 -88.63957
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 7472.91 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam, 2 to 5 percent slopes, eroded	Source: USDA NRCS
Surrounding Land Use : Forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 10

Justification / Notes :

Drainage within cultivated field. 1' wide, 50 top of bank, mud substrate. No water present.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 1)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E012
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: In forested area at the northeastern project boundary.	
HUC (12 digit): 051201150404	Lat/Long:
Previous Rainfall (7-days) : 0.00 in	38.11587 -88.63828
Precipitation this Season vs. Normal : abnormally wet elevated average **[low]** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 7472.91 acres	County: Hamilton
Soil Type(s) / Geology : Ava silt loam, 5 to 10 percent slopes, eroded	Source: USDA NRCS
Surrounding Land Use : Forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **[Moderate]** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 11.5

Justification / Notes :

Ephemeral through deciduous forest. 3' OHWM, 5' top of bank, mud substrate. No water present.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E013
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: south of railroad track and east of CR 350 East Rd.	
HUC (12 digit): 051201150404	Lat/Long: 38.113023 -88.63817
Previous Rainfall (7-days) : 0.00 in	
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 7472.91 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam and Ava silt loam	Source: USDA NRCS
Surrounding Land Use : Forested	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 17

Justification / Notes :

Ephemeral with defined bed and bank. 3' OHWM, 5' top of bank, mud substrate. No water present.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 17

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Opossum Creek	Date/Time: 10/17/23
Assessors/Affiliation: Brittany Schweiger and Levi Reed	Project ID : E014
Site Name/Description: Sugar Camp North Mine Expansion - Viking District #4 Bleeder Shaft	
Site Location: North of the railroad at the eastern project boundary.	
HUC (12 digit): 051201150404	Lat/Long:
Previous Rainfall (7-days) : 0.00 in	38.11414 -88.63776
Precipitation this Season vs. Normal : abnormally wet elevated average **low** abnormally dry unknown Source of recent & seasonal precip data :	
Watershed Size : 7472.91 acres	County: Hamilton
Soil Type(s) / Geology : Bluford silt loam, 2 to 5 percent slopes, eroded	Source: USDA NRCS
Surrounding Land Use : Forest and railroad right-of-way	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe **Moderate** Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	X	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet weather conveyance

Secondary Indicator Score (if applicable) = 5.5

Justification / Notes :

Erosional gully. Mud substrate, top of bank height 2', width 2', no water present.

Swale.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 1)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 0.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 4)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

TVARAM
Data Forms

TENNESSEE VALLEY AUTHOROITY RAPID ASSESSMENT MEHTOD: Assessing Wetland Condition, Functional Capacity, Quality

TVARAM FIELD FORM

Site: W001	**Rater(s):** Brittany Schweiger and Levi Reed	**Date:** 10/17/23

Metric 1. Wetland Area (size)

0 (max 6 pts.) | 0 (subtotal)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

Select one size class and assign score.

- ☐ >50 acres (>20.2 ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
- ☐ 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
- ☐ 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
- ☐ 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
- ☐ 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
- ☑ <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

Metric 2. Upland Buffers and Surrounding Land Use

11 (max 14 pts.) | 11 (subtotal)

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
- ☑ MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
- ☐ NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
- ☐ VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☑ LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
- ☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
- ☐ High. Urban, industrial, open pasture, row cropping, mining, construction (1)

Metric 3. Hydrology

16 (max 30 pts.) | 27 (subtotal)

3a. Sources of water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3) [BR/CM (5)]
- ☑ Precipitation (1) [unless BR/CM primary source (5)]
- ☐ Seasonal/intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- ☐ 100-year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☑ Part of wetland/upland (e.g., forest), complex (1)
- ☐ Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 m (27.6 in.) (3)
- ☐ 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
- ☑ <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]

3d. Duration inundation/saturation. Score one or dbl. check & avg.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3) [BR/CM (4)]
- ☐ Seasonally inundated (2) [BR/CM (4)]
- ☑ Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☑ None or none apparent (12)
- ☐ Recovered (7)
- ☐ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

☐ ditch	☐ point source (nonstormwater)
☐ tile (including culvert)	☐ filling/grading
☐ dike	☐ road bed/RR track
☐ weir	☐ dredging
☐ stormwater input	☐ other _____

Metric 4. Habitat Alteration and Development

17 (max 20 pts.) | 44 (subtotal)

4a. Substrate disturbance. Score one or double check and average.

- ☑ None or none apparent (4)
- ☐ Recovered (3)
- ☐ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☑ Moderately good (4)
- ☐ Fair (3)
- ☐ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☑ None or none apparent (9)
- ☐ Recovered (6)
- ☐ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

☐ mowing	☐ shrub/sapling removal
☐ grazing	☐ herbaceous/aquatic bed removal
☐ clearcutting	☐ woody debris removal
☐ selective cutting	☐ sedimentation
☐ farming	☐ dredging
☐ toxic pollutants	☐ nutrient enrichment

44

Site: W001	**Rater(s):** Brittany Schweiger and Levi Reed	**Date:** 10/17/23

44
subtotal previous page

0.00 (max 10 pts.) | 44 (subtotal)

Metric 5. Special Wetlands

0
raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- ☐ Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- ☐ Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- ☐ Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- ☐ Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- ☐ Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- ☐ Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- ☐ Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- ☐ Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- ☐ Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- ☐ Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- ☐ Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

4 (max 20 pts.) | 48 (subtotal)

Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- [1] Emergent
- ☐ Shrub
- [2] Forest
- ☐ Mudflats
- ☐ Open water <20 acres (8 ha)
- ☐ Moss/lichen. Other _____

Vegetation Community Cover Scale

0 =	Absent or <0.1 ha (0.25 acre) contiguous acre [For BR/CM <0.04 ha (0.1 acre)]
1 =	Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2 =	Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
3 =	Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- ☐ High (5)
- ☐ Moderately high (4) [BR/CM (5)]
- ☐ Moderate (3)[BR/CM (5)]
- ☑ Moderately low (2) [BR/CM (3)]
- ☐ Low (1) [BR/CM (2)]
- ☐ None (0)

Narrative Description of Vegetation Quality

low =	Low species diversity &/or dominance of nonnative or disturbance tolerant native species
mod =	Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
high =	A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rate, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☑ Sparse 5-25% cover (-1)
- ☐ Nearly absent <5% cover (0)
- ☐ Absent (1)

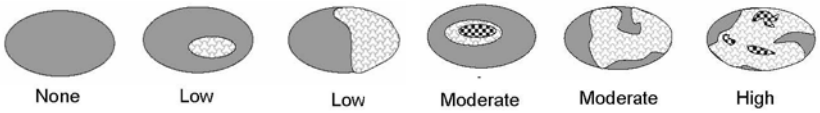
Mudflat and Open Water Class Quality

0 =	Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
1 =	Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
2 =	Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <02 ha (0.5 to 5 acre)]
3 =	High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- [0] Vegetated hummocks/tussocks
- [0] Coarse woody debris >15 cm (6 in.)
- [0] Standing dead >25 cm (10 in.) dbh
- [0] Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

0 =	Absent
1 =	Present in very small amounts or if more common of marginal quality
2 =	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3 =	Present in moderate or greater amounts and of highest quality

48 **GRAND TOTAL (max 100 pts)**

0- 29 = Category 1, low wetland function, condition, quality**
30- 59 = Category 2, good/moderate wetland function, condition, quality**
60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: http://www.epa.state.oh.us/dsw/401/401.html

TENNESSEE VALLEY AUTHOROITY RAPID ASSESSMENT MEHTOD: Assessing Wetland Condition, Functional Capacity, Quality

TVARAM FIELD FORM

Site: W002	**Rater(s):** Brittany Schweiger and Levi Reed	**Date:** 10/17/23

Metric 1. Wetland Area (size)

0 (max 6 pts.) | 0 (subtotal)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

Select one size class and assign score.

- ☐ >50 acres (>20.2 ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
- ☐ 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
- ☐ 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
- ☐ 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
- ☐ 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
- ☑ <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

GIS

Metric 2. Upland Buffers and Surrounding Land Use

1 (max 14 pts.) | 1 (subtotal)

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
- ☐ NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
- ☑ VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
- ☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
- ☑ High. Urban, industrial, open pasture, row cropping, mining, construction (1)

Metric 3. Hydrology

4 (max 30 pts.) | 5 (subtotal)

3a. Sources of water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3) [BR/CM (5)]
- ☑ Precipitation (1) [unless BR/CM primary source (5)]
- ☐ Seasonal/intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- ☐ 100-year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☐ Part of wetland/upland (e.g., forest), complex (1)
- ☐ Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 m (27.6 in.) (3)
- ☐ 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
- ☑ <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]

3d. Duration inundation/saturation. Score one or dbl. check & avg.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3) [BR/CM (4)]
- ☐ Seasonally inundated (2) [BR/CM (4)]
- ☑ Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☐ Recovered (7)
- ☐ Recovering (3)
- ☑ Recent or no recovery (1)

Check all disturbances observed

- ☐ ditch
- ☑ tile (including culvert)
- ☐ dike
- ☐ weir
- ☐ stormwater input
- ☐ point source (nonstormwater)
- ☐ filling/grading
- ☐ road bed/RR track
- ☐ dredging
- ☑ other row crop

Metric 4. Habitat Alteration and Development

3 (max 20 pts.) | 8 (subtotal)

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☐ Recovered (3)
- ☐ Recovering (2)
- ☑ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☐ Poor to fair (2)
- ☑ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☐ Recovered (6)
- ☐ Recovering (3)
- ☑ Recent or no recovery (1)

Check all disturbances observed

- ☐ mowing
- ☐ grazing
- ☐ clearcutting
- ☐ selective cutting
- ☑ farming
- ☐ toxic pollutants
- ☐ shrub/sapling removal
- ☐ herbaceous/aquatic bed removal
- ☐ woody debris removal
- ☐ sedimentation
- ☐ dredging
- ☐ nutrient enrichment

8

Site: W002	**Rater(s):** Brittany Schweiger and Levi Reed	**Date:** 10/17/23

8
subtotal previous page

0.00 (max 10 pts.) | 8 (subtotal)

Metric 5. Special Wetlands

0
raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- ☐ Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- ☐ Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- ☐ Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- ☐ Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- ☐ Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- ☐ Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- ☐ Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- ☐ Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- ☐ Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- ☐ Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- ☐ Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

1 (max 20 pts.) | 9 (subtotal)

Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- [1] Emergent
- ☐ Shrub
- ☐ Forest
- ☐ Mudflats
- ☐ Open water <20 acres (8 ha)
- ☐ Moss/lichen. Other _____

Vegetation Community Cover Scale

0 =	Absent or <0.1 ha (0.25 acre) contiguous acre [For BR/CM <0.04 ha (0.1 acre)]
1 =	Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2 =	Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
3 =	Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- ☐ High (5)
- ☐ Moderately high (4) [BR/CM (5)]
- ☐ Moderate (3)[BR/CM (5)]
- ☐ Moderately low (2) [BR/CM (3)]
- ☐ Low (1) [BR/CM (2)]
- ☑ None (0)

Narrative Description of Vegetation Quality

low =	Low species diversity &/or dominance of nonnative or disturbance tolerant native species
mod =	Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
high =	A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rate, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☑ Nearly absent <5% cover (0)
- ☐ Absent (1)

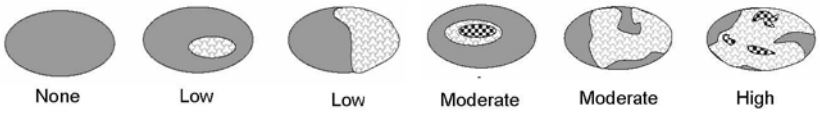
Mudflat and Open Water Class Quality

0 =	Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
1 =	Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
2 =	Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <02 ha (0.5 to 5 acre)]
3 =	High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- [0] Vegetated hummocks/tussocks
- [0] Coarse woody debris >15 cm (6 in.)
- [0] Standing dead >25 cm (10 in.) dbh
- [0] Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

0 =	Absent
1 =	Present in very small amounts or if more common of marginal quality
2 =	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3 =	Present in moderate or greater amounts and of highest quality

9
GRAND TOTAL (max 100 pts)

0- 29 = Category 1, low wetland function, condition, quality**
30- 59 = Category 2, good/moderate wetland function, condition, quality**
60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: http://www.epa.state.oh.us/dsw/401/401.html

Site: W003	**Rater(s):** Brittany Schweiger and Levi Reed	**Date:** 10/17/23

Metric 1. Wetland Area (size)

1 (max 6 pts.) | 1 (subtotal)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

Select one size class and assign score.

- ☐ >50 acres (>20.2 ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
- ☐ 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
- ☐ 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
- ☐ 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
- ☑ 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
- ☐ <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

GIS

Metric 2. Upland Buffers and Surrounding Land Use

3 (max 14 pts.) | 4 (subtotal)

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
- ☐ NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
- ☑ VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
- ☑ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
- ☐ High. Urban, industrial, open pasture, row cropping, mining, construction (1)

Metric 3. Hydrology

19. (max 30 pts.) | 23 (subtotal)

3a. Sources of water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3) [BR/CM (5)]
- ☑ Precipitation (1) [unless BR/CM primary source (5)]
- ☑ Seasonal/intermittent surface water (3)
- ☑ Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- ☐ 100-year floodplain (1)
- ☑ Between stream/lake and other human use (1)
- ☐ Part of wetland/upland (e.g., forest), complex (1)
- ☐ Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 m (27.6 in.) (3)
- ☐ 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
- ☑ <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]

3d. Duration inundation/saturation. Score one or dbl. check & avg.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3) [BR/CM (4)]
- ☐ Seasonally inundated (2) [BR/CM (4)]
- ☑ Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☑ Recovered (7)
- ☐ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

☐ ditch	☐ point source (nonstormwater)
☐ tile (including culvert)	☐ filling/grading
☑ dike	☐ road bed/RR track
☐ weir	☐ dredging
☐ stormwater input	☑ other _____

Metric 4. Habitat Alteration and Development

13 (max 20 pts.) | 36 (subtotal)

4a. Substrate disturbance. Score one or double check and average.

- ☑ None or none apparent (4)
- ☐ Recovered (3)
- ☐ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☑ Fair (3)
- ☐ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☑ Recovered (6)
- ☐ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

☑ mowing	☐ shrub/sapling removal
☐ grazing	☐ herbaceous/aquatic bed removal
☐ clearcutting	☐ woody debris removal
☐ selective cutting	☐ sedimentation
☐ farming	☐ dredging
☐ toxic pollutants	☐ nutrient enrichment

36

Site: W003	**Rater(s):** Brittany Schweiger and Levi Reed	**Date:** 10/17/23

36
subtotal previous page

0.00 (max 10 pts.) | 36 (subtotal)

Metric 5. Special Wetlands

0
raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- ☐ Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- ☐ Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- ☐ Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- ☐ Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- ☐ Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- ☐ Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- ☐ Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- ☐ Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- ☐ Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- ☐ Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- ☐ Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

Metric 6. Plant Communities, Interspersion, Microtopography

6 (max 20 pts.) | 42 (subtotal)

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- 2 Emergent
- ☐ Shrub
- ☐ Forest
- ☐ Mudflats
- ☐ Open water <20 acres (8 ha)
- ☐ Moss/lichen. Other _____

Vegetation Community Cover Scale

0 =	Absent or <0.1 ha (0.25 acre) contiguous acre [For BR/CM <0.04 ha (0.1 acre)]
1 =	Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2 =	Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
3 =	Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- ☐ High (5)
- ☐ Moderately high (4) [BR/CM (5)]
- ☐ Moderate (3)[BR/CM (5)]
- ☐ Moderately low (2) [BR/CM (3)]
- ✔ Low (1) [BR/CM (2)]
- ☐ None (0)

Narrative Description of Vegetation Quality

low =	Low species diversity &/or dominance of nonnative or disturbance tolerant native species
mod =	Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
high =	A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rate, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☐ Nearly absent <5% cover (0)
- ✔ Absent (1)

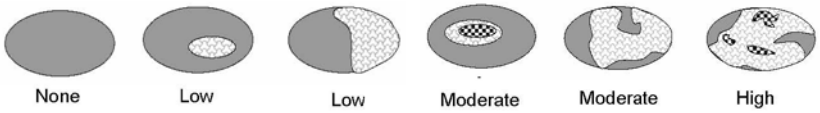
Mudflat and Open Water Class Quality

0 =	Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
1 =	Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
2 =	Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <02 ha (0.5 to 5 acre)]
3 =	High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- 0 Vegetated hummocks/tussocks
- 1 Coarse woody debris >15 cm (6 in.)
- 0 Standing dead >25 cm (10 in.) dbh
- 1 Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

0 =	Absent
1 =	Present in very small amounts or if more common of marginal quality
2 =	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3 =	Present in moderate or greater amounts and of highest quality

42
GRAND TOTAL (max 100 pts)

0- 29 = Category 1, low wetland function, condition, quality**
30- 59 = Category 2, good/moderate wetland function, condition, quality**
60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: http://www.epa.state.oh.us/dsw/401/401.html

USFWS Bat Habitat Phase I
Data Forms

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): B1

Water Resources at Sample Site				
Stream Type	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
(# and length)	0	0	0	No water features
Pools/Ponds	0	Open and accessible to bats?		
(# and size)		NA		
Wetlands	Permanent	Seasonal		
(approx. ac.)	0	0		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	10	30	50
Dominant Species of Mature Trees	Pignut hickory, White oak, Black willow		
% Trees w/ Exfoliating Bark	0	1	0
Size Composition of	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
Live Trees (%)	50	40	10
No. of Suitable Snags		3	

Standing dead trees with exfoliating bark, cracks, crevices, or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS Yes

IS THE HABITAT SUITABLE FOR NORTHERN LONG-EARED BA Yes

Additional Comments:
Large snags mid to late stage decay. Cavities along trunk and one basal cavity.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): B2

Water Resources at Sample Site				
Stream Type	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
(# and length)	0	1	0	5' wide intermittent stream. No water at time of survey
Pools/Ponds	0	Open and accessible to bats?		
(# and size)		Yes		
Wetlands	Permanent	Seasonal		
(approx. ac.)	0	0		

Forest Resources at Sample Site				
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')	
	25	10	5	
Dominant Species of Mature Trees	Shagbark hickory, Shellbark hickory, American elm			
% Trees w/ Exfoliating Bark	0	0	15	
Size Composition of	Small (3-8 in)	Med (9-15 in)	Large (>15 in)	
Live Trees (%)	20	5	75	
No. of Suitable Snags		3		

Standing dead trees with exfoliating bark, cracks, crevices, or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BAT? Yes

IS THE HABITAT SUITABLE FOR NORTHERN LONG-EARED BAT? Yes

Additional Comments:
Several large snags just outside of Study Area.

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): B3

Water Resources at Sample Site				
Stream Type	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
(# and length)	0	1	0	5' wide intermittent stream. No water at time of survey
Pools/Ponds	0	Open and accessible to bats?		
(# and size)		Yes		
Wetlands	Permanent	Seasonal		
(approx. ac.)	0	0		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	50	2	2
Dominant Species of Mature Trees	Shagbark hickory, White oak		
% Trees w/ Exfoliating Bark	0	5	5
Size Composition of	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
Live Trees (%)	10	85	5
No. of Suitable Snags		5	

Standing dead trees with exfoliating bark, cracks, crevices, or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BAT? Yes

IS THE HABITAT SUITABLE FOR NORTHERN LONG-EARED BAT? Yes

Additional Comments:
Good quality suitable for roosting & foraging

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): B4

Water Resources at Sample Site				
Stream Type	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
(# and length)	0	0	0	No water features
Pools/Ponds	0	Open and accessible to bats?		
(# and size)		NA		
Wetlands	Permanent	Seasonal		
(approx. ac.)	0	0		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	5	10	10
Dominant Species of Mature Trees	White oak, Shagbark hickory, Eastern red cedar		
% Trees w/ Exfoliating Bark	0	0	2
Size Composition of	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
Live Trees (%)	2	5	93
No. of Suitable Snags		2	

Standing dead trees with exfoliating bark, cracks, crevices, or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BAT? Yes

IS THE HABITAT SUITABLE FOR NORTHERN LONG-EARED BAT? Yes

Additional Comments:
Edge of forest. Some suitable roosting trees; open area for foraging

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): B5

Water Resources at Sample Site				
Stream Type	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources:
(# and length)	0	0	0	No water features
Pools/Ponds	0	Open and accessible to bats?		
(# and size)		NA		
Wetlands	Permanent	Seasonal		
(approx. ac.)	0	0		

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	15	5	60
Dominant Species of Mature Trees	Shagbark hickory, White oak, Pin oak, Black oak		
% Trees w/ Exfoliating Bark	0	0	2
Size Composition of	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
Live Trees (%)	5	15	80
No. of Suitable Snags		0	

Standing dead trees with exfoliating bark, cracks, crevices, or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS No

IS THE HABITAT SUITABLE FOR NORTHERN LONG-EARED BAT No

Additional Comments:
Greater than >1000ft to contiguous forest, no water sources, dense understory. Some large hickories with exfol bark but no cavities or crevices on trees

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area
A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): B6

Water Resources at Sample Site

Stream Type (# and length)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: 5' wide intermittent stream. No water at time of survey.
	0	1	0	
Pools/Ponds (# and size)	0	Open and accessible to bats?		
		Yes		
Wetlands (approx. ac.)	Permanent	Seasonal		
	0	0		

Forest Resources at Sample Site

Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	20	25	15
Dominant Species of Mature Trees	Black walnut, Shagbark hickory, Common hackberry, Pig nut hickory		
% Trees w/ Exfoliating Bark	0	2	2
Size Composition of Live Trees (%)	Small (3-8 in)	Med (9-15 in)	Large (>15 in)
	70	20	10
No. of Suitable Snags		0	

Standing dead trees with exfoliating bark, cracks, crevices, or hollows.
Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS Yes

IS THE HABITAT SUITABLE FOR NORTHERN LONG-EARED BA Yes

Additional Comments:
Marginal roosting; open understory and water feature for foraging

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

F

Appendix F – Site Photographs

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Aquatic Ecology

Streams

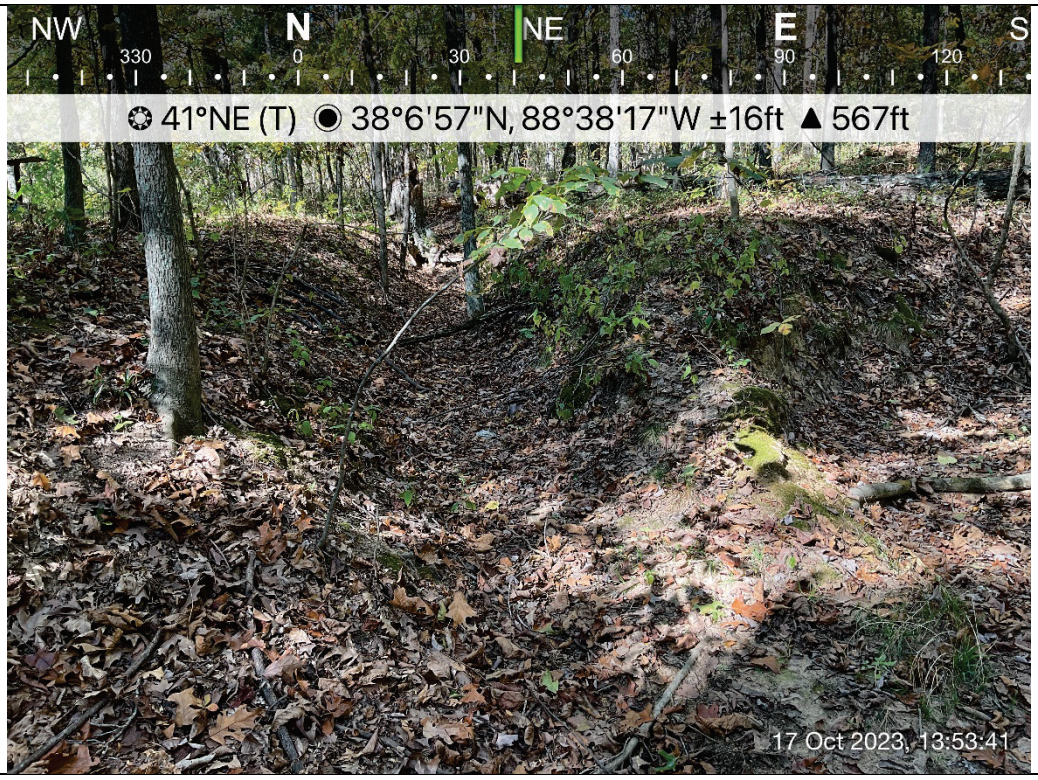

Photo 1- S001, Intermittent.

Photo 2- S002, Intermittent.

Photo 3- Culvert underneath railroad track, where E010 flows into S002.

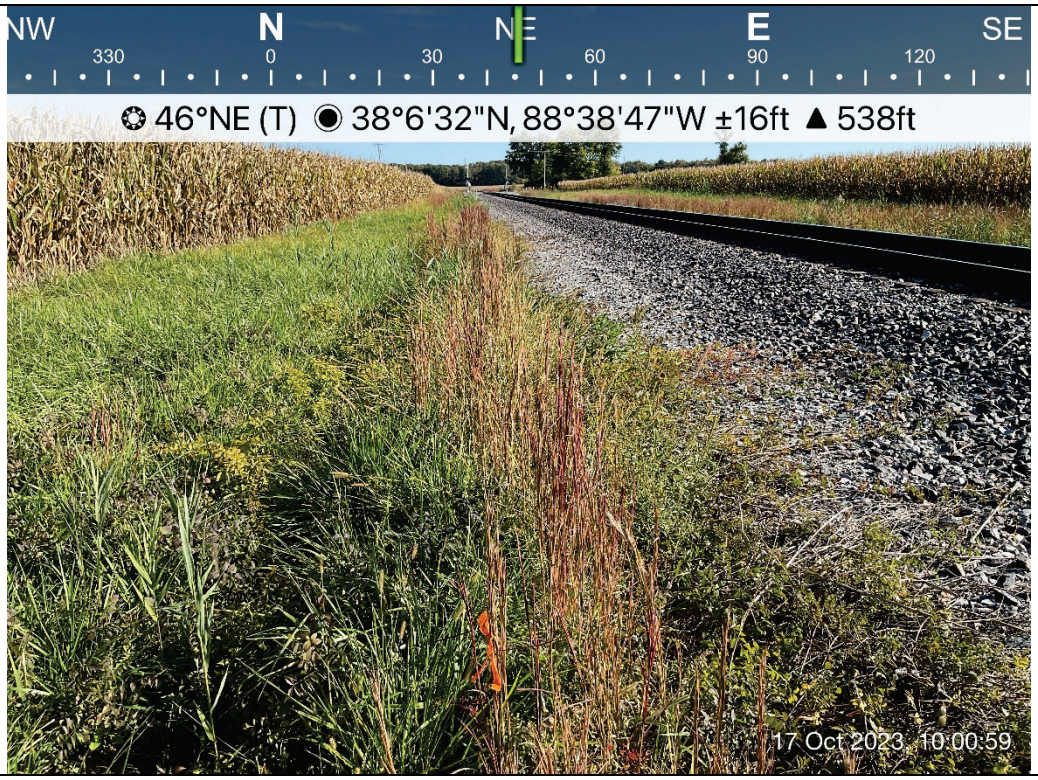

Photo 4- E001, Ephemeral.

Photo 5- E002, Ephemeral.

Photo 6- E003, Ephemeral.

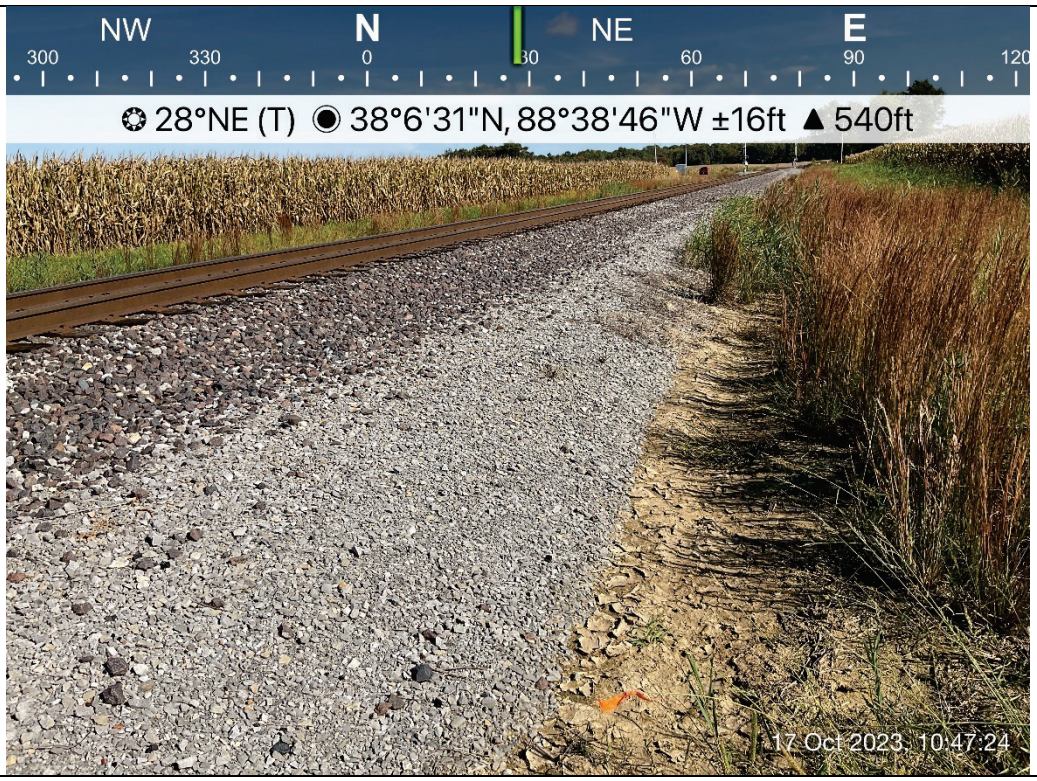

Photo 7- E004, Ephemeral. Photo facing towards the Study Area; taken outside boundary.

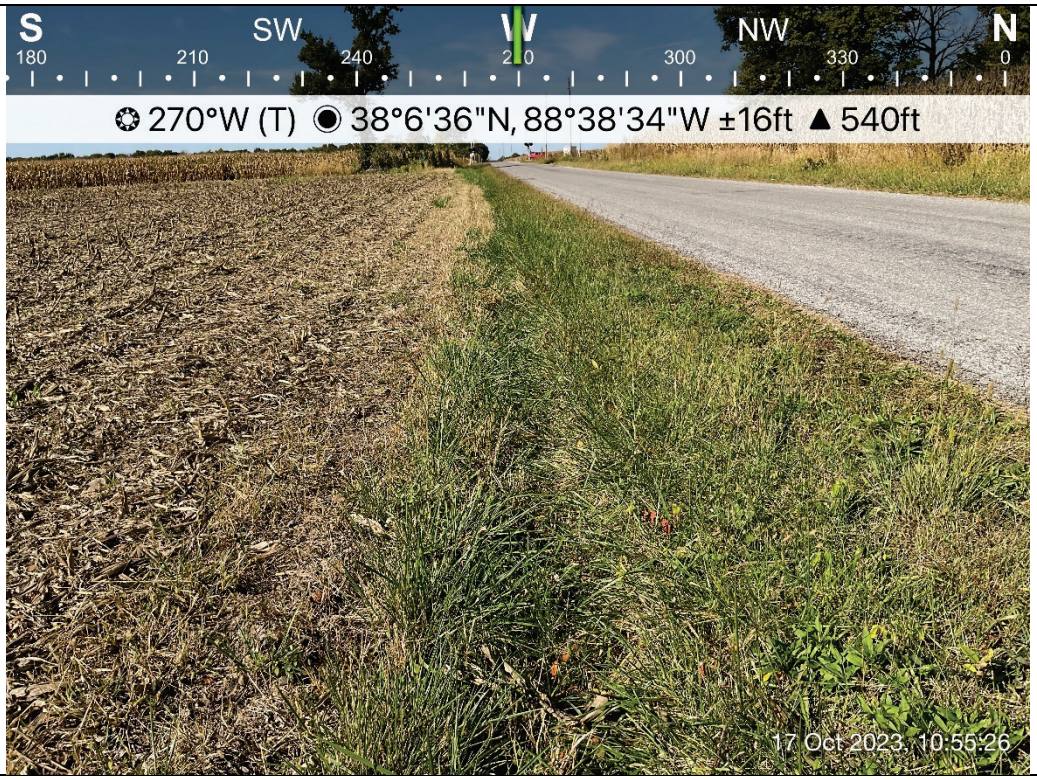

Photo 8- E005, Ephemeral. Photo facing towards the Study Area; taken outside boundary.

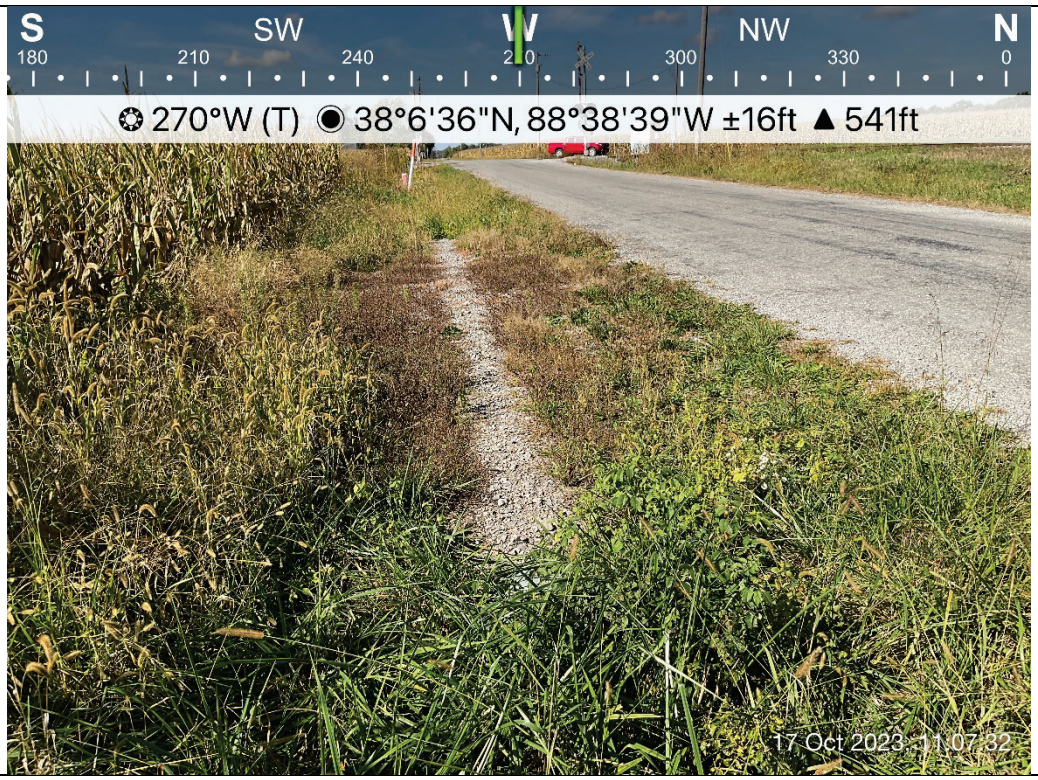

Photo 9- Culvert parallel to E005.

Photo 10- E006, Ephemeral. Photo facing towards the Study Area; taken outside boundary.

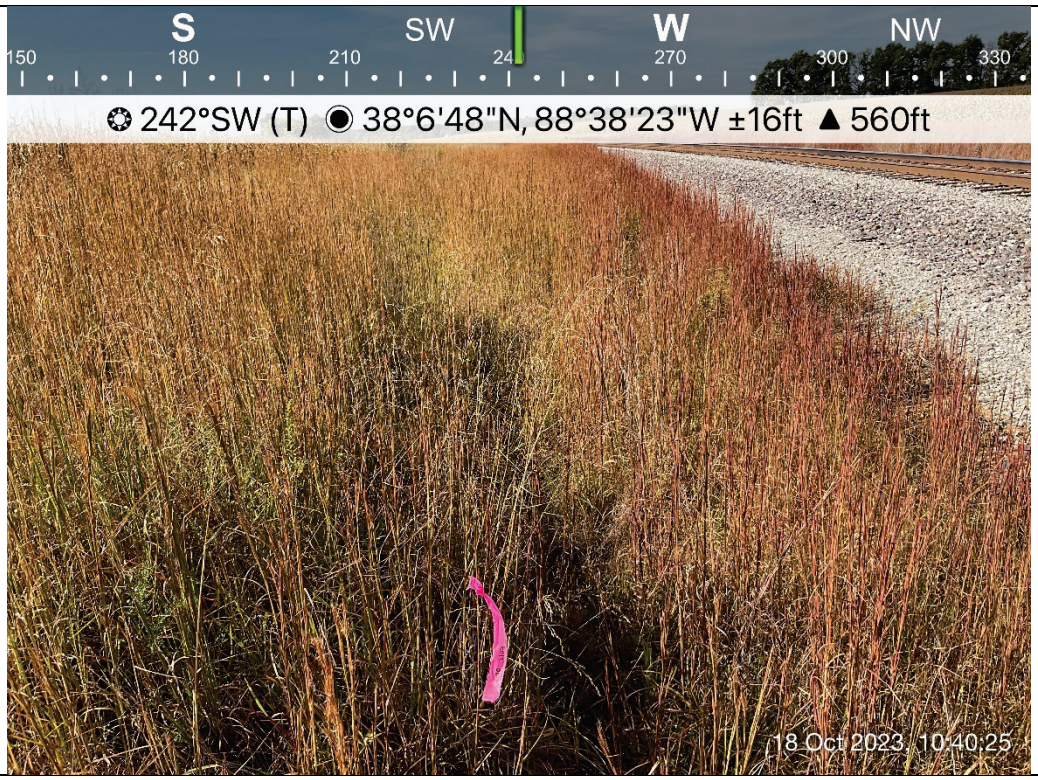

Photo 11- E007, Ephemeral.

Photo 12- E008, Wet weather conveyance.

4

Photo 13- E009, Wet weather conveyance.

Photo 14- E010, Ephemeral.

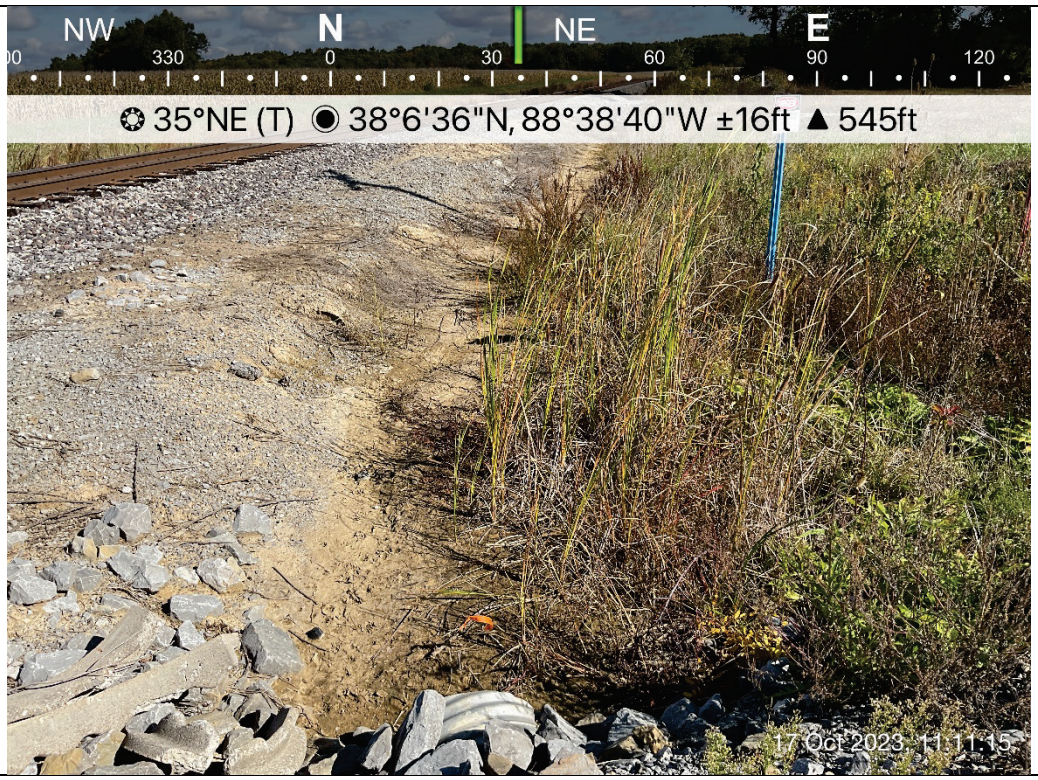

Photo 15- Culvert underneath railroad tracks at intersection with CR 350 East.

Photo 16- E011, Wet weather conveyance.

Photo 17- E012, Wet weather conveyance.

Photo 18- E013, Ephemeral.

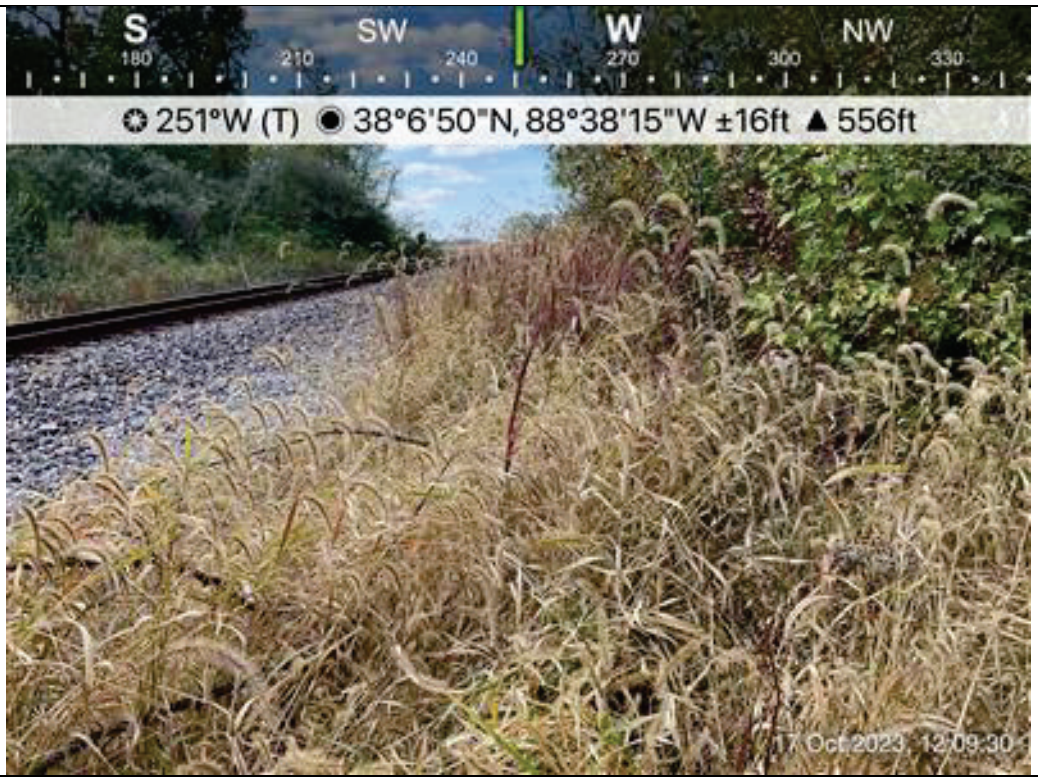

Photo 19- E014, Wet weather conveyance. Photo facing towards the Study Area; taken outside boundary.

Wetlands

Photo 20- W001, Forested, 0.050-acre, moderate quality.

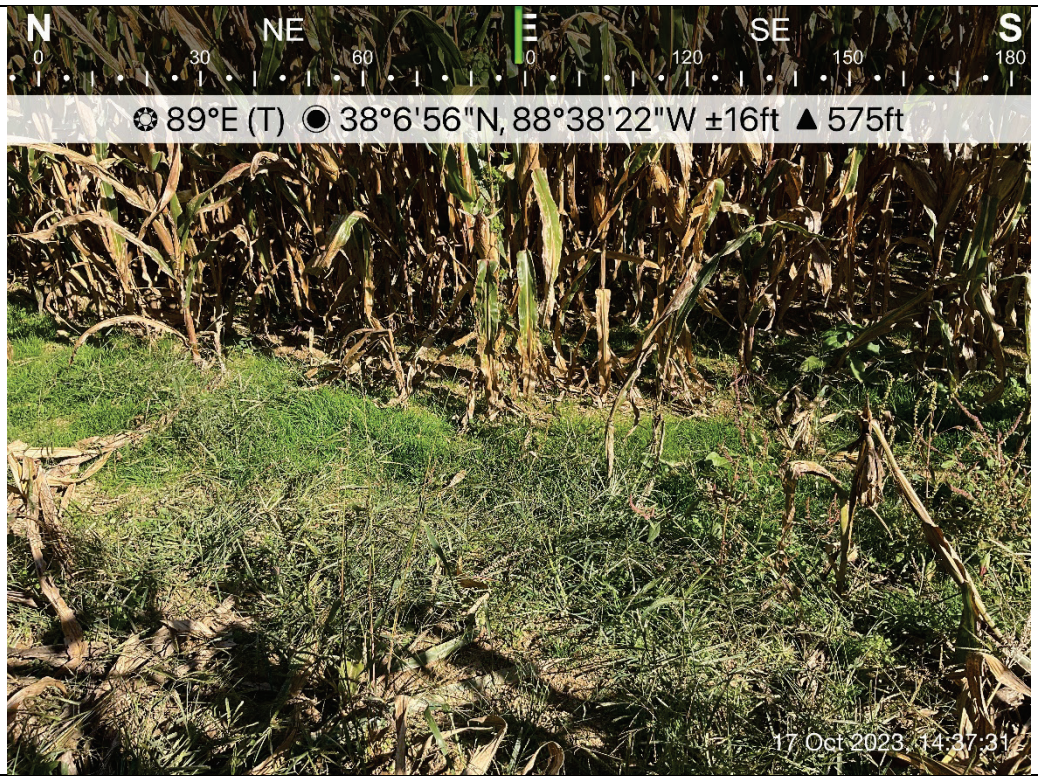

Photo 21- W002, Farmed emergent, 0.006-acre, low quality.

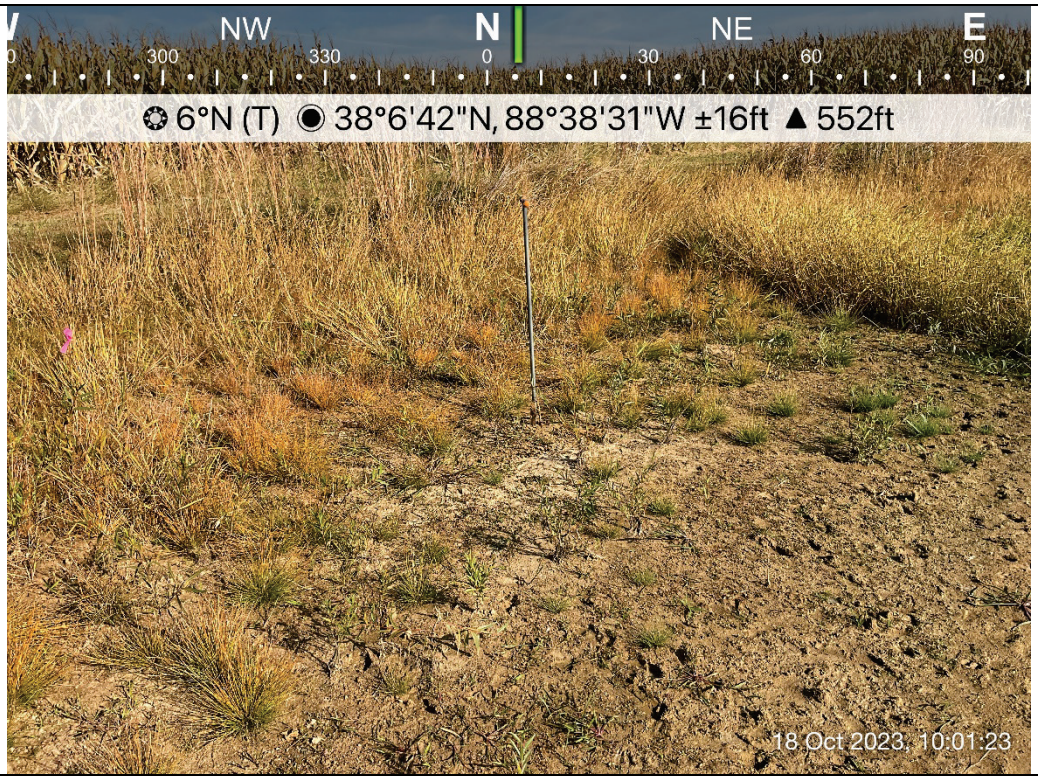

Photo 22- W003, Emergent, 0.146-acre, moderate quality.

Photo 23- P001, freshwater pond, impounded, 0.329 acre.

Terrestrial Ecology

Vegetation

Photo 24- Representative of crop field used for the cultivation of corn within Study Area.

Photo 25- Representative of herbaceous vegetation within Study Area.

Photo 26- Representative of deciduous forest within the Study Area.

Terrestrial Zoology

Photo 27-Bat Sample ID 1, moderate habitat quality.

Photo 28- Bat Sample ID 2, low habitat quality.

Photo 29- Bat Sample ID 3, high habitat quality.

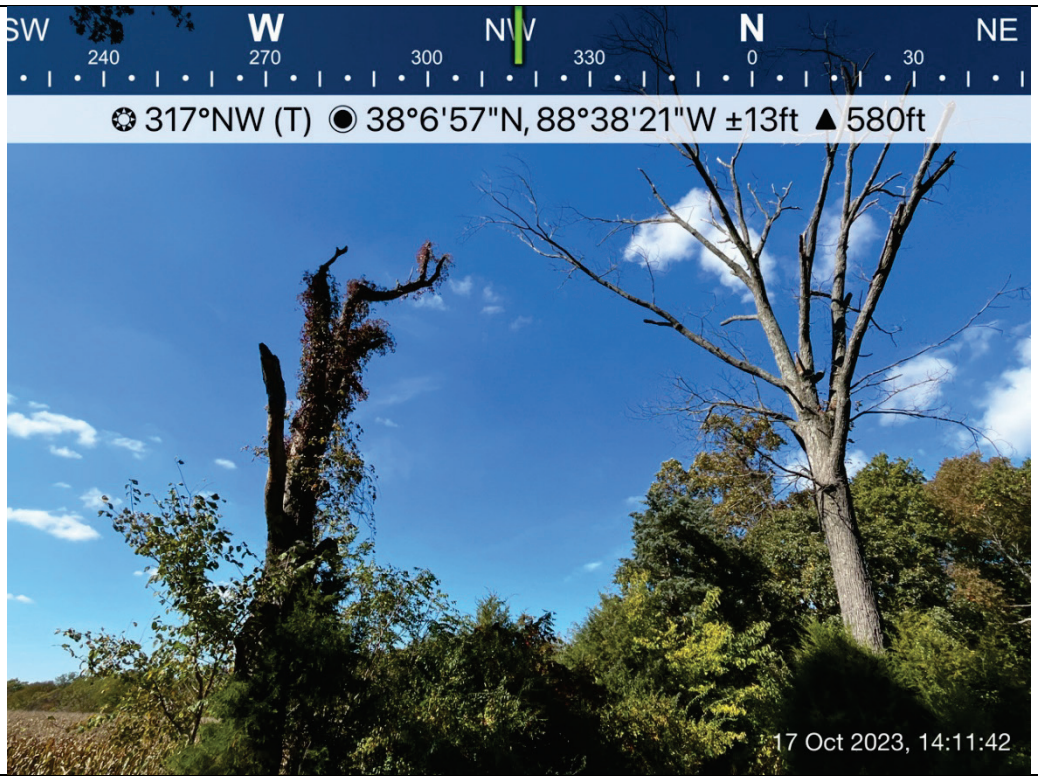

Photo 30- Bat Sample ID 4, moderate habitat quality.

3

Photo 31- Bat Sample ID 5, not suitable habitat.

Photo 32- Bat Sample ID 6, low habitat quality.

Photo 33- Representative photo of milkweed plants along disturbed roadside and railroad areas.

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440 S Church Street, Suite 1200
Charlotte, NC 28202-2075
704.338.6700

hdrinc.com

Appendix D – Cultural Resources Agency Coordination

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TENNESSEE VALLEY AUTHORITY

400 West Summit Hill Drive, Knoxville, Tennessee 37902

January 9, 2024

Ms. Carey Mayer
Deputy State Historic Preservation Officer
Illinois Department of Natural Resources
Attn: State Historic Preservation Office
One Natural Resources Way
Springfield, Illinois 62702

Dear Ms. Mayer:

TENNESSEE VALLEY AUTHORITY (TVA), APPLICATION FOR PROPOSED BLEEDER SHAFT, SUGAR CAMP ENERGY, LLC (SUGAR CAMP) MINE NO.1, SIGNIFICANT BOUNDARY REVISION NO. 8 – CULTURAL RESOURCES SURVEY (TVA TRACKING NO. CRMS 32276060734) (38.11210, -88.64401)

Introduction
TVA is currently reviewing the plan of Sugar Camp to construct and operate a bleeder shaft facility on a 91-acre tract in Hamilton County, Illinois as part of Sugar Camp's Significant Boundary Revision No. 8 mine expansion project. Sugar Camp leases coal reserves from TVA for mining purposes. Construction of the bleeder shaft facility would be part of a larger undertaking, for which TVA has consulted previously with your office pursuant to Section 106 of the National Historic Preservation Act. TVA is reopening consultation with your office and federally recognized Indian tribes to re-determine the undertaking's area of potential effects (APE) and present the findings of a recent cultural resources survey in the new APE portion.

Background
TVA in 2002 leased its Illinois Basin coal reserves to Sugar Camp under the condition that any proposed mining plan must be subject to environmental review and TVA approval. Since that time TVA has consulted with your office and federally recognized Indian tribes regarding proposed mine expansions and installation of bleeder shafts for the Sugar Camp Mine. In 2020 TVA issued a record of decision (ROD) for the Sugar Camp energy, LLC Mine No. 1 Boundary Revision 6 Final Environmental Impact Statement (FEIS) (Federal Register 85(228):75395-75397). The FEIS noted that certain site-specific information was unknown at the time, pending final mine component design, including the locations of bleeder shaft facilities. The ROD stipulated that TVA would, as required by Section 106, complete appropriate consultations with the pertinent federal and state agencies to ensure impacts associated with the Bleeder Shaft Facilities to cultural resources are avoided, minimized, or mitigated, once locations for the bleeder shaft facilities were determined. TVA notified you and the consulted Tribes of our intent to proceed under phases as provided under 36 CFR § 800.4(b)(2) and § 800.5(c)(1), and to conduct a phase I cultural resources survey and provide a report to your office for consultation once the locations of the bleeder shafts and associated infrastructure were identified.

Project description
On January 4, 2023, Sugar Camp submitted Permit 382 Significant Boundary Revision 8 application to the Illinois DNR for an expansion of its underground longwall mining operation at Sugar Camp Mine No. 1 (Significant Boundary Revision No. 8). The proposed expansion encompasses an approximately 22,414-acre shadow area which includes approximately 21,868 acres of coal reserves owned by TVA. Under this proposal, Sugar Camp would be allowed to extract approximately 122 million raw tons of TVA-owned coal over a 25-year period. Underground mining would be performed using room and pillar and continuous mining techniques during a development period, followed by longwall mining and associated planned subsidence (controlled settlement of the ground surface). Sugar Camp would also construct approximately six bleeder ventilation shafts and install associated utilities needed to operate the bleeder shafts within the project area. The current phase of the project includes the first of those bleeder shafts on a 91-acre tract within the shadow area.

Construction would include the augering or drilling of various boreholes; excavation of a dewatering pit surrounded by an earthen berm; construction of concrete pads for the bleeder shaft and a transformer; stockpiling of excavation spoils and bore hole cuttings; and various other construction activities. The project has potential for physical effects on archaeological sites and visual effects on historic architectural properties, if any are present in the APE. TVA recommends expanding the undertaking's APE to include the approximately 91-acre bleeder shaft area ("footprint") as well as areas within one-half mile of the bleeder shaft from which the new facilities would be visible ("viewshed").

Surveys
HDR completed an archaeological survey of the project footprint and a survey of historic architectural properties within the viewshed, under contract with TVA. The reports are attached as part of this consultation package. Copies also may be downloaded.

The archaeological survey revisited previously recorded Site 11H141 but did not identify any artifacts or features at the site location. The survey newly identified 11H186, which consists of a low-density historic artifact scatter with little data potential. HDR recommends that both sites are ineligible for inclusion in the National Register of Historic Places (NRHP), and TVA agrees.

The historic architectural survey inventoried six historic-age architectural resources in the APE. HDR recommends that all six are ineligible for the NRHP due to a lack of significance. TVA agrees with this recommendation.

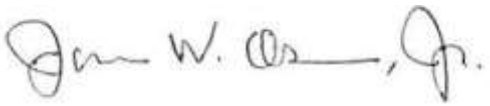
Finding
TVA has reviewed the reports and agrees with the findings and recommendations. Based on these surveys, TVA finds that no historic properties are located in the area that would be affected by the proposed bleeder shaft facility. TVA finds that construction of the proposed bleeder shaft facility would result in no effects on historic properties. TVA will continue to consult with your office regarding additional bleeder shaft locations that Sugar Camp may propose in future.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP.

Pursuant to 36 CFR Part 800.4(d)(1) we are notifying you of TVA's finding of no historic properties affected, providing the documentation specified in § 800.11(d); and inviting you to review the finding. Also, we are seeking your agreement with TVA's eligibility determinations and finding that the undertaking as currently planned will have no effects on historic properties.

Please contact Steve Cole by email, sccole0@tva.gov with your comments.

Sincerely,



James W. Osborne, Jr.
Manager
Cultural Compliance

SCC:ERB
Enclosures

Illinois Department of Natural Resources

JB Pritzker, Governor • Natalie Phelps Finnie, Director
One Natural Resources Way • Springfield, Illinois 62702-1271
www.dnr.illinois.gov

Hamilton County
McLeansboro
CR 1400 N & CR 300 E
Sections:3,10-Township:5S-Range:5E
Ineligible Sites: 11H141, 11H186
TVA-CRMS 32276060734
Mine No.1 Bleeder Shaft- Sugar Camp Energy

PLEASE REFER TO: SHPO LOG #024010924

February 16, 2024

Steve Cole
Tennessee Valley Authority
400 W. Summit Hill Dr.
Knoxville, TN 37902

We have reviewed the documentation submitted for the referenced project in accordance with 36 CFR Part 800.4. Based upon the information provided, no historic properties are affected. We, therefore, have no objection to the undertaking proceeding as planned.

Please retain this letter in your files as evidence of compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. This clearance remains in effect for two (2) years from date of issuance. It does not pertain to any discovery during construction, nor is it a clearance for purposes of the Illinois Human Remains Protection Act (20 ILCS 3440).

If you are an applicant, please submit a copy of this letter to the state or federal agency from which you obtain any permit, license, grant, or other assistance. If further assistance is needed contact Jeff Kruchten, Principal Archaeologist, at 217/785-1279 or jeff.kruchten@illinois.gov.

Sincerely,

Carey L. Mayer

Carey L. Mayer, AIA
Deputy State Historic
Preservation Officer